

Synchronous Environments for Distance Learning: Combining Network and Collaborative Approaches

David Raymond

Thesis directors: Yano Yoneo and Michel Diaz

Co-Supervisors: Kazuhide Kanenishi, Kenji Matsuura,
Veronique Baudin and Thierry Gayraud

B4 Laboratory, Dept. Information Sciences and Intelligent System,
Faculty of Engineering, Tokushima University, Japan

Software Tools for Communication (OLC Group), Laboratory for
Analysis and Architecture of Systems, Centre National de la
Recherche Scientifique, (LAAS-CNRS), France

Defense of a PhD.

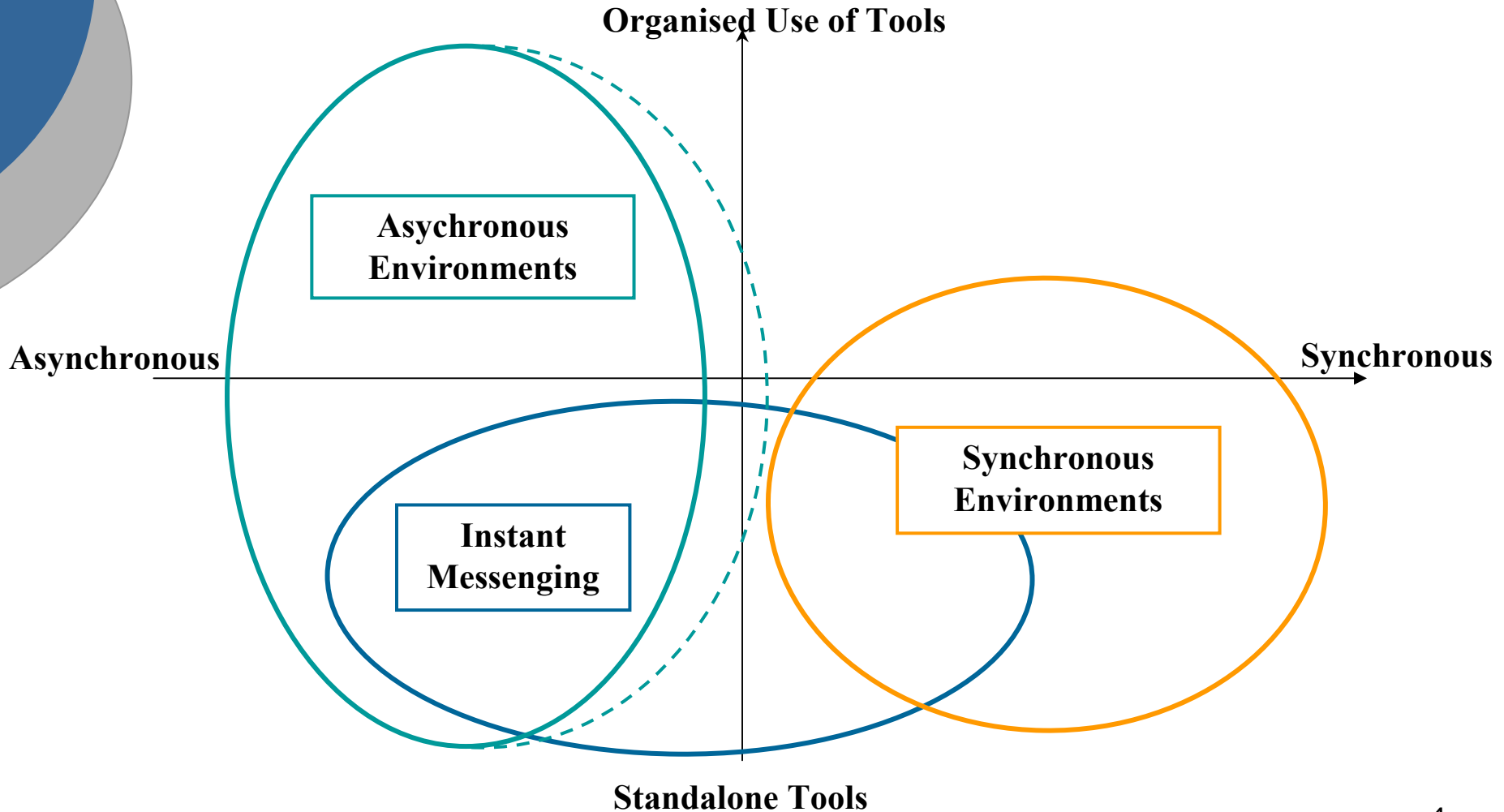
- Distribution of a Manuscript
- Presentation
 - Compulsory requirements for PhD defense
 - Difficult and costly to gather the jury



Diversity of Distance Learning

- Different users
 - Location (from work, university, home...)
 - Needs
 - Motivations
 - Background
- Different Activities
 - Different Type of Contents (Technical vs. Artistic, Academic vs. Professional, Practical vs. Theoretical)
 - Different Goals (knowledge, know-how, application)
 - Different Ways to Teach
- How to support these Users and Activities?

