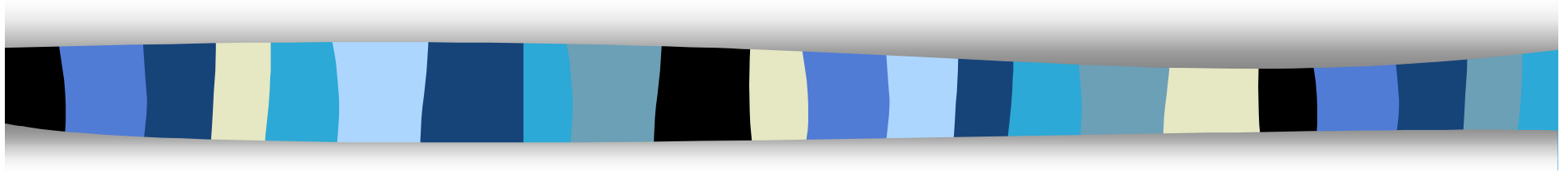


Collaborative Learning: Theory and Systems



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What is collaborative learning?

- Collaborative learning is a reculturative process that helps students become members of knowledge communities whose common property is different from the common property of the knowledge communities they already belong to. (p.13, Koschmann, 1997)

What is CSCL?

Crossroads of CSCW and Collaborative Learning





History of Educational Software

- eLearning (WBT)
- CSCL(KB)
- ILE(Multimedia, DM)
- ITS(prob.-solv., std. model)
- CAI/Courseware

1950 1960 1970 1980 1990 2000



Taxonomy of CSCL systems

	Same time	Different times
Same place	EDC	Video-based asynchronous classroom
Different places	Satellite Collaboration System	CICLE/KIE Code-broker Swiki

Synchronous CSCL

Interface design principle:

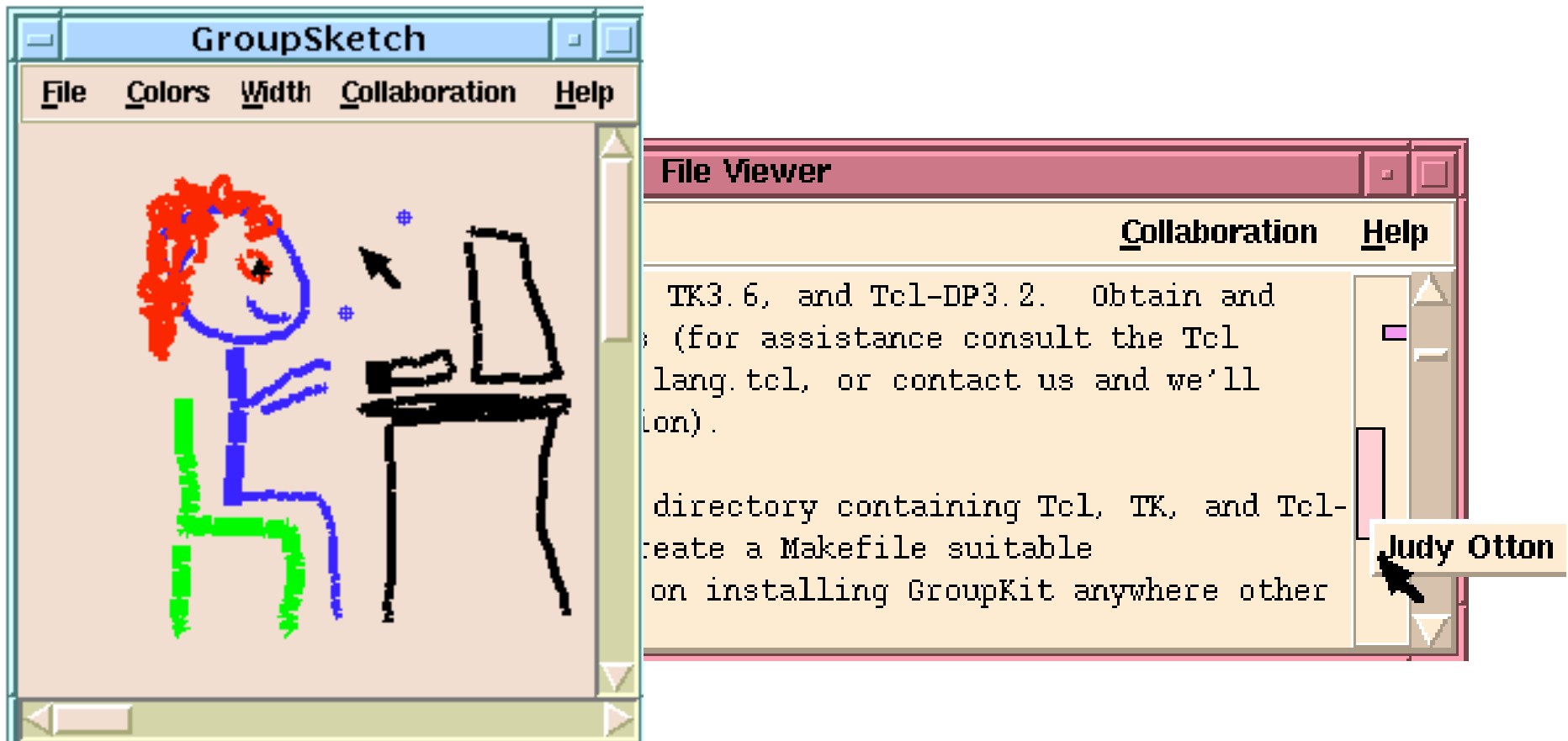
WYSIWIS(What you see is what I see)

