


# 1<sup>st</sup> National Conference on System of Rice Intensification (SRI) for Sustainable Rice Security and Heritage



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Peranan IT dalam penyebaran SRI



(The Role of IT in Disseminate SRI Information:  
Case in Design Strategies using VR and  
Persuasive Technology)

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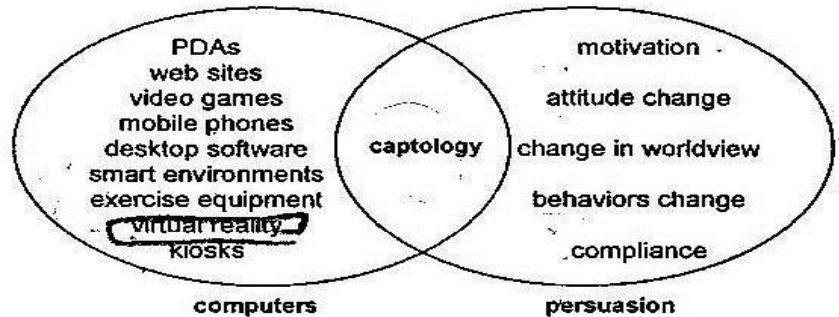
# Outline

- Introduction
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# Introduction

- Sustainability in agriculture refers to the farm's ability to maintain production and giving benefits based on maintaining nature and environment, accelerates the social growth, stabilize the economy and being commercially good competitor in the fast changing environment (Ismail, 2006).
- Malaysia aims to transform its current agricultural activities into advanced, innovative and sustainable practices. However, this is not an easy task because there are basic problems that the farmers encounter especially with regards to their understanding of the sustainable practice principle and that of organic planting.
- Thus, as a solution, introducing awareness in sustainable agricultural practices through information and communications technology (ICT) is a viable alternative to increase the knowledge of sustainable plantation. .

# Introduction



- **Captology:** the study of computer as persuasive technologies. This includes the design, research, and analysis of interactive computing products created for the purpose of changing people's attitudes or behaviors (Fogg, 2003)
- **Persuasive:** an attempt to shape, reinforce or change behaviors, feelings, or thoughts about an issue, object or action.

# Introduction

- **Virtual reality (VR)** as a way for humans to visualize, manipulate and interact with computers and extremely complex data (Isdale, 1993).
- **Virtual reality:** (VR) is a technology which allows a user to interact with a computer-simulated environment, be it a real or imagined one.

# Introduction

- **Virtual reality (VR):** It mean VR using computer technology to create a simulated, three-dimensional world that a user can manipulate and explore while feeling as if he were in that world.
- The simulated environment can be similar to the real world, for example, simulations for pilot or combat training, and so on.

# Motivation

- According to the National Green Technology Policy Malaysia, **effective promotion and public awareness** are two of the main factors that would affect the success of sustainable development through the Green Technology agenda.
- The public awareness is general lacking in sustainable agriculture in paddy practices.
- **This research focus is to promote sustainable awareness through learning environment.**

# Literature

- As new information medium of 21st century, virtual reality (VR) will replace the majority of passive entertainment activities like reading books, watching movies and listening to the music. In fact all of them will be unified in one big virtually multimedia system.
- VR also is the best among printed media and video/film for its immersive, interactivity and information intensity (Barnett & Shih, 1999). It will solve the problem how to get the realistic view at an affordable price and at the right time easily.



Jadual 2.2: Perbandingan Media Cetak, Filem atau Video dan VR

Jenis Media	<i>Immersive</i>	Interaksi	Intensiti Maklumat
Bahan Cetak	Pengguna menafsir simbol kepada sesuatu yang boleh memberi makna, bukannya melalui pengalaman.	Membaca secara asas adalah suatu pengalaman fizikal yang pasif. Kesan tindak balas di antara media dengan pengguna semasa berinteraksi tidak termasuk dalam fikiran pembaca itu.	Jumlah maklumat yang terdapat daripada media cetak sangat banyak. Jenis penyampaian maklumat adalah secara simbolik dan perlu ditafsir oleh pengguna.
Filem/Video	Lebih mudah difahami daripada membaca. Pengalaman ini masih jauh untuk menyamai pengalaman sebenar. Pengguna menafsir imej yang dilihat kepada sesuatu yang boleh memberi makna.	Video dan filem juga sebahagian daripada pengalaman pasif. Peranan pemerhati tidak melibatkan penukaran pengalaman yang sama kepada pengguna lain.	Jenis maklumat yang disampaikan melalui video atau filem lebih berkesan daripada cetakan. Ia juga mengandungi maklumat simbolik dan paparan yang mesti ditafsirkan oleh pemerhati berdasarkan pengetahuannya.
VR	VR merupakan percubaan memberi kesan <i>immersive</i> kepada pengguna. Mereka dirangsang mencipta suatu pengalaman yang hampir menyerupai pengalaman sebenar.	Pengalaman maya menyediakan banyak interaksi kepada pengguna. Ianya merupakan tindak balas terus kepada setiap perbuatan dalam dunia maya. Pengguna juga berkebolehan untuk mengesan keadaan sebenar dalam dunia maya sama seperti pengguna lain.	Maklumat didapati melalui pengalaman sendiri dalam dunia maya. Pengguna tidak perlu menafsirkan simbol atau paparan. Lebih senang difahami dan berkesan kerana pengguna berasa berada dalam dunia nyata.