Different Approaches



Goals of this Research

- Take into consideration users' constraints
- Support the variety of activities
- Provide the best quality from users' point of view
- Develop/Adapt Synchronous Learning Environments Solutions

- Impossible to model in advance the diversity of users and activities
- Support professors educational choices rather than providing support at the content level

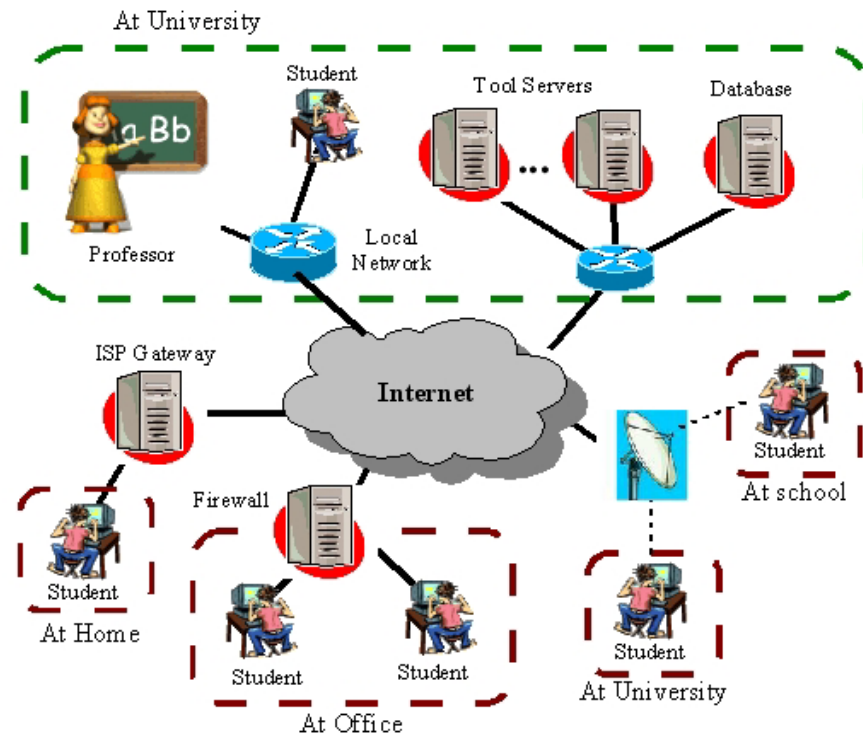
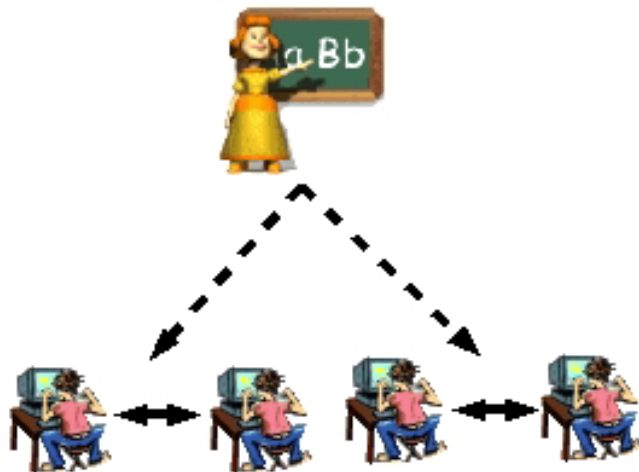
Several Fields of Expertise

- Educational Theories
 - Computer Supported Collaborative Learning
 - Ubiquitous Learning
- Collaboration Strategies
 - Teaching Models
 - Learning Protocols
- Human Computer Interactions
- Distributed Systems
 - Transparency
 - Openness
- Multimedia Communications
 - Quality of Service (QoS) for the user
- Network Access

Approach of this research

- Model the relationship between collaboration and distributed systems
- Experts provides specific adaptations

Practical Supervised Work



Plan

1. Introduction & Related Researches
2. Relationship between Network and Collaboration
3. Presentation of the CCMS Model
4. Evaluation of the CCMS Approach
5. Conclusion and Future Directions

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Initial experiments

- Identify the relationship between a collaboration scenario and technical supports of this scenario
- Validate the use of synchronous environments in Internet simulated conditions
- Identify users' issues in the use of synchronous environments
- Identify criteria for evaluating and comparing synchronous environments

