Severe accident at the Sprintfield Nuclear Power Plant

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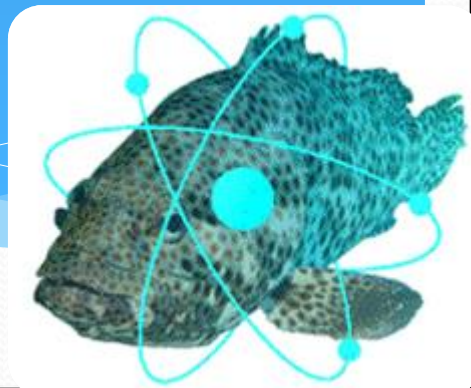


Context

- ISIB - Master level
  - Nuclear Engineering

Nuclear Power Plant
- Neutron module
- Thermal-hydraulic module
- Safety module

Safety studies
Major accidents (Chernobyl, TMI, Fukushima)

Context

- ISIB - Master level
  - Major accidents
    - Technical data
    - Chronological accident progression
    - A posteriori analysis
    - « Why did operators not understand what was happening ? »
    - « Why did they (not) perform this action ? »
    - « Why did they make this mistake ? »

Context

MINES Nantes

ISIB Bruxelles

French University

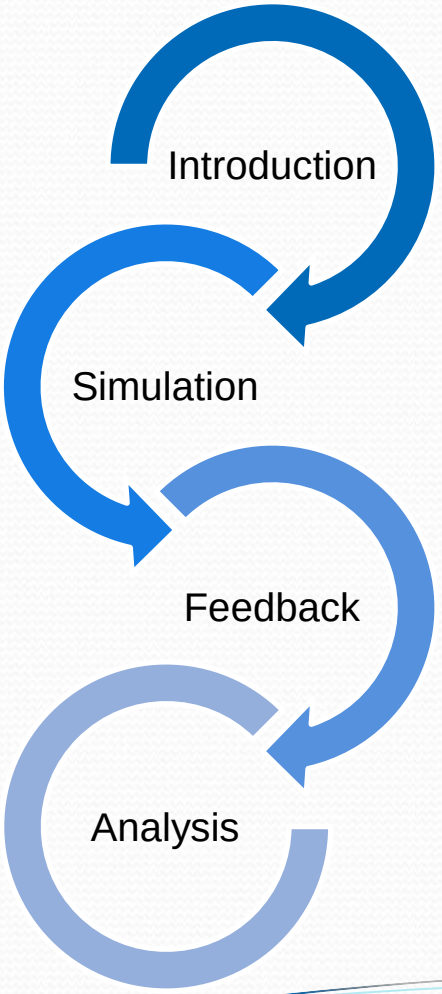
Human Sciences
Social Sciences

Sprintfield
Power Plant

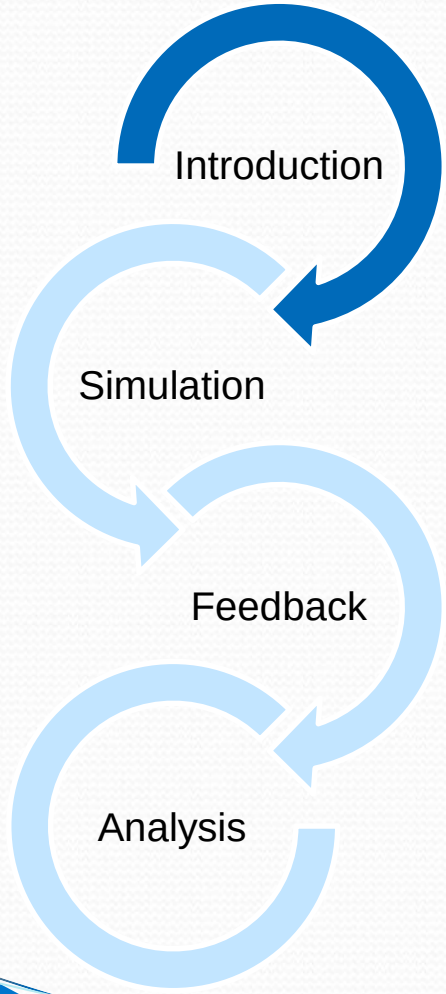
Game's description

- Serious game ?
  - What is it ?
    - A role playing game
    - Not only for fun
  - Why ?
    - Living method
    - Live and not hear
    - Active attitude in the learning (to improve the knowledge acquisition)

Game's description



Game's description



Context description (by teachers)
nuclear power plant
night shift
hand over to the day shift