Sumber: Barnett & Shih (1998); Pimentel & Teixeira (1993)

# Literature

- The potential of VR technology for supporting education is widely recognized.
- Many researchers such as Youngblut (1998); O'Connor (2004); Kuo *et al.* (2004); Ha and Woo (2006) and Oka and Yamauchi (2006) found that virtual reality offers many benefits that can support learning.
- Some of the benefits include the meaningful learning, easy and better understanding of the learning contents.

# Literature

Deria Manusia yang Menyokong Maklumat ke Otak

## **DERIA PERATUS**

- Penglihatan mata 70%
- Dengar 20%
- Bau 5%
- Sentuh 4%
- Rasa 1%
- Sumber: Mazuryk & Gervautz , (1996: 15)

# Literature

- There are several successful implementations ICT in paddy plantation as follows such International Rice Research Institute (IRRI). IRRI was established in 1960. IRRI is the oldest and largest international agricultural research institute in Asia.
- Since 2000, IRRI use ICT application to disseminate information about their research (International Rice Research Institute, 2008; Bell, 2003).
- According Zavaleta *et al.*, (2005) game can be considered as an important educational strategy that allows the cognitive emotional, linguistic, social, moral and motor development, as well as make each player more autonomous, critic, creative responsible and cooperative.

# Question?

- How about SRI?
  - Internet
  - Online forum
- Advantages
  - Widely, freely, 24 hours operation

# Literature

- **Blogs and Websites**

- <http://sri.ciifad.cornell.edu/countries/malaysia/index.html>

- <http://pertanianselangor.wordpress.com/>

- <http://sripadiukm.blogspot.com/>

- Taharim, Noorazimah. 2010. [Weblog Padi Selangor - Pertanian Selangor](#). [Malaysian language blog primarily about SRI rice projects in Sabak Bernam, Selangor and Tunjong, Kelantan, Malaysia. See Noorazimah Taharim's [videos](#) below]
- [Padi SRI Selangor](#) FaceBook page
- Lee, Victor. 2010. [System of Rice Intensification](#). *Agroecologic* website.  
<http://www.agroecologic.com/sriagroecology/srisri2.html>
- Isahak, Anizan. 2009. [SRI-PADI / SRI Group](#). [Blog of a multidisciplinary research group at UKM called SRI-PADI which was created by Dr. Anizan Isahak at the National University of Malaysia]

# Literature

- According Ninomiya (2006), Japan uses ICT more for collecting and disseminating information like grid computing technology, decision support system, mobile phone with internet connection, knowledge based system and so on (Ninomiya, 2006).
- The following are key points in making information technology successful for agriculture (Ninomiya: 2006).
  - Project management policy
  - Utilization of distributed resources
  - Standardized interface
  - Efficient and low cost field data acquisition
  - Useful and attractive client applications
  - Case-based knowledge management
  - Evaluation with end users
  - Venture Incubation & commercialization
  - International activities

# Literature

## **Sustainable Agriculture in Virtual Reality Games application (Example project)**

### **a. SimFarm, Harvest Moon and Plant Tycoon.**

- SimFarm is SimCity's country cousin programme. While the SimFarm provides the same kind of building and planning atmosphere of SimCity, much of the player's time is spent in micromanaging crops. SimFarm consists of descriptions of all the animals, buildings, vehicles and chemicals in the games. In addition to SimFarm, the agricultural games can also be found in Harvest Moon from Nintendo and Plant Tycoon.

