

Exploring the Influence of Culture on Collaborative Learning

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Outline

- Design problem: designing culture general collaborative learning environments
- Specific example: argumentation
- Proposed solution: dynamic collaborative learning support
- Nagging questions

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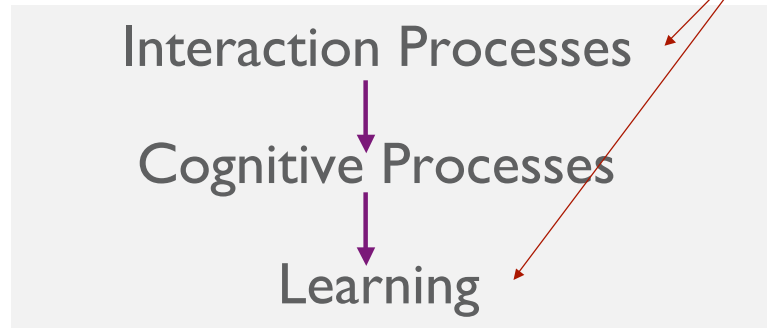
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Research Questions

- Practical: How can we design collaborative learning environments that foster effective learning in multiple cultural contexts?
- Theoretical: How can we become more aware of how cultural variables affect how students respond to educational interventions?

Design Challenge: Collaborative Process Problems Hurt Learning

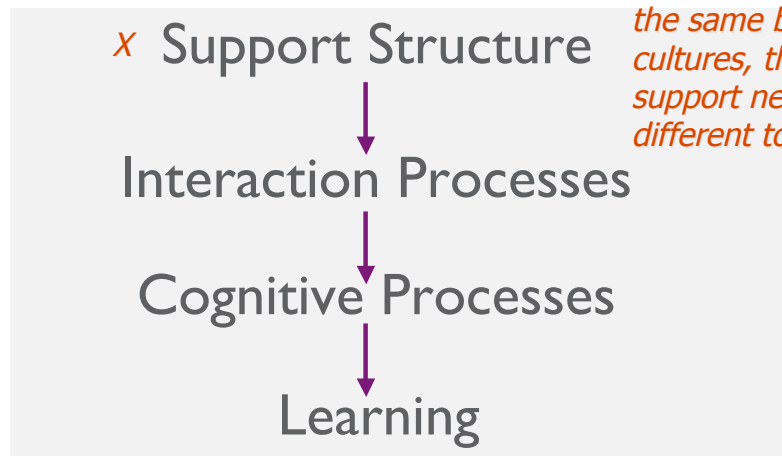
Problems with the Process reduce learning



Collaboration support increases learning



But if the process difficulties are not the same between cultures, then the support needs to be different too.



Process Problems in Collaborative Learning



- Process Loss (Brown & Paulus, 2002)
- Shallow help (Webb, Nemer, & Zuniga, 2002)
- Talking at cross purposes (Weinberger, 2003)
- Status oriented conflicts (Elbert & de Hann, 2004; ten Dam, Voman & Wardekker, 2004)

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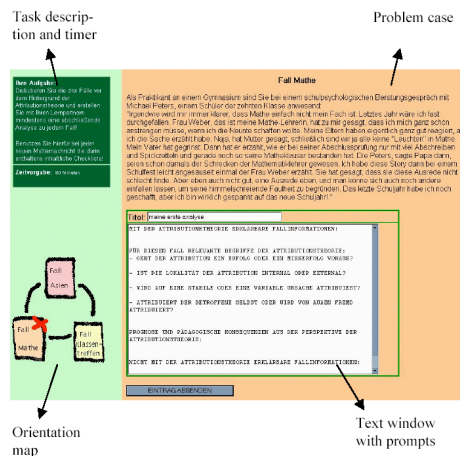
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Example Cultural contrast: Argumentation