WYSIWITYS(what you see is
what I think you see)

- Time and place restriction

WYSIWIS application

- Workspace Awareness
- Multi-user pointers / Multi-user scroll-bars



Asynchronous CSCL

WYSIWID (What you see is what I've done)

The system shows when, where and who has made changes to the shared object.

This information is useful to facilitate collaboration with the current user and the past users.



Our projects

- AVC(Asynchronous Virtual Classroom)

Agents reproduce the past activities in VC.

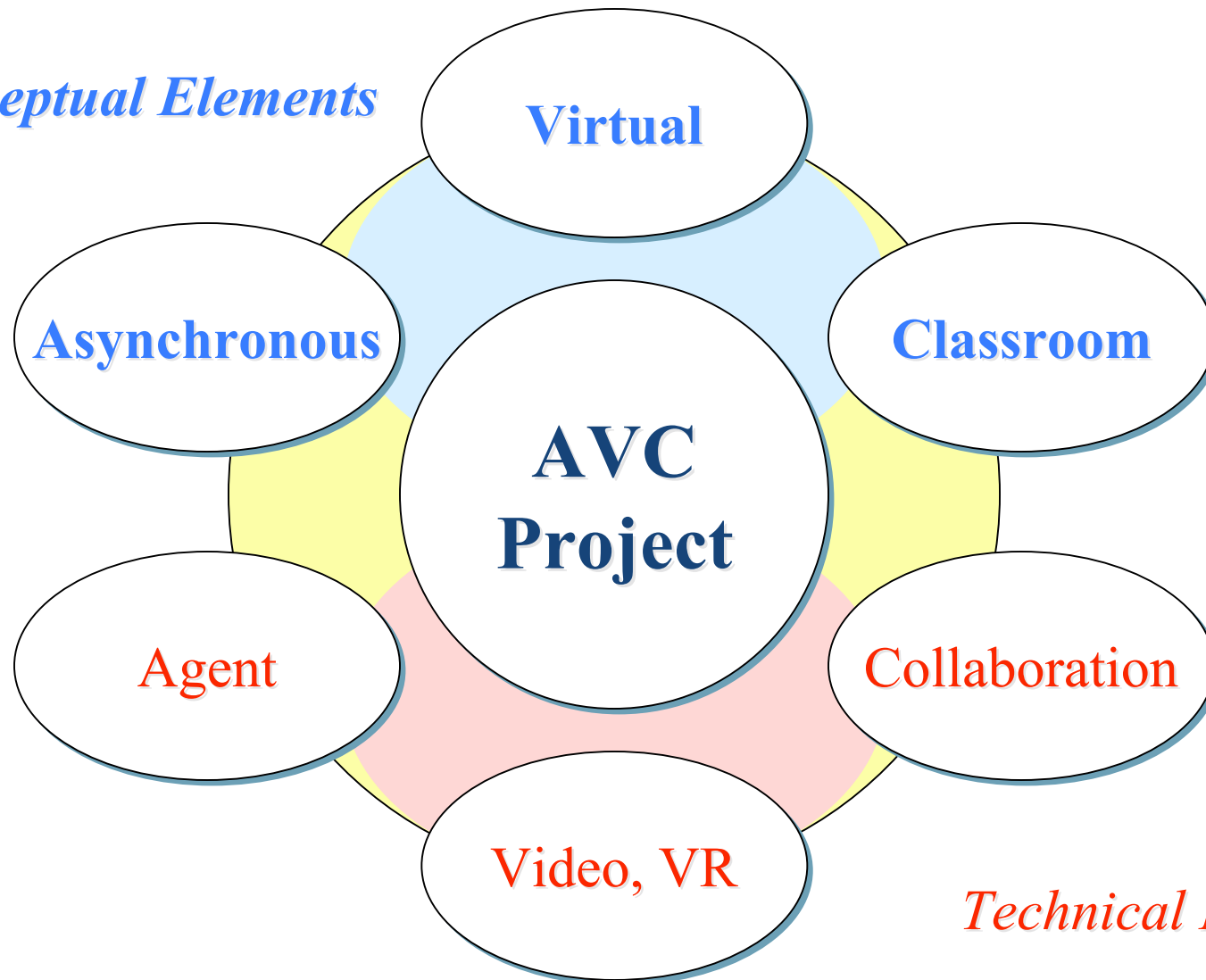
Asynchronous Virtual Classroom

- **Agents supports:**
 - **To provide the feeling of being present at the classroom with other learners at the same time, despite the solitary participation.**
 - **To understand what happened in the classroom.**
 - **To facilitate interaction among learners.**