### **b. VIRTU@LIS**

- VIRTU@LIS, funded under the IST Programme, explored the potential of new digital and multimedia technologies to increase awareness of environmental management and risks in four domains - agricultural pollution, climate change, freshwater resources and fisheries.  
The prototype enables visitors to learn about how their lifestyle and behaviour affects the environment.



# Literature

## **c. VGAS**

- VGAS was developed under the VIRTU@LIS project. VGAS is a computer game that consists of a set of models that relate lifestyles to emissions of three greenhouse gases, carbon dioxide, methane and nitrous oxide. It is designed on virtual reality concepts and was customized for five countries: England, France, Italy, Portugal and Spain.

## **d. Ecological Farmland Navigating System.**

- To help Council of Agriculture, Taiwan (COA), promote the importance of farmland conservation, and to help elementary education authorities on basic agricultural, ecological education, in this study, a 3-D virtual environment is developed to demonstrate the virtual farmland theme and associated temporal and spatial data and information.

## **e. Garden Alive**

- The Garden Alive aims to provide both entertainment and education.

# Research Methodology

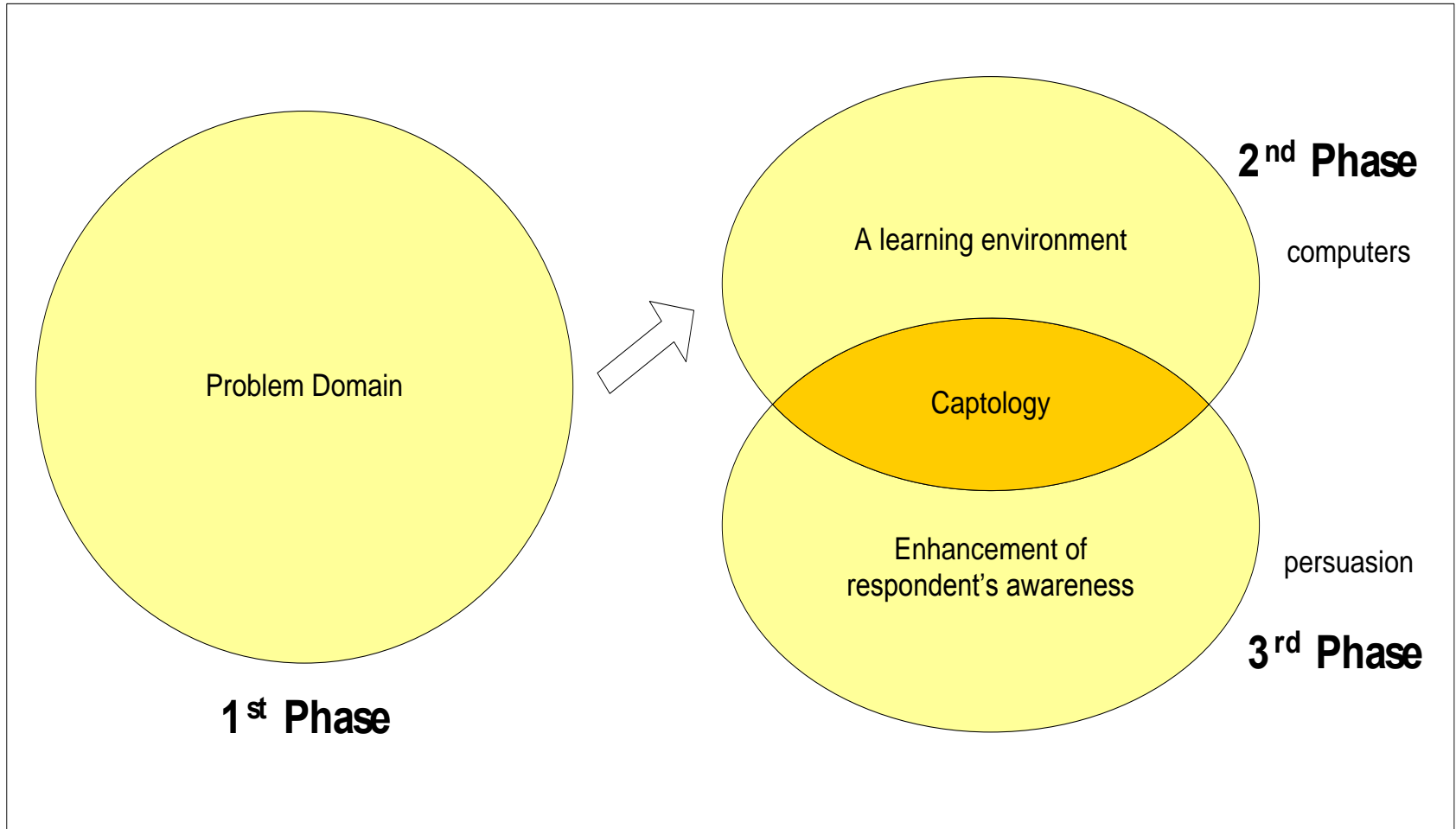
- This research employed a qualitative research design using observation and interview approach.
- The respondents are farmer, researcher and agriculture officer.