Scenario of Use

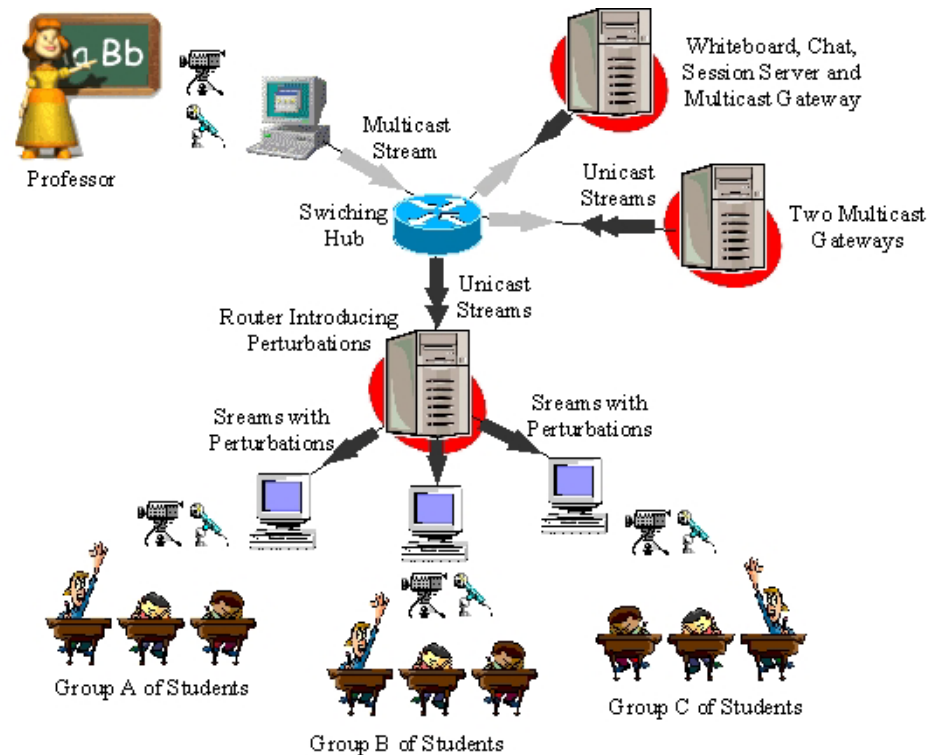
- Lectures of Discrete Mathematics for undergraduate students
- Highly interactive communications between professor and students
- Students can communicate between them with lower interaction
- Slide based Content

Environment Settings (Students)



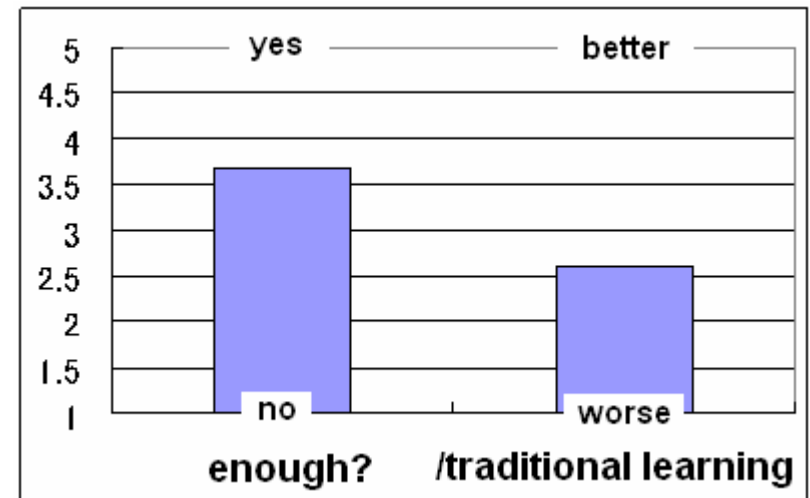
Architecture and Set up

- Set up
 - 4 networks, 1 router, tool servers, gateways
 - Separated rooms
 - 4 lectures of 40 min.
 - 26 students
- Simulation of perturbations
- Evaluation
 - Perceived Quality
 - Questionnaire
 - Observations



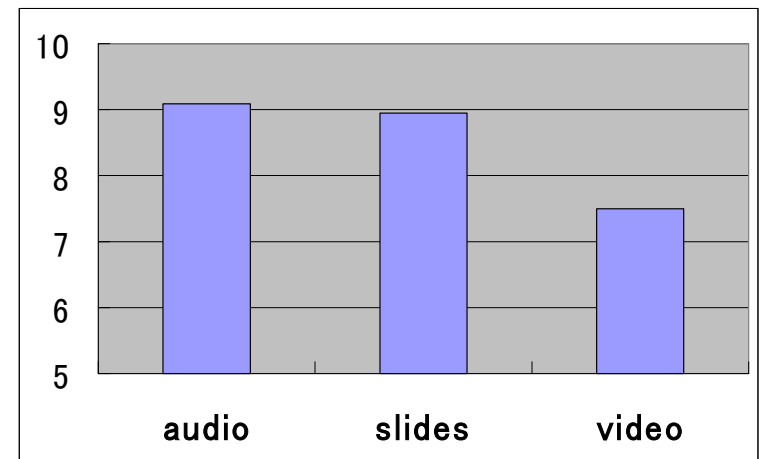
Results (Scenario)

- Seen as an alternative to face-to-face education
- Interest of the students
- Solution is sufficient for learning
- Learning easier in face-to-face
- Difficult to Interact
- “I feel strange”



Results (Network)

- Communication Strategies depend on users and activities
- Synchronization issues
- Intercorrelation issues with heterogeneous QoS



Results (QoS Requirements)

- QoS requirements different from phone recommendations
- Delay tolerance is higher
- Jitter Buffer
- Perturbations affected video stream

