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‘Activity in Context’ –
Planning to Keep Learners ‘in the Zone’ for Scenario-based Mixed-Initiative Training

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Reporting on MSc in e-Learning Dissertation
School of Education, 2012

http://atate.org/oscc13

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Mixed-Initiative Training

My area of interest is “mixed-initiative” approaches to education and how they might be supported by intelligent systems.

Mixed-initiative means that the various agents can take the lead or initiative in an interaction at appropriate times, in contrast to tutor-guided learning or student discovery-based learning.

I am interested in how scenario-based training and learning works, and what is the most effective way to support learners in such a context.

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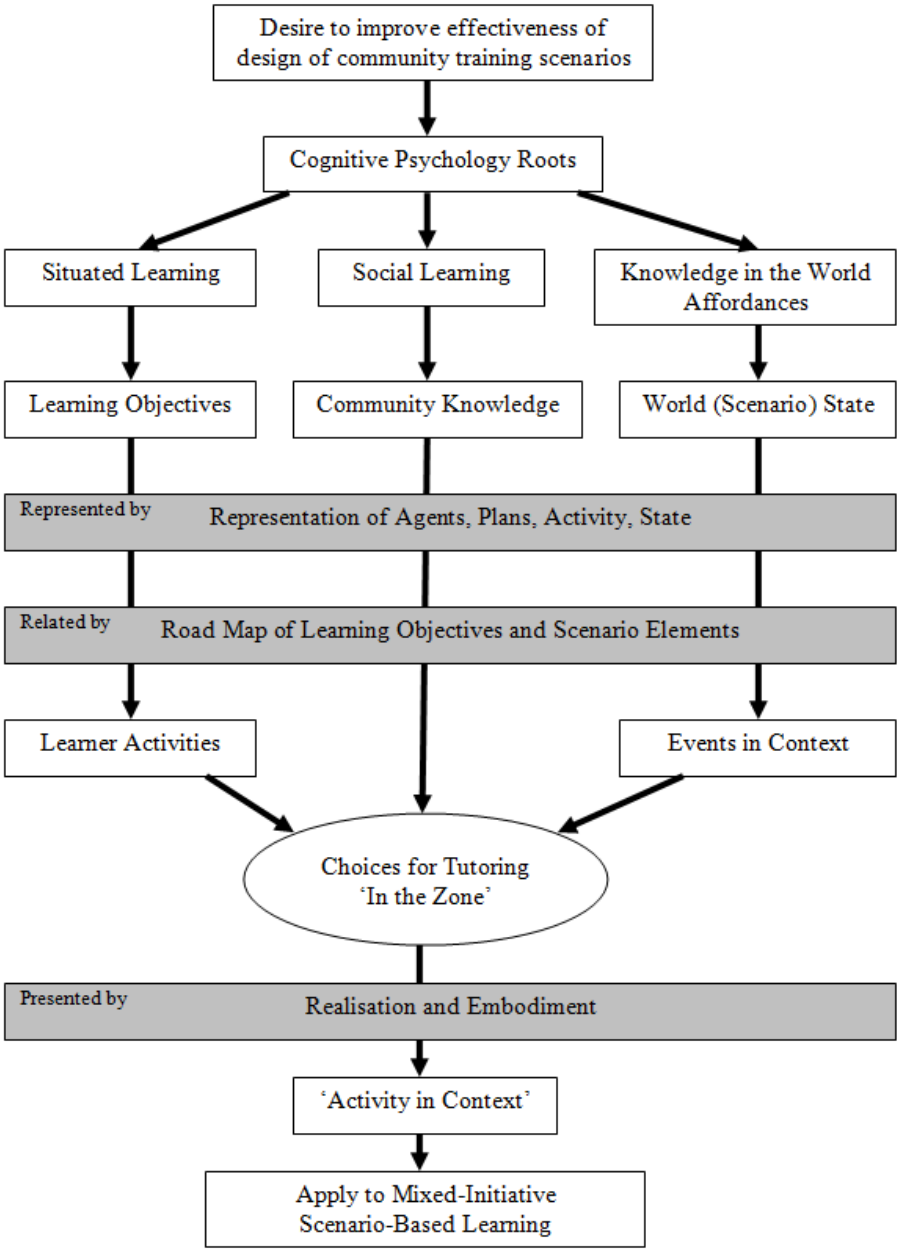
Flow Diagram of Concepts Explored