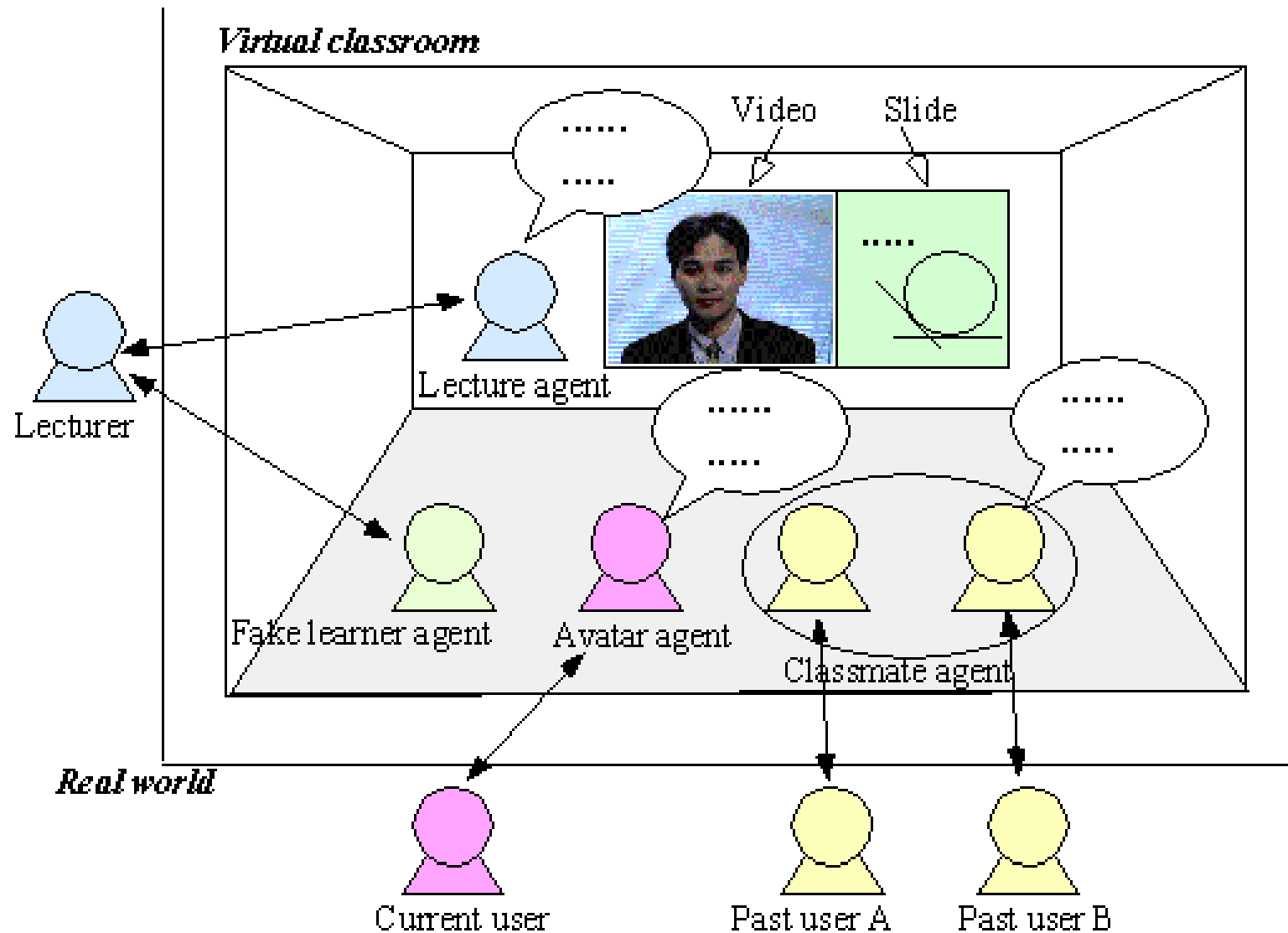
Elements of AVC research

Conceptual Elements

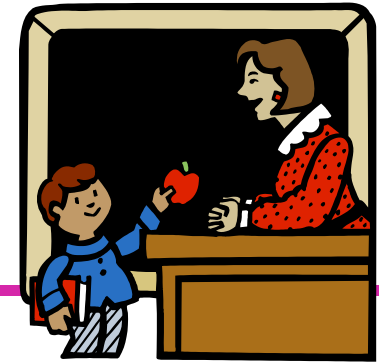


Technical Elements

Overview of AVC



The role of agents



- **To replay the past learners' actions that were stored and shared in the AVC system.**
- **To arrange the actions to replay, according to the learner's past actions and the time of the video segment.**
- **To send / receive messages instead of the user.**