	<i>Small</i>	<i>Medium</i>	<i>Large</i>
Delay (ms)	500	1000	1500
Jitter (ms) Audio	10	150	300
Jitter (ms) Video	10	150	300
Packet drop (%) Audio	5	17.5	30
Packet drop (%) Video	5	17.5	30

- QoS requirements depend on the activities
- Professors responsible for collaboration strategies

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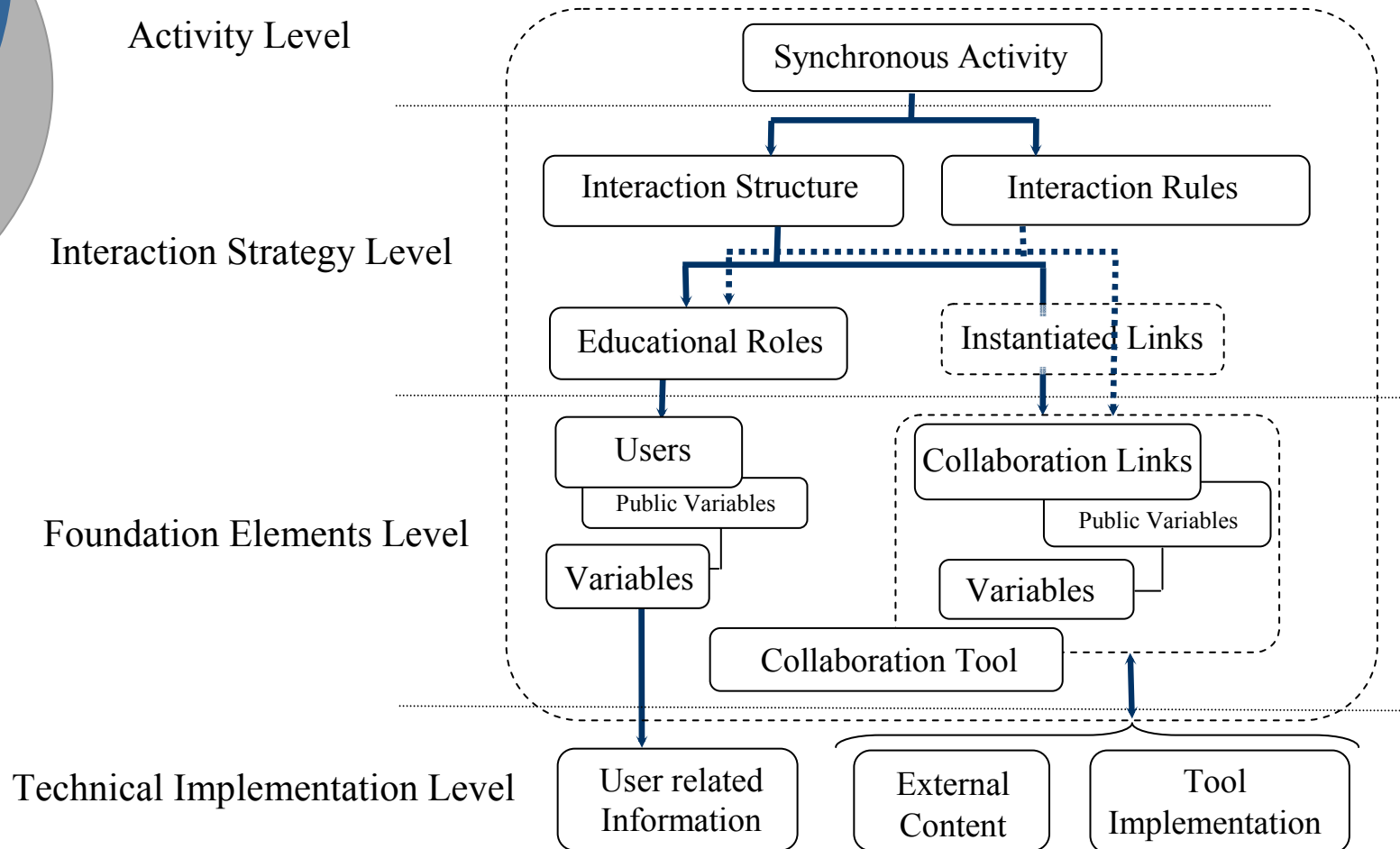
Foundation Elements

- Variables
 - Technical Variables
 - Public Variables
- Users (Human Being, Software Agents)
 - Technical Information
 - Administrative Information
 - Educational Information
- Collaboration Tools
 - Variables
 - Collaboration Link (Source, Destination)

Association Elements

- Educational Role
 - User
 - Role Name and Description
- Collaboration Tools Interaction Structure
 - Instantiated Links (Source, link, Destination)
- Collaboration Tools Interaction Rules
 - Controller of the Rule
 - Instantiated Link
 - Rule Invocation Method