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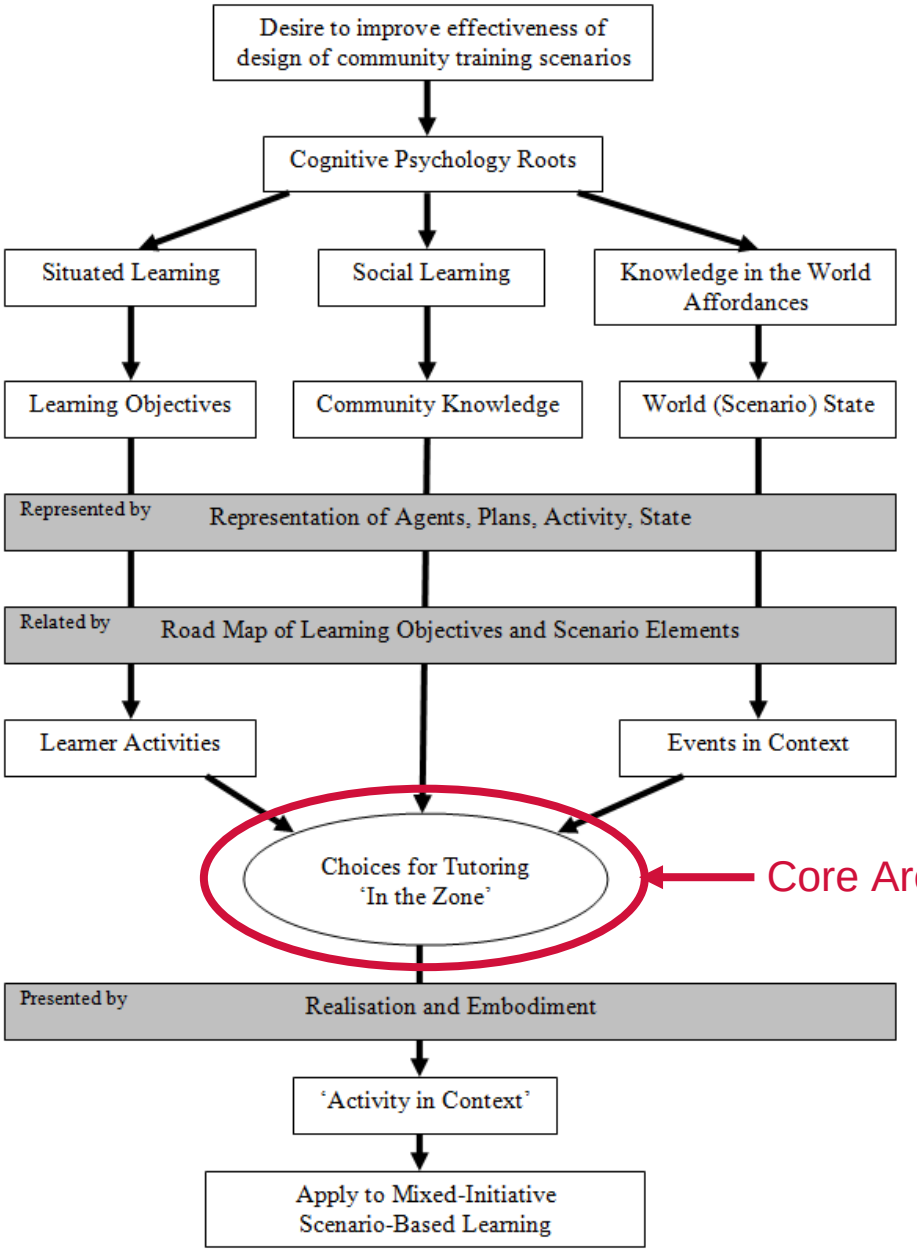

AI Plan Representation

Road Maps

Core Area

Virtual Worlds Experiments with I-Zone and NPC

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Mixed-Initiative Training

A number of threads have been brought together in this work:

- to study the cognitive psychological foundations for situated social learning;
- to identify effective learning methods relevant to mixed-initiative interaction between agents;
- to describe the relationship between cognitive psychological activity models and an AI research-informed conceptual model of activity;
- to provide a methodology for how the concepts identified could be utilised in a training-orientated “I-Zone” – a virtual space for intelligent scenario-based interaction; and
- to create, document and demonstrate a resource base for experimentation and potential re-use on projects in this area.

