



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

Wen Shuang Chiou

Department of Computer and Communication Engineering, Ming Chuan
University

Outline

- Introduction
- literature review
- System Development
- Conclusion

Introduction

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

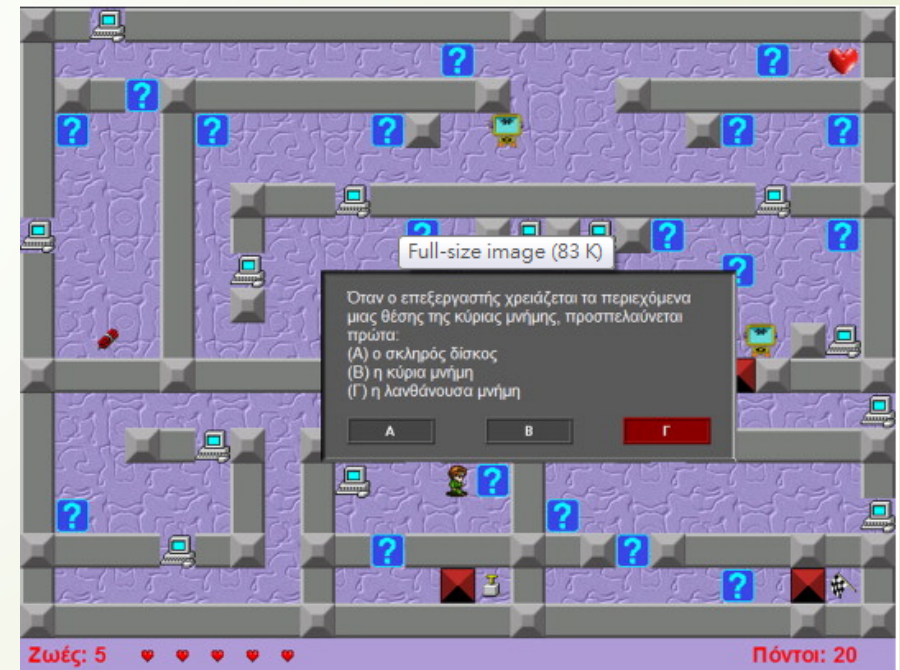
Literature review

- 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



- Natvig&Line(2004)
- 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

	Notebook	PC
CPU	Intel Core i7	Intel Xeon E3-1230
VGA	Nvidia GeForce GT630M	Nvidia Quadro K600
RAM	8G	4G
OS	Windows 7	Windows 7

System Architecture

Prototype



Conclusion

- More experiments
- Evaluate the learning effect of this system

Thank you for listening