# Research Methodology

This study involved three research phases:

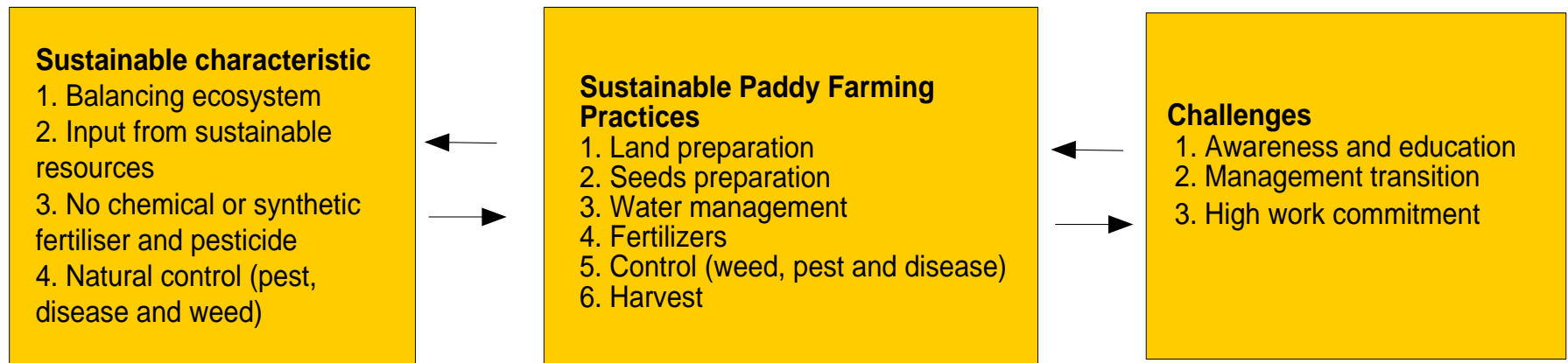
- Research Phase 1: understand and identification
  - Understand the problem domain
- Research Phase 2: designing and develop
  - Suggestion solution
- Research Phase 3 : evaluate