Study of Relevant Cognitive Psychology and Uses of AI in Education

RELEVANT EDUCATIONAL PSYCHOLOGY

- Learning by Doing
- Situated Learning
- Social Learning
- Communities, Action and Change
- The Power of Stories
- Intrinsic Motivation and Learning Principles in Games
- 5E Instructional Model – Engage, Explore, Explain, Extend, Evaluate

AI IN LEARNING SYSTEMS

- Monitored, Mixed-Initiative and Guided Discovery Learning
- Intelligent Tutoring Systems and AI in Education
- Computer Supported Collaborative Learning
- Learning by Exploring and Construction
- Learning by Debugging
- Computer-Based Pedagogical Agents
- AI in Games for Learning

Models of Activity, the <I-N-C-A> Ontology and Using AI Planning Technology

‘ACTIVITY IN CONTEXT’ – MODELS OF ACTIVITY

- Plans, Activities, Constraints and Agents
- Constrained Activity – Affordances

A FRAMEWORK USING I-X TECHNOLOGY AND THE <I-N-C-A> ONTOLOGY

- <I-N-C-A> – Issues, Nodes, Constraints and Annotations
- I-X Mixed-Initiative Approach

MAPPING LEARNING OBJECTIVES TO APPROPRIATE LEARNER ACTIVITIES

RELATING EDUCATIONAL AND DOMAIN LEVEL PLANS VIA ROAD MAPS

USING PLANNING TO COMPOSE LEARNING EPISODES

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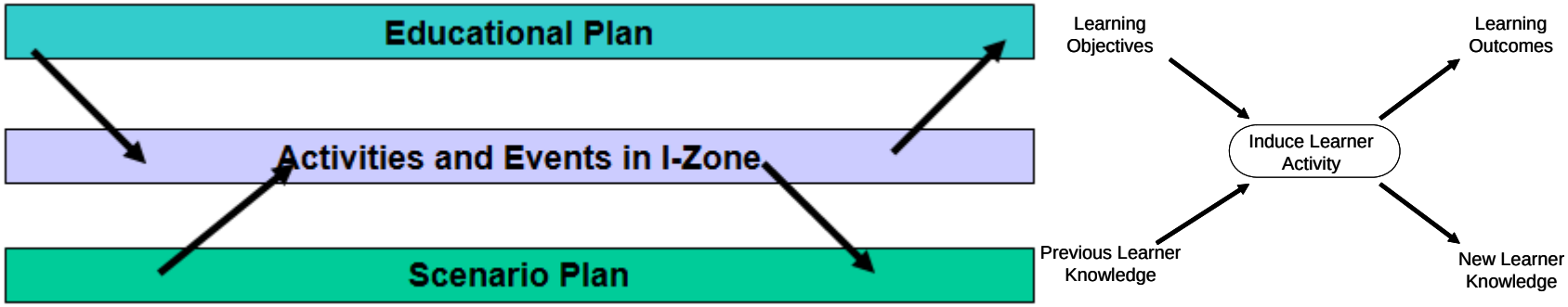
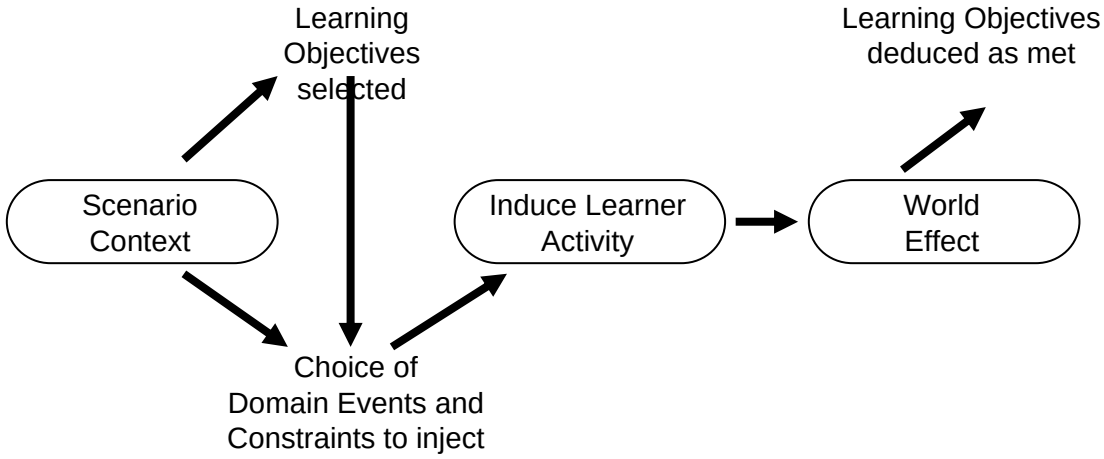
Road Map to relate Training Objectives to appropriate Scenario Events and Activity