Representation of the Model



Scenario Example

Legend

Educational Roles

User name

Tool
Link



Source



Destination



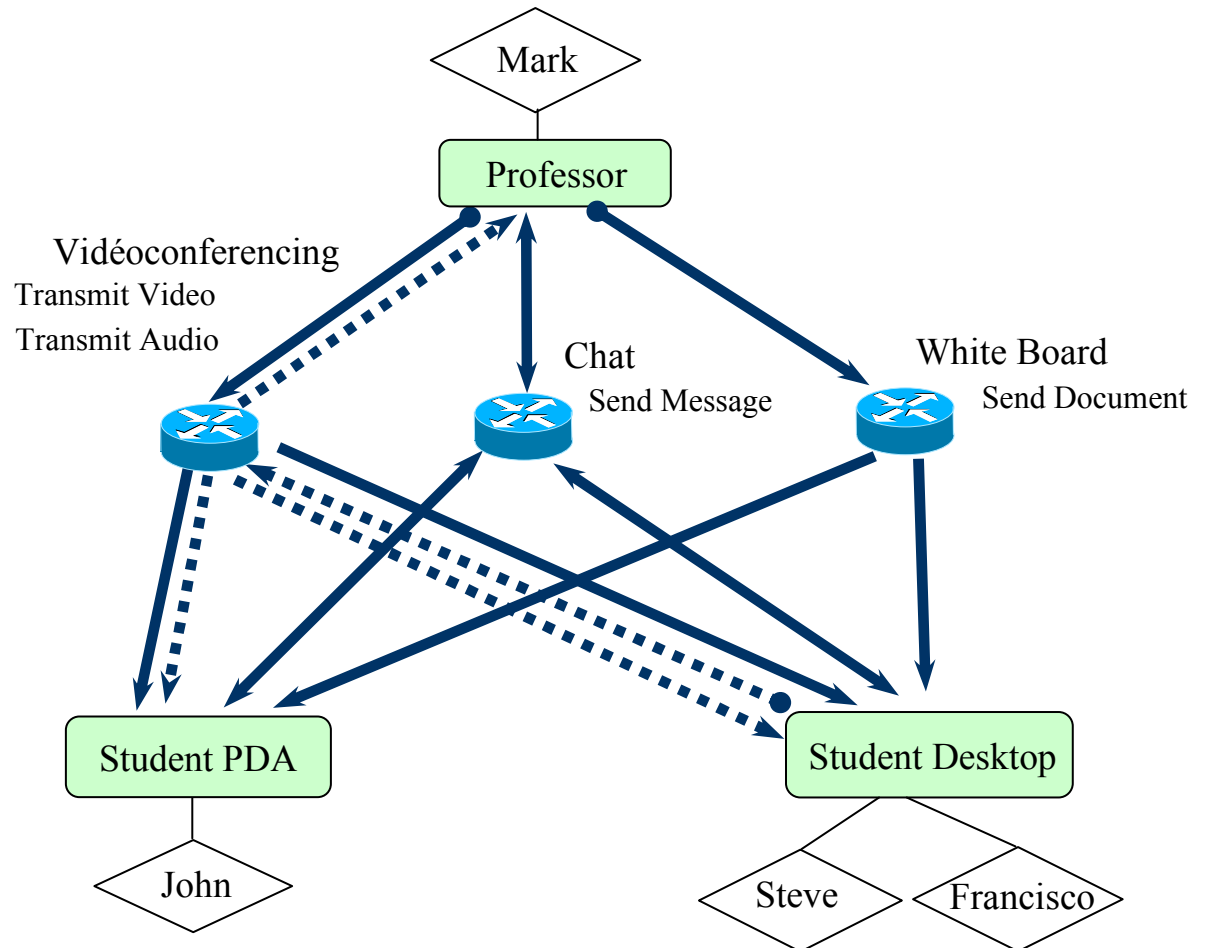
Source & Destination



CTIS



CTIR



Advantages and Applications

- Support the expression relationship between collaboration and systems
- Fine grained Preparation of Session
 - Differentiate Collaboration Activities
 - Reduce Technical Manipulation
- Independence and relationship between collaborative and network experts
 - Optimize of Communication
 - Relationship with asynchronous environments
 - Activities and user related adaptations

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Final Experiments

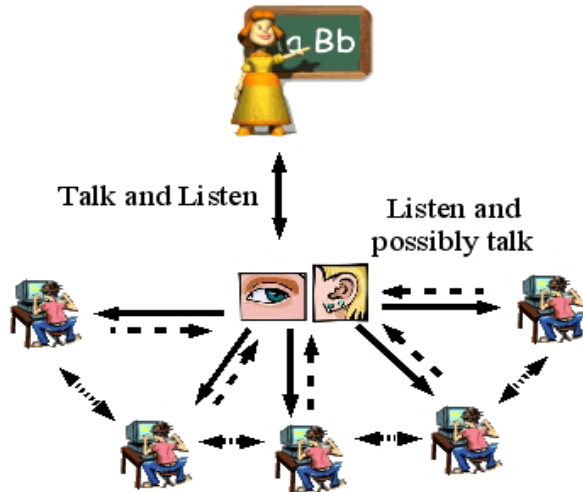
- Illustrate the potential of the CCMS model
- Confirm this research approach
 - Evaluation with respect to initial experiment
 - Move closer to CSCL theories
 - Move closer to distance learning context
 - Explore the asynchronous - synchronous relationship
- Evaluate a CCMS based support system
- Evaluate Platine improvements
- Evaluate the Basic Support for Ubiquitous Learning (BSUL) environment