# Generic model of the study



# Research Methodology

1. Understanding the problem domain: visit to paddy field and interview with relevant personal



Model of Sustainable Paddy Farming Practices

# Research Methodology

## 2. Suggestion solution

### A Persuasive learning environment

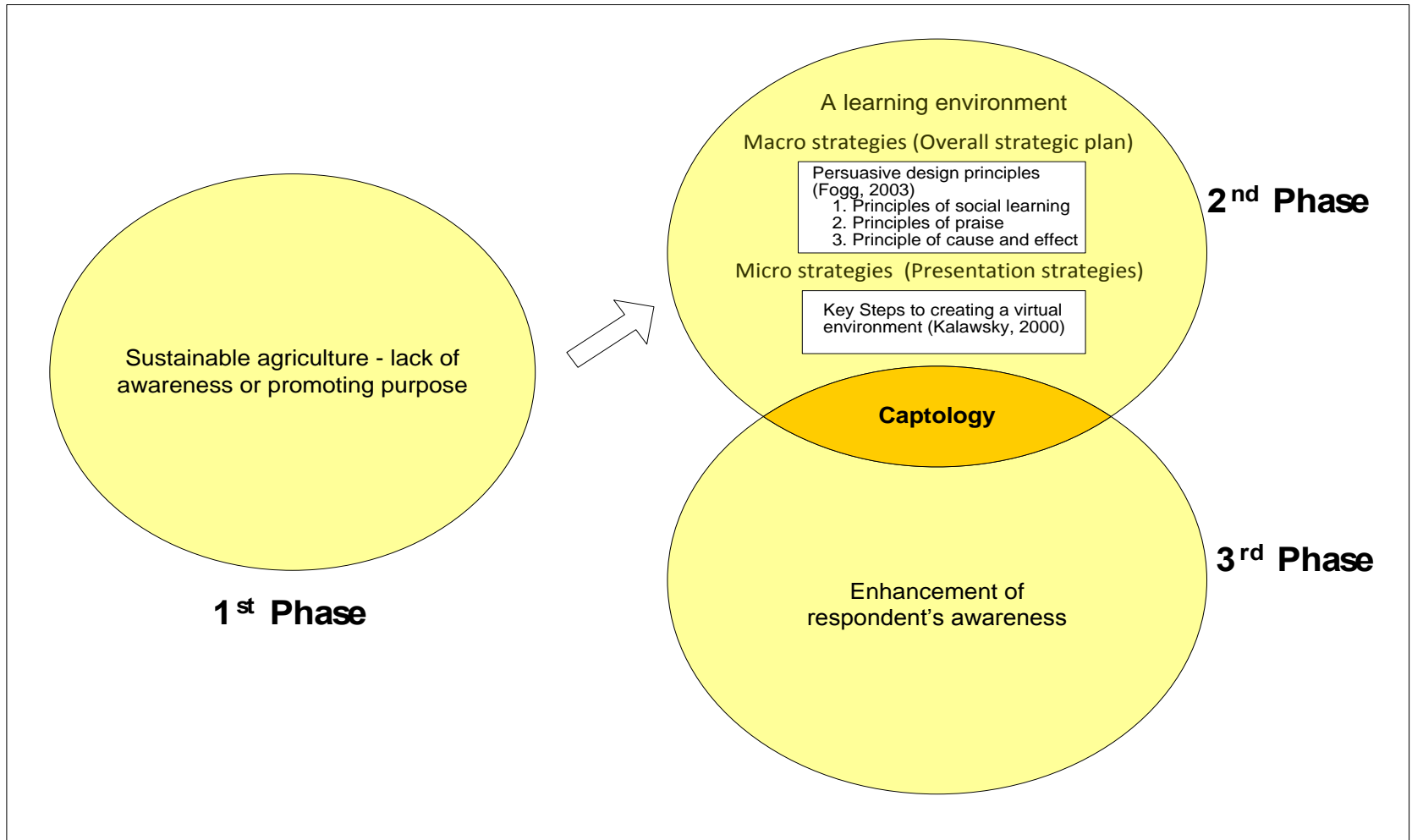
Prototype (Model for design and development, Alissi and Trollip, 2001)

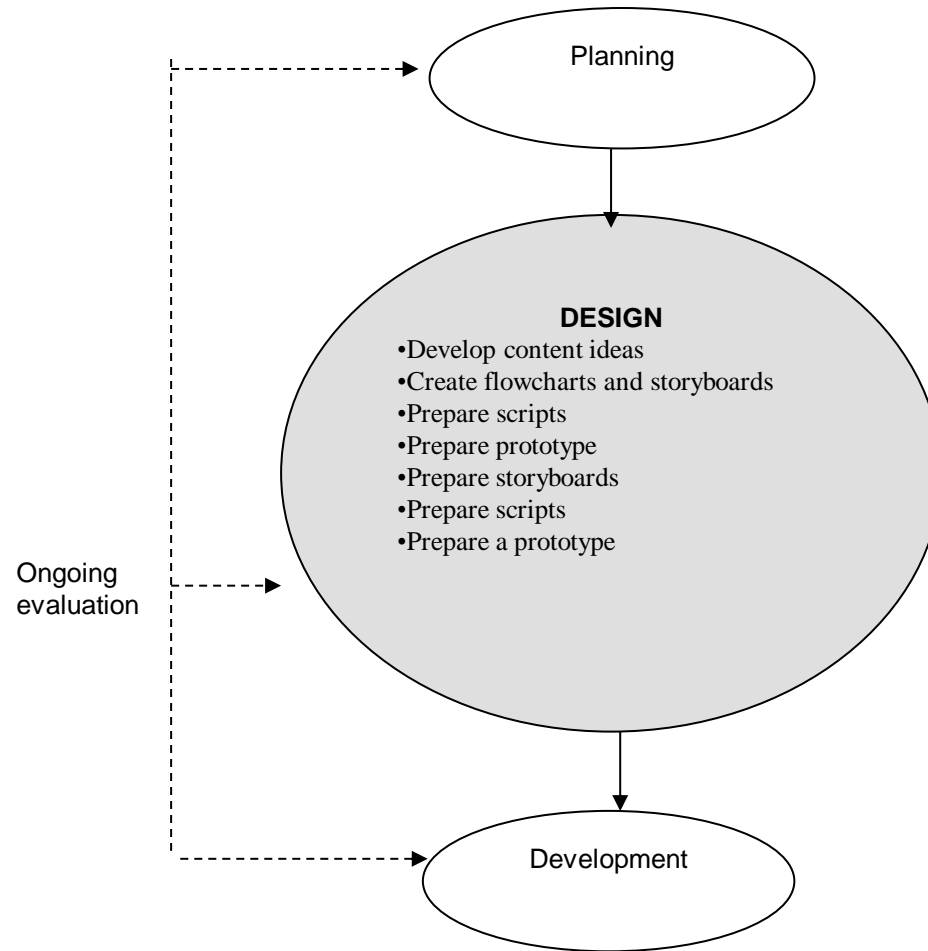
The prototype design focused on basic **SRI organic practices information. This includes the virtual environment and games development.** [Prototype](#)