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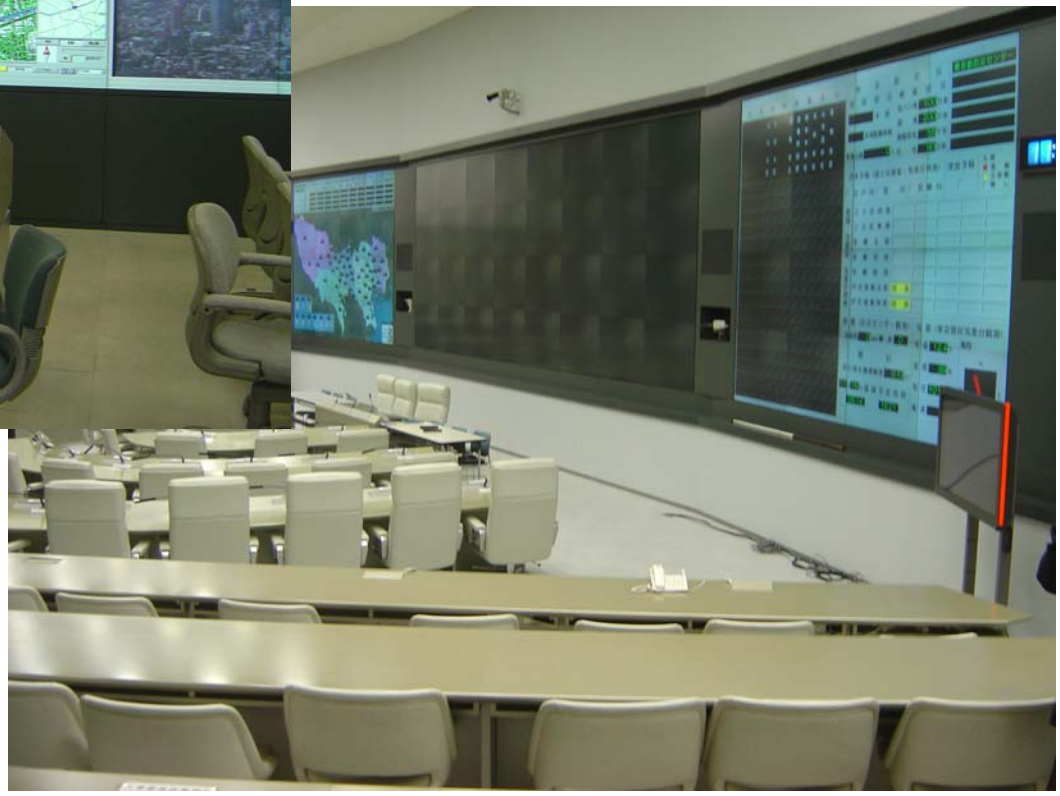
Emergency Response Operations Centres in Real Life

Tokyo Metropolitan Government
Emergency Response Centre



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Emergency Response Operations Centres in Real Life