- **To take actions which teacher / learner described with AACML (Agent-based Asynchronous Classroom Markup Language).**



Examples of elements of AACML

AVC3 Ver1.0 ログイン画面

下にユーザ名とパスワードを入力してOKボタンを押してください

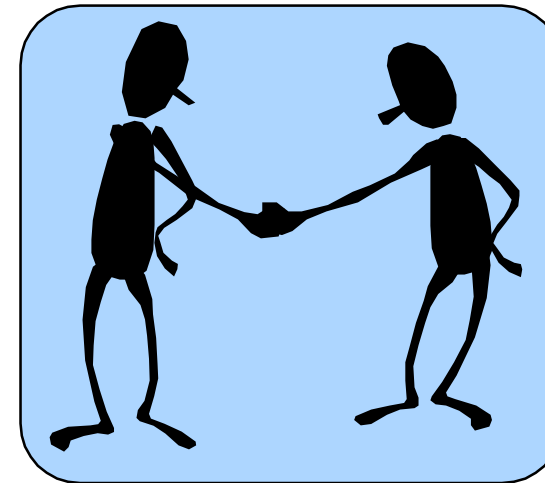
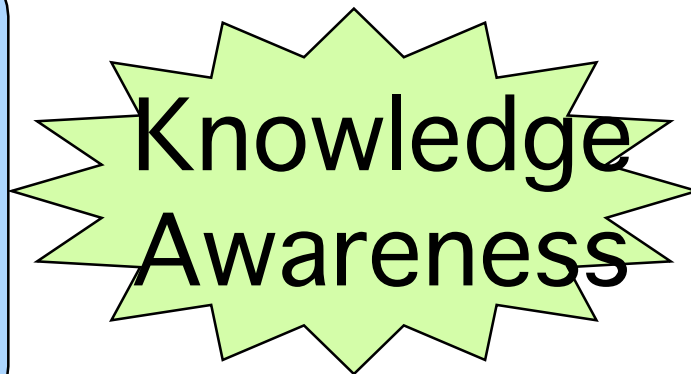
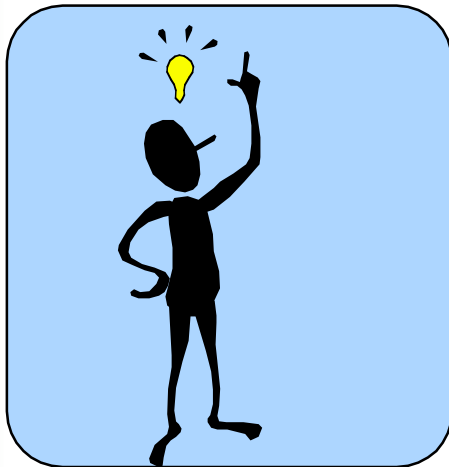
- Internet Explorer
- Microsoft Outlook
- Acrobat 4.0
- Create CD
- RealPlayer Basic
- JMS Audio
- Ulead COOL 3D 2.0
- マイ ネットワーク
- MSN Explorer
- Personal Dictionary f.
- QuickTime Player



