3D virtual learning environment for 9th grade Earth Sciences education

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Outline

- Introduction
- Literature review
- System Development
- Conclusion
Introduction

- Emerging technologies
- Education
  - Traditional ➔ Digital
- DGBL (Digital Game-based Learning)
- 3D virtual environment
Literature review

- Definition and characteristics of game
  - Csikszentmihalyi (1975) - Flow theory
  - Malone & Lepper (1987) - Gaming motivation
- Game-based Learning
  - Kerschensteiner (1965) happy learning environment
  - Vygotsky (1978) abstract thinking
Digital game-based learning features
- Prensky (2007) - Six key points
  - Rule
  - Goal or Object
  - Outcome and Feedback
  - Conflict, Competition and Challenge
  - Interaction
  - Representation and story
Application of 2D Digital Game-based Learning

- Papastergiou (2009)
- Subject
  - Computer Science
- Result
  - Increase interests
- Subject
  - Computer Science
- Result
  - Increase learning effect
Application of 3D Digital Game-based Learning

- Angela, Meixun, Hiller & James (2011)

Subject
- Science

Result
- The learning effect is better than using 2D environment
Purpose of study

- Make the earth science digital teaching material
- Solving the problem of global pollution
- Training students logic thinking skill
System Development

- Software
  - Unity3D
  - 3DsMAX
  - Adobe Photoshop CS6
  - MonoDevelop
  - Maya2012
## Hardware

<table>
<thead>
<tr>
<th></th>
<th>Notebook</th>
<th>PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Core i7</td>
<td>Intel Xeon E3-1230</td>
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<tr>
<td>VGA</td>
<td>Nvidia GeForce GT630M</td>
<td>Nvidia Quadro K600</td>
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<tr>
<td>RAM</td>
<td>8G</td>
<td>4G</td>
</tr>
<tr>
<td>OS</td>
<td>Windows 7</td>
<td>Windows 7</td>
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</tbody>
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System Architecture
Prototype
Conclusion

- More experiments
- Evaluate the learning effect of this system
Thank you for listening