Mobile Emergency Response Operations Centres

Future Emergency Response Operations Centres

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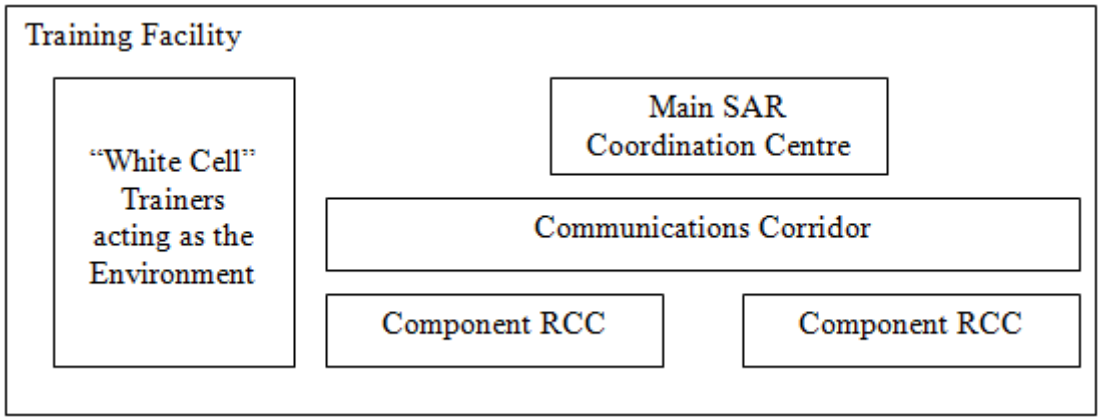
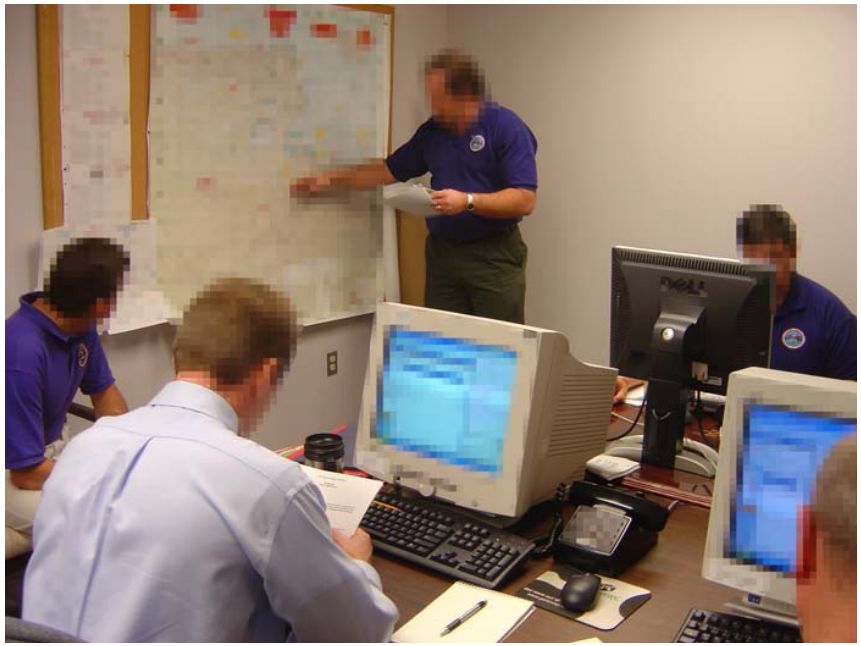
Emergency Response Training Centres in Real Life