Knowledge Awareness in Computer Supported Collaborative Learning

Knowledge Awareness

KA is information about other learners' activities in the shared knowledge space for inducing collaboration.



Individual learning → Collaborative learning



Learning by Intellectual Curiosity

- **Hatano & Inagaki, 1973:**
Human being has intellectual curiosity for learning by nature. So, we can learn something though the stimulation of curiosity, e.g., others statement, etc.
- **Convergent curiosity (CC):**
This is generated by the lack of sufficient knowledge, and it is very useful in that the learner can acquire detailed knowledge.
- **Divergent curiosity (DC):**
This occurs when there is a desire for learning and it makes the learner's stock of knowledge well balanced by widening the learner's interests.

Types of Knowledge Awareness

	<i>Same knowledge (CC)</i>	<i>Different knowledge</i>
Same time	<p>Who is looking at the knowledge?</p> <p>Who is changing the knowledge?</p> <p>Who is discussing the knowledge?</p>	<p><i>What knowledge (DC)</i></p> <p>What knowledge are they looking at?</p> <p>What knowledge are they changing?</p> <p>What knowledge are they discussing?</p>
Diff. time	<p>Who looked at the knowledge?</p> <p>Who changed the knowledge?</p> <p>Who discussed the knowledge?</p>	<p>What knowledge did they look at?</p> <p>What knowledge did they change?</p> <p>What knowledge did they discuss?</p>



Features of KA map

1. Visualization of hyperlinks on the WWW and other learners' activities.
2. Filtering the KA information according to learner's interests and activities.
3. Recommending the suitable learner as a collaborator using learners' profiles.



COALE

- Adaptive & Adaptable WBT system for CSCL
- Characteristics :
 - CSCL
 - Sharing Knowledge and annotations
 - Discussing with each other
 - Personalization
 - Recommending the content (Content awareness map)
 - Recommending learning mates (Learning-mate awareness map)
 - Customizable rule-based active web server
 - ECA (Event-Condition-Action) rules

学習者マップ
Learning-mate map

Category

User's interests

Recommended user

Current question

Current user

HELP

教材マップ
Content awareness map

Current question

Recommended question

HELP

Web Based Training - Microsoft Internet Explorer

ファイル(F) 編集(E) 表示(V) お気に入り(O) ツール(T) ヘルプ(H)

戻る 検索 お気に入り 履歴

アドレス http://wbt.is.tokushima-u.ac.jp/wbt/usercertificator.jsp

BACK TOP EXIT

共有知識一覧

知識入力

討論要求入力

教材マップ

学習者マップ

Question category

コンピュータアーキテクチャ

コンピュータ構成要素のアーキテクチャ

PROB00085 集積回路の種類

出典: 1種H11(1999)午前問19

Question

コンピュータの集積回路に用いられ、ユニポーラ型で消費電力が少なく、高集積度を実現できるものはどれか。

ア CMOS イ ECL ウ 12L エ TTL

Answer

解答:ウ 正解:ア

×まちがっています

Evaluation

Explanation

現在討論は行われていません。

Discussion starts



Concluding remarks

- Papers are available at <http://cscl.is.tokushima-u.ac.jp/ogata/>
- Useful links: <http://www.cscl-home.org/>
- Interdisciplinary research: pedagogy, computer science, social science, cognitive science, psychology.