(nearly) random teams and roles

Documentation reading

Game's description

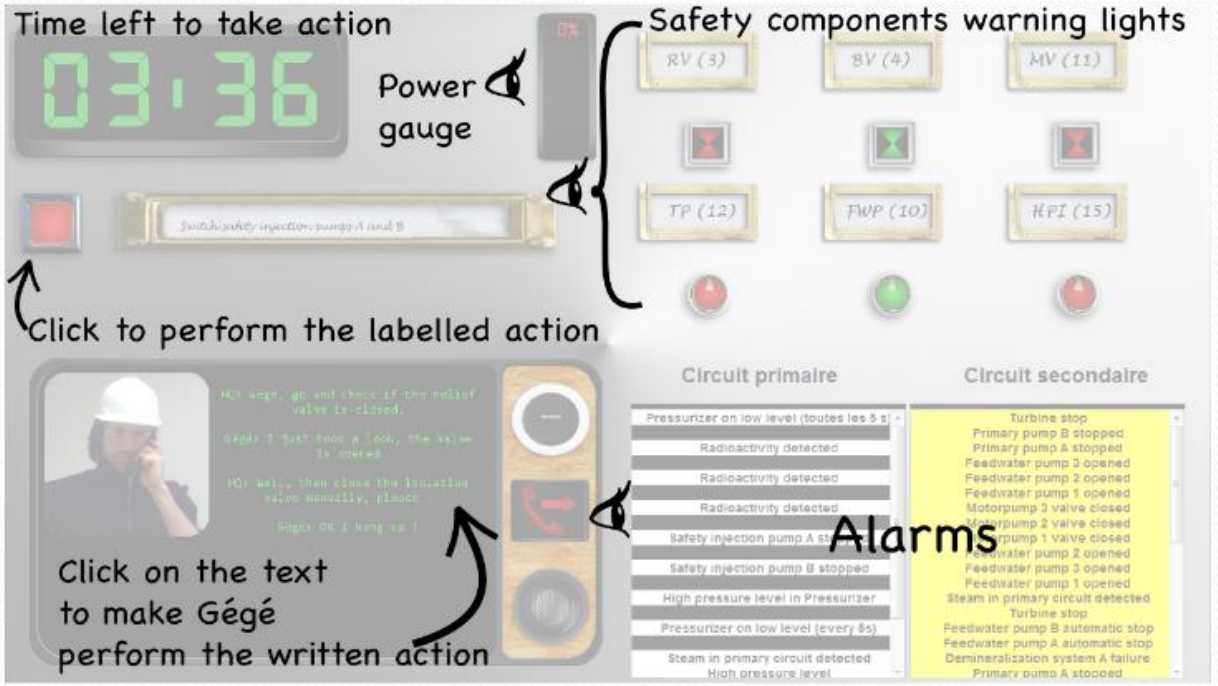
Introduction

Simulation

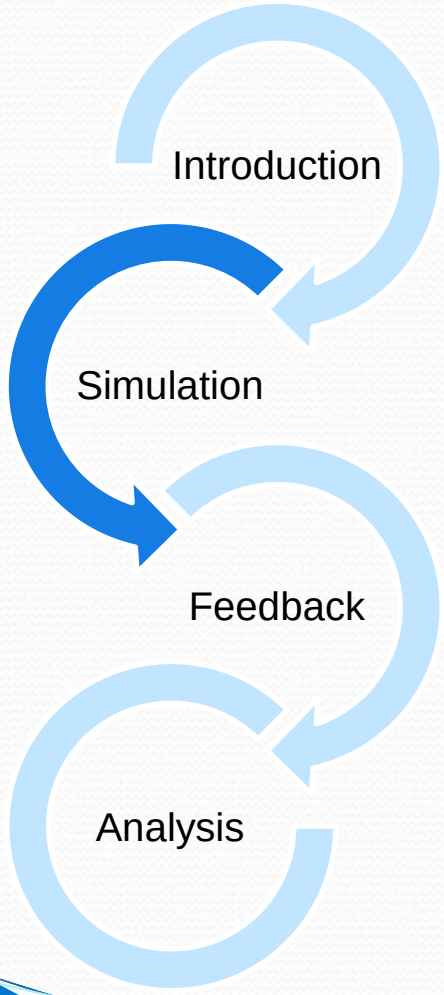
Feedback

Analysis

Short tutorial



Game's description



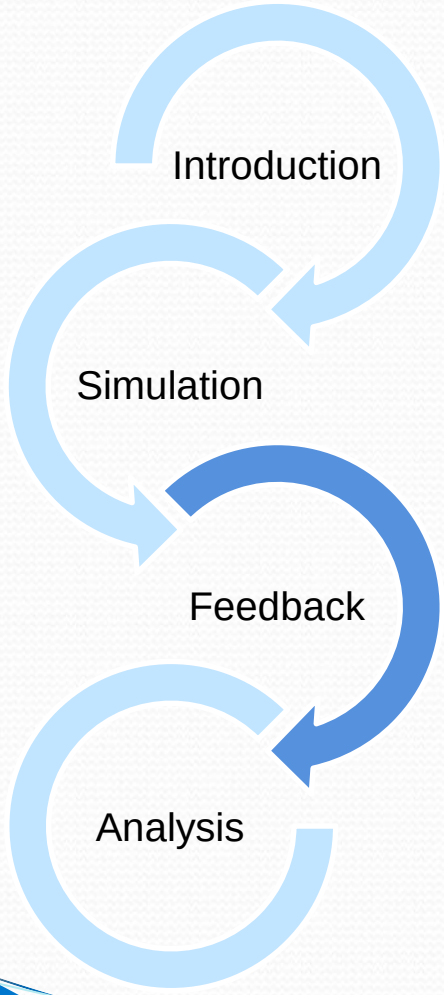
Game phase

Scenario based on TMI

Actions are proposed
Students click to accept

Ambiguous messages
Conflicting data
Flashing red countdown

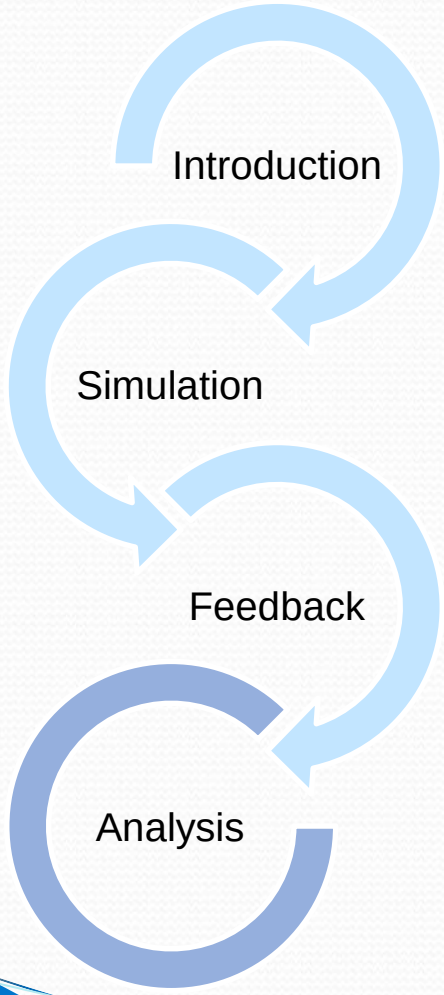
Game's description



First : a break !

Short presentation,
without specific guidelines
INES level

Game's description



Students receive the description of the plant evolution and undertaken actions

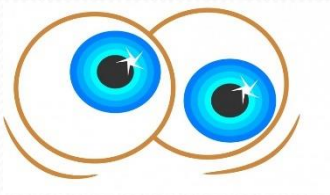
Documents about human factors

Several weeks later :

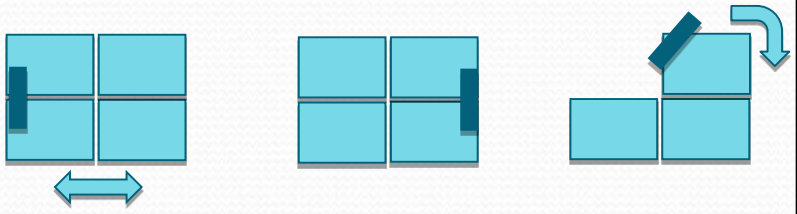
Each team presents a scientific analysis and a human anlaysis

Feedback from the teacher about their behaviour during the game phase.

Analysis



- Observation (by teachers)
  - Documents reading
  - Computer (Where ? Who ?)
  - Role appropriation
  - Discussion
  - Decision, consensus…



- Collaboration between specialists and no-specialists ?

Analysis

- Students

We learned a lot in a very funny way

Unique opportunity to experiment suches situations

Reflex

We have no time to think before acting

We do not take responsibilities into account

Stress

Conclusions and perspectives

- Powerful pedagogical device
  - Specificities of disturbed situations
  - Impact of human factor

- (Too ?) simplified interface
- Easy enough for no-specialists and realistic enough for specialists

- Apply nuclear knowledge

Conclusions and perspectives

- Prototype

- Increased interactivity ?
- Enriched scenario ?
- Several scenarios ? (wich ones ?)
- Mixed teams ?

Thank you for your attention