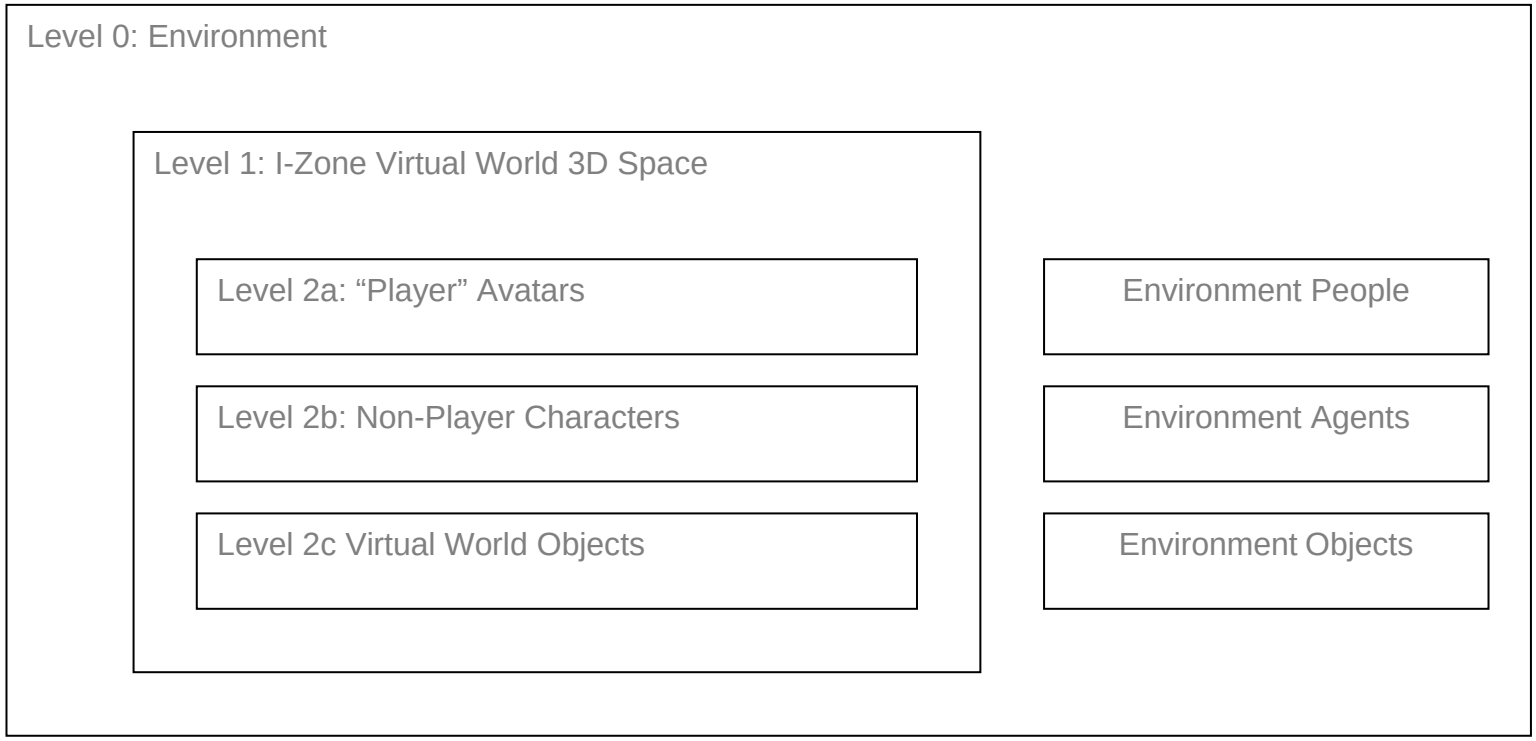
PRETC, Frederickburg, Virginia



"White Cell"