- Argumentation is important for learning (Leitão, 2000; Voss & Van Dyke, 2001)
- Americans tend to focus on the points where they disagree (Setlock et al., 2004)
 - Pro: focus on differences more likely to lead to cognitive conflict (Piaget, 1985)
 - Con: less discussion in general
 - Solution: design support that creates conflict or otherwise elicits more discussion
- Asians may discuss each point regardless of whether they disagree or not (Setlock et al., 2004)
 - Pro: more thorough discussion, possibly more explanation (Chi et al., 2000)
 - Con: not all discussion equally valuable for learning
 - Solution: emphasize productive discussion and de-emphasize unproductive communication
- Implication: support may need to be different for Asians than for Americans

Collaborative Learning Support

- Script based support increases effective argumentation (Weinberger, 2003)
- Effective in Germany, but would it work in Taiwan?



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Prompts for the constructive critic

These aspects are not clear to me yet:

We have not reached consensus concerning these aspects:

My proposal for an adjustment of the analysis is:

Prompts for the case analyst

Regarding the desire for clarity:

Regarding our difference of opinions:

Regarding the modification proposals:

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How do we meet the needs of learners from different cultures?

- Collaboration support should be dynamic rather than static
 - Can respond to different patterns of interaction
 - Some Westerners may behave more like Asians and vice versa
- Dynamic support has other pedagogical motivations
 - Support should be faded over time (Collins et al., 1991)
 - Unnecessary support can be demotivating (Dillenbourg, 2002)

TagHelper Project



- Automatic analysis of conversational data
 - Automatic collaborative learning process analysis (Donmez et al., 2005; Wang et al., 2007b)
 - Trigger support on an as-needed basis
- Publicly Available Tool
 - <http://www.cs.cmu.edu/~TagHelper.html>
 - Currently provides text processing support for English, German, and Chinese

Coding provides an analysis of on-line argumentation

Question: How can we prevent a debris flow hazard from happening

Social Modes	Macro	Micro	Text
Externalization	Argument	Claim	We should limit urban development.
Externalization	Argument	Warrant	Over-development puts a strain on the environment.
Quote	Quote	Quote	> We should limit urban development.
Conflict-Oriented-Consensus Building	Counter-Argument	Claim	Limiting urban development is a bad idea.
Conflict-Oriented-Consensus Building	Counter-Argument	Warrant	It would negatively affect the economy.
Externalization	Argument	Claim	We could plan eucalyptus trees.
Externalization	Argument	Warrant	Eucalyptus trees soak up moisture.

Dynamic Support Using Dialogue Agents

Task Description

- 請想想有哪些「地理環境或人為因素可能是造成此次土石流災害的原因」，把你想到的都列舉出來，請一次輸入一個想法！

Student 1's Contribution

- 盜採砂石

Student 2's Contribution

- 盜採是違法的吧

Agent's Feedback

- 是的，盜採砂石可能鬆動了山坡地，進而破壞山坡地的平衡狀態。山坡地難道完全不能開發？怎樣的開發可能造成問題？
- 維護山坡地
- 可以開發
- 你似乎提到一個人為開發方面的想法，很好！「水土保持」的影響呢？
- 但盡量不要在順向坡的位置

Conferencing Mode: Student 1, Student 2 & Dialogue Agent

Example Dialogue

Speaker	Text
Student 1	People stole sand and stones to use for construction.
VIBRANT	Yes, stealing sand and stones may destroy the balance and thus make mountain areas unstable. Thinking about development of mountain areas, can you think of a kind of development that may cause a problem?
Student 2	Development of mountain areas often causes problems.
Student 1	It is okay to develop, but there must be some constraints.

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Can we avoid a completely separate design effort in every cultural context?

No Transfer	Partial Transfer	100% Transfer
Separate design effort in each context	Some findings transfer and other investigations must be conducted in multiple contexts	Design effort in one context is sufficient

How can we efficiently identify the aspects of design of collaborative learning environments that warrant "redundant" efforts in different cultural contexts?

Other nagging questions...

- Related to communication
 - How can we make sure our process analyses are measuring the same thing across different languages?
 - How can we be sure our coding schemes are not biased by our own cultural expectations?
- More general
 - How do we identify equivalent comparison groups across countries?