Scenario

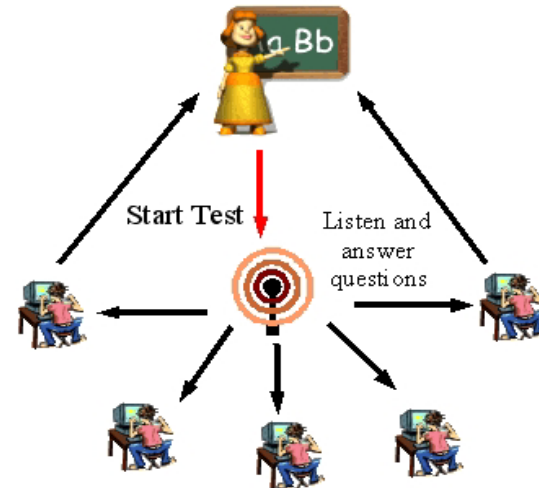
- Language Course
- 1: Evaluation and orientation
 - Lecture Style communication
- 2: Field activities
 - Pair collaboration and tutor
- 3: Final Meeting
 - Group Discussion

Cooperation Structure

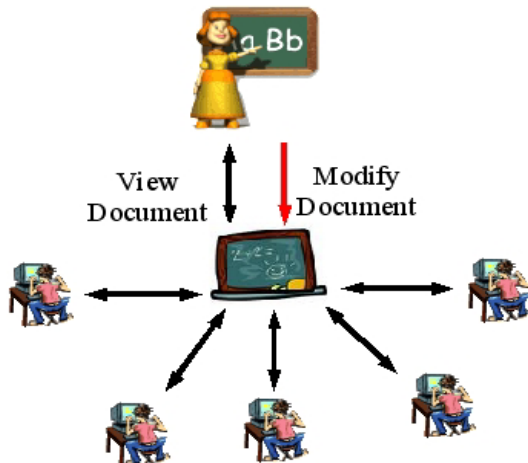
Direct Communication



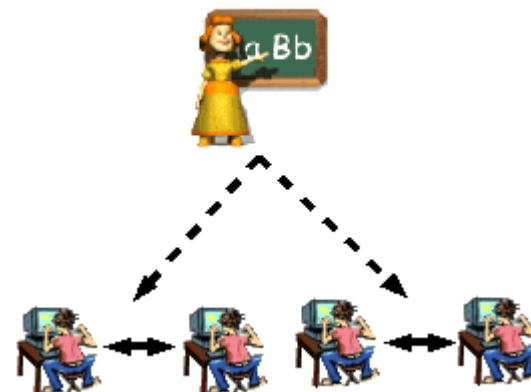
Listening Test



Document Based Collaboration



Pair Work



Support Strategies

- Support understanding of how to collaborate
 - Informative Support Based on the CCMS Model

Untitled Document - Mozilla Firefox

Echier Edition Affichage Aller à Marque-pages Outils ?

file:///c:/Documents%20and%20Settir

[日本語](#)


Welcome to the Model Description

Learning Activity:


[English Test](#)

[Next Activity](#)

Profiles




Professor




Students


Tools




Videoconferencing



Whiteboard



Chat



Streaming

Terminé

This section will help you to understand the structure of the communication and give you details on the manipulations of the tools.

Click on the tools in the left frame to get information related to the Activity, the roles and the associated users and the tools.

In order to Join the Synchronous Phase of the session, follow these Instructions.

In the new window of the environment, you can see the list of users connected. You can view the list of participants and their role by scrolling down the list of users. You can use the chat to communicate with your friends. When the professor will be connected, you will see his name and role in the list of connected users. When the professor has started the synchronous phase of the session and joined this synchronous phase, his status will change to Active in the list of Connected users. **Join the synchronous phase too by clicking the "Join Synch Phase" Button.**

After a few seconds, all the tools should be started.