Main SAR Coordination Room

I-Zone Realisation – A Virtual Space for Intelligent Training



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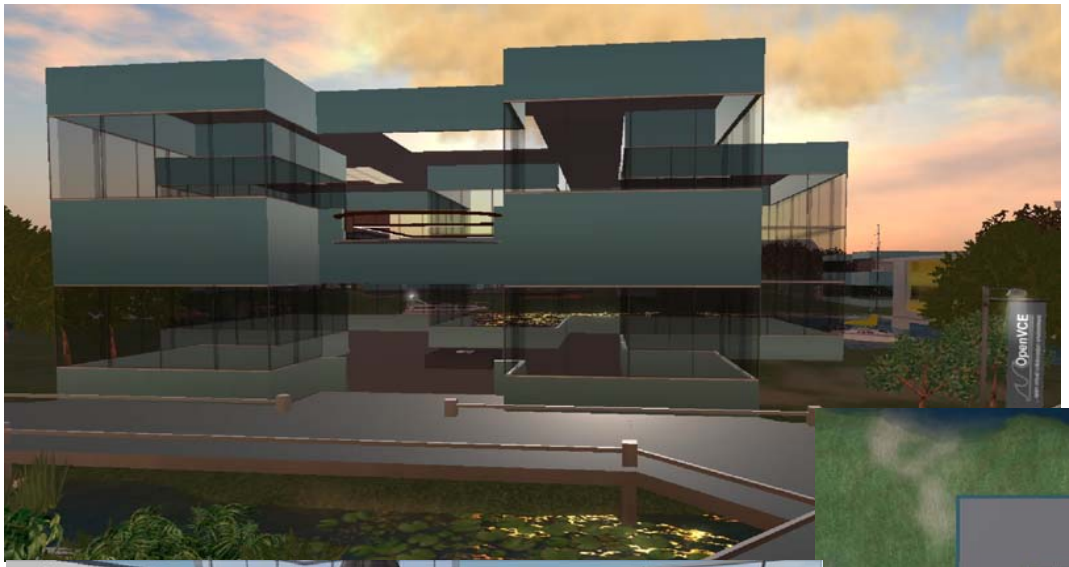
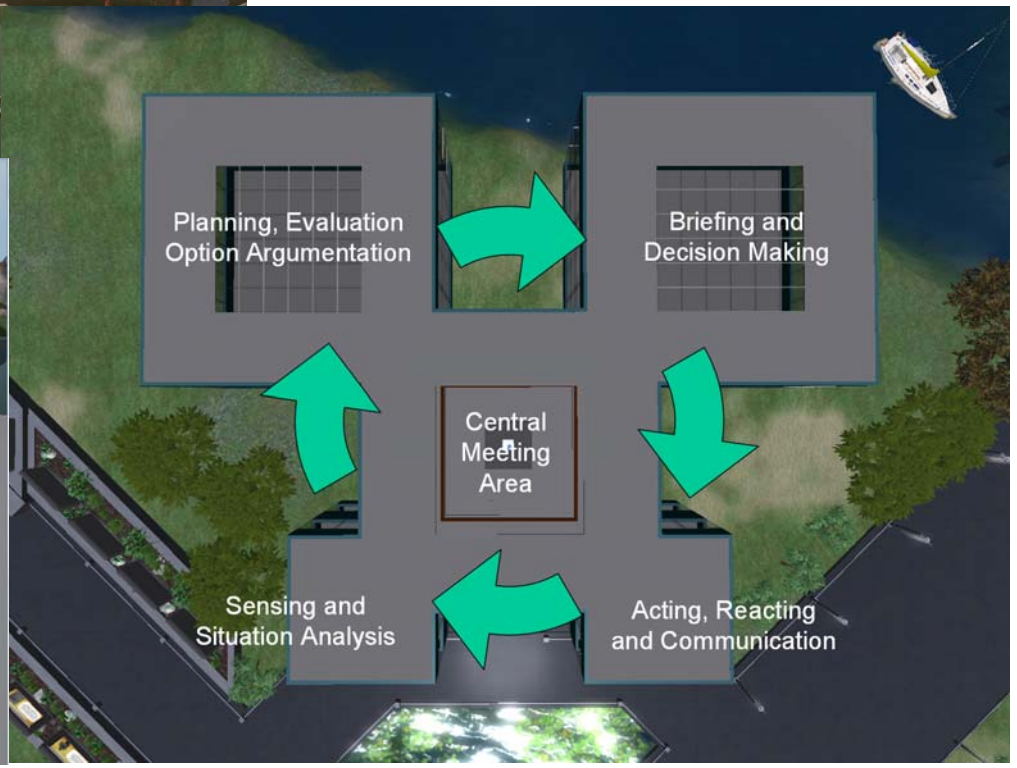
I-Zone Realisation – A Virtual Space for Intelligent Training