## 3. Evaluating such solution

user test at lab experiment, interview University Putra Malaysia student

# Specific model of the study





Prototype design and development  
(Alessi and Trollip,2001)



## Key Steps to Creating a Virtual Environment

Key Step	Sub-Task
<b>1. Scene Definition</b>	3D Object definition Model accuracy/detail – could involve specification of different levels of detail Material definitions Description of textures to be applied to models Definition of preferred performance trade-offs (e.g. High polygon count versus low polygon count and texture mapping) Scene lighting description Definition of environmental effects Definition of interaction between individual objects (user initiated behaviour or autonomous behaviour)
<b>2. Object Modelling</b>	Geometric modelling – may involve creating models with different levels of detail Material application Texture map application
<b>3. Optional Database Conversion</b>	Object scaling Polygon flipping Polygon reduction
<b>4. Virtual Environment Authoring</b>	Scene building (placing of objects in the environment) Integration of level of detail models Lighting implementation Autonomous behaviour implementation User initiated behaviour implementation Inverse kinematics linking Integration with other modalities (e.g. audio properties)
<b>5. Testing/Debugging</b>	Performance testing Optimisation User interface testing

Source: Kalawsky, 2001; p: 83.

# Result

This research produce two major outcomes:

1. The identification of sustainable paddy practice based on organic practices in selected area in West Malaysia;
2. and the design strategies and the instructional development model that guide its design and development.

# Result

- The sample of the evaluation study is limited to the Biology, Engineering and Agriculture Department student, Faculty of Engineering in University Putra Malaysia.
- University students have the value potential to be respondents as the students will at the end graduate in the agriculture and technology sector.
- A lab experiment is limited to measure the awareness level (knowledge and understanding) of sustainable practice of prototype during pre-test and post-test experiment. This study also is limited to measure the user satisfactory.

# Result

- At the beginning of the survey in Part 1 questionnaire, it was found that 32% of the 50 respondents were not aware of organic practices as being part and parcel of sustainable agriculture. However, after the respondents had used this prototype, 90% of them agreed that organic practices are a part of sustainable agriculture.
- Similarly, information from respondents (18) in lab experiment 2 (focus groups), only one respondent was not sure about organic practices after using the system. In conclusion, Sipadi proven as a learning tool to provide information and concepts of sustainable and organic.
- The results at lab experiment 1 also indicated that 94% of the respondents agreed that this system provided more understanding in organic paddy farming practices.

# Result

For the descriptive user interface satisfaction analysis, the lab experiment results shown at table 1 reveal that the highest item stands at a mean of 4.40 and the lowest mean is overall system capabilities.

Table 1: Mean of User Interface Satisfaction

<b>Dimension</b>	<b>Mean (Scale 5)</b>
Overall Reaction to the Software	4.25
Screen	4.40
Terminology and Sytem Information	4.27
Learning	4.35
System capabilites	4.16

# Conclusion

- In correspondence to the ICT era, technology is an important and effective medium in displaying information that is more realistic, interesting, accurate, fast and extensive.
- As an example, the Sustainable Paddy Planting System (SiPadi) is designed to be a persuasive learning tool in virtual paddy plantation to promote SRI among young generation.
- This system adapts virtual reality technology and persuasive technology.

# Conclusion

- Strategies - ICT as a alternative tool to promote young generation (using Persuasive + entertainment + enjoy)
- In this study, it has been shown that the learning environment prototype can be used to educate and promote sustainable practices to the public.
- However, other factors such as interactive and cooperation between farmer; government, research institution; and the role of the policy-maker are important factors in achieving sustainable agriculture (Murad *et al*, 2008; Sharghi *et al*, 2010).

Thanks

Sharing is caring

Any suggestion/comment

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