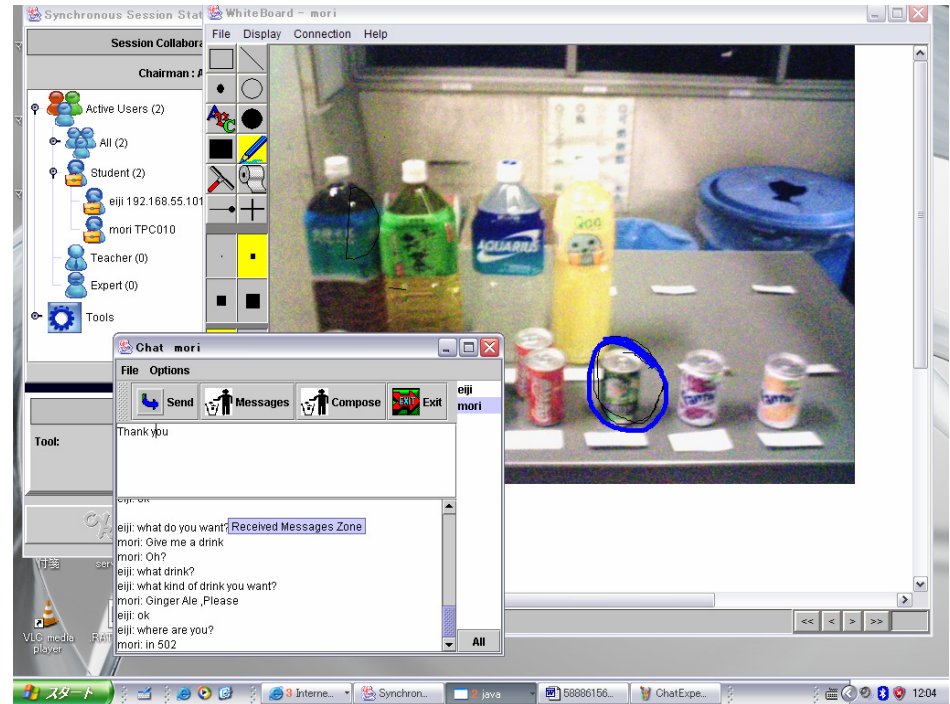
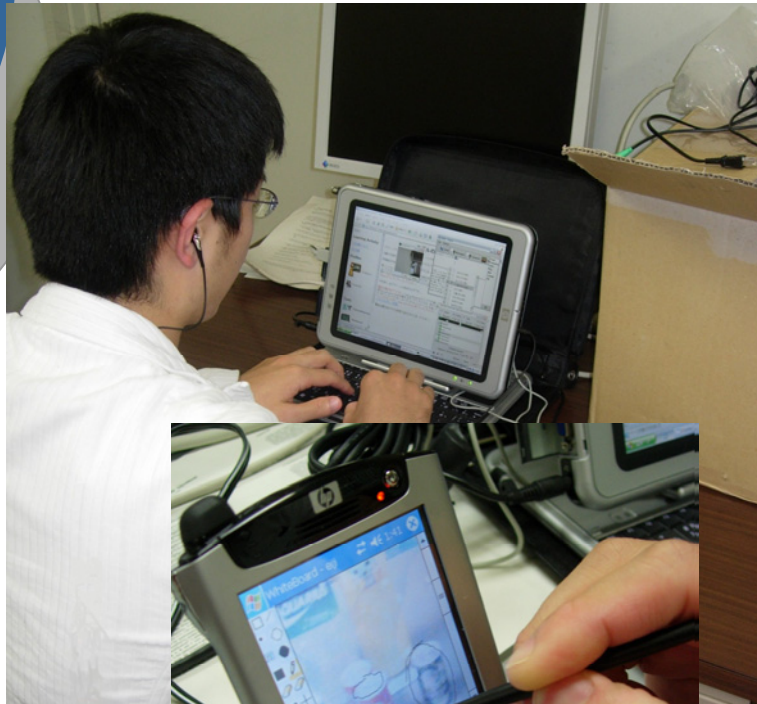
Then, Start the audio conference: select the "audio conference" window located in the task bat of the environment, Click the Start Button. This will start the RAT tool and ou should see a new interface. **In this interface, check the "Talk" box** . For more information about this tool click follow this [link](#).

After you have started the audio conference, Follow the Instruction of the Professor.

Support Strategies

- Support understanding of how to collaborate
 - Informative Support Based on the CCMS Model
- Support Awareness of the session
 - Synchronous Session State Display (SSSD)
- Support Human Computer Interaction
 - Tablet PCs with graphic tablet capabilities
- Support collaboration in field activities
 - Platine Client on PDA