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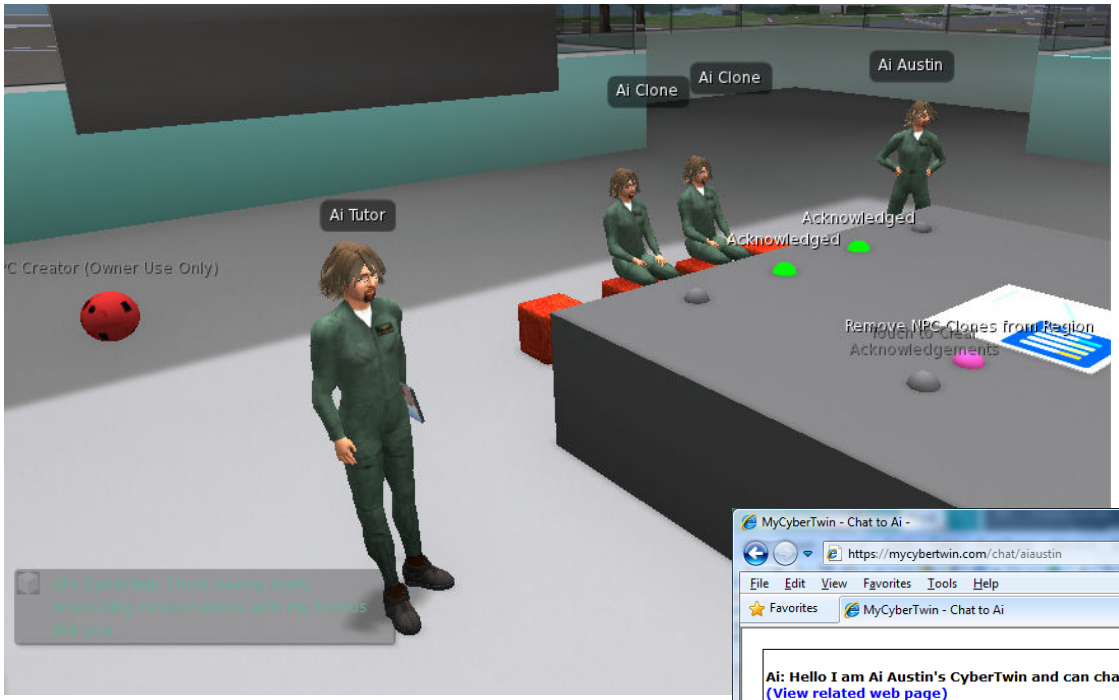
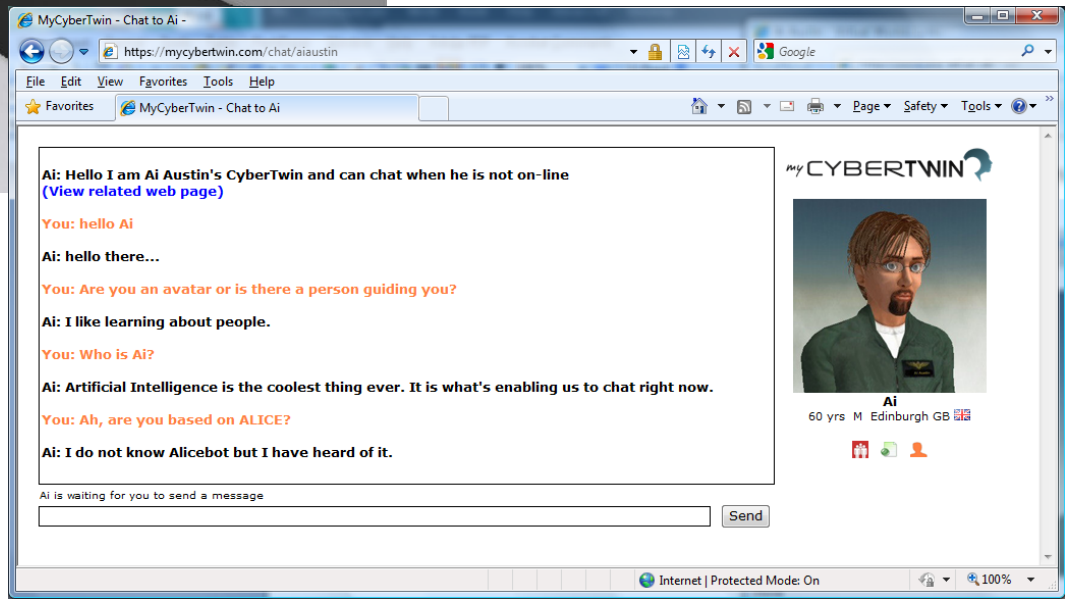
Virtual Classroom Assistant Embodiment = NPC Avatar + Chatbot + Intelligent Agent





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I-Zone Methodology

During the course of the study an approach to support scenario generation and adaptation in a mixed-initiative situated training context has been made explicit. This comprises:

- an ***embodiment*** of the target training situation which allows for an immersive and engaging user experience;
- natural ***constraints*** “in the world” for what can and cannot be done via interaction with the environment through provision of situation realistic devices and communications mechanisms, and which provide natural affordances on what activity can be performed;
- set up of appropriate, realistic, challenging and motivational ***tasks or objectives*** within the scenario guided by the learning objectives desired;
- carefully select and inject scenario ***events*** into the training situation to maintain interest and keep learners “in the zone” for effective learning;
- induce appropriate ***context-specific activity*** by the learners to respond to the situation they find themselves in.

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I-Zone Methodology

The methodology can be summarised as:

- **constrain** the world situation and the activities which are possible;
- **select** or generate relevant tasks and events;
- **inject** into the situation to keep learners ‘in the zone’; and
- **induce** appropriate learner **‘activity in context’.**

The dissertation takes the form of providing a conceptualisation, technology and realisation of a virtual space to support scenario-based training in a community context. It outlines a methodology or approach to support the generation of scenario-based training episodes that are context-sensitive to the receptiveness of a student to learn effectively.

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Further Reading

The full dissertation and resources can be found at

http://atate.org/mscel/i-zone