Environnement Usage

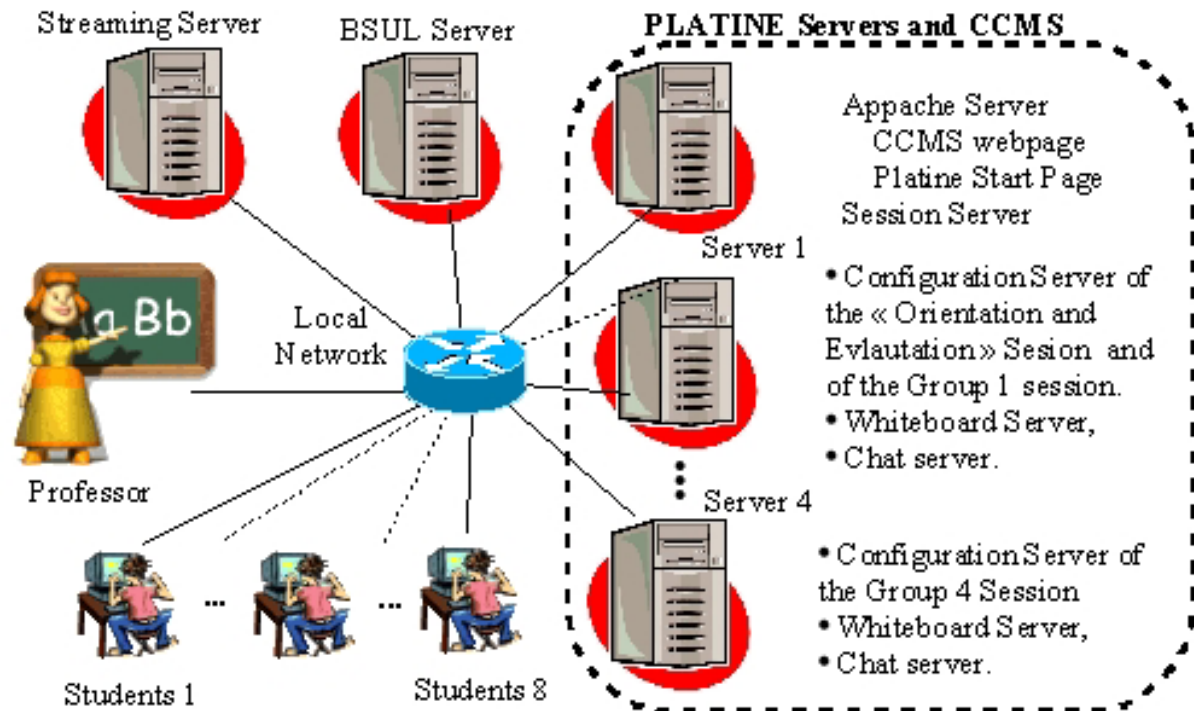


Support Strategies

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 - Informative Support Based on the CCMS Model
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- Support collaboration in field activities
 - Platine Client on PDA
- Support Human Computer Interaction
 - Tablet PCs with graphic tablet capabilities
- Support the access and organization of activities:
 - Avatar of the Classroom
- Support Preparation of the Activities and Content Management
 - Basic Support for Ubiquitous Learning (BSUL)

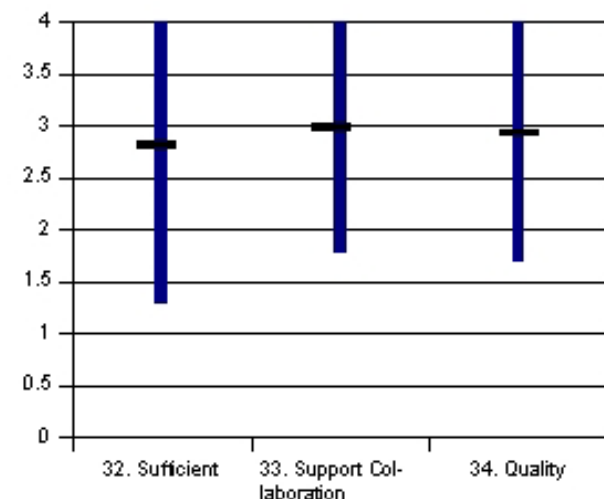
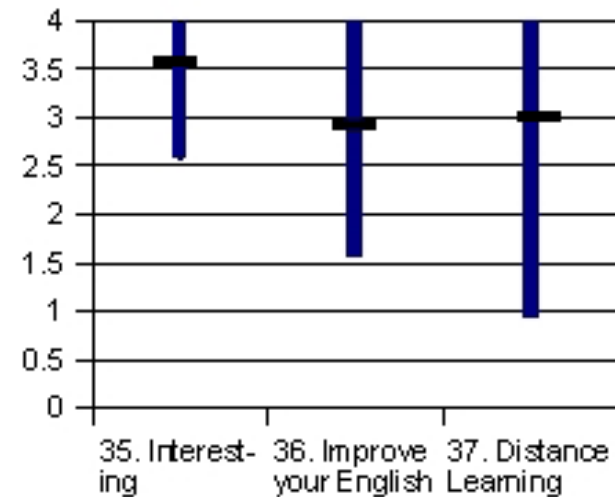
Architecture

- 22 students
- 6 or 8 Students at a time
- One shot event of 90 minutes
- Graduate and undergraduate students
- 9 rooms



Results

- Interest in the Learning Scenario
 - Field Activities
- Technical solution supported the scenario
- CCMS web pages satisfactory:
 - Understanding Role
 - Understanding communication
 - Useful



Results

- Distance learning Context
 - Access satisfactory
 - Manipulation Satisfactory
- Asynchronous/Synchronous
 - Need to relate questions that issues from synchronous activities to asynchronous support
 - BSUL support satisfactory
- Need improvements to support a larger part of the population
- Interface can be improved

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Conclusion

- Model and approach to support Collaboration between Educational and Technical Experts
- Consequent experiments performed
 - Study of collaborative and networking influences
 - Knowledge and know-how
- Aim to bring synchronous communications to educational field

Future Directions

- Integration of the CCMS
 - Activity related display
 - Timing of interactions
- Develop Scenarios and Activities
- Develop support solutions
 - Awareness supported by sensors
- Asynchronous/Synchronous integration
 - Provide a complete solution
 - Support review and preparation
- Tests and Validation
- Provide generic integration of the CCMS support for other synchronous environments

Questions and Comments

Thank you for your attention