

Modelling and visualising traces for reflexivity in synchronous collaborative systems

Damien CLAUZEL, Karim SEHABA, Yannick PRIÉ

Laboratoire d'InfoRmatique en Image et Systèmes d'information (LIRIS)

Université Lyon 1, LIRIS UMR5205, F-69622 Villeurbanne, France

<https://liris.cnrs.fr/>

Outline

- 1 Context
- 2 Reflexivity and traces
- 3 Modelled traces
- 4 Our trace models
- 5 Prototypes in progress
- 6 Conclusion and perspectives

Context

Online synchronous collaborative learning is characterized by

- ≡ size: small closed group
- ≡ activity's structure: teachers specify the content
- ≡ collaboration: strong human exchanges
- ≡ time: synchronicity

Context

Our goals are

- ▢ to support group activity
- ▢ to support individual reflexivity
- ▢ to support group reflexivity
- ▢ to describe human activity on computer
- ▢ to create a memory of past interactions

Metacognition for learning

Metacognition is important in learning, and needs reflexivity
[Worrall and Bell, 2007]

Metacognition [Flavell, 1976]

[is] one's knowledge concerning one's own cognitive processes or anything related to them. . . For example, I am engaging in metacognition if I notice that I am having more trouble learning A than B; if it strikes me that I should double check C before accepting it as fact.

Why reflexivity?

Reflexivity of activity allows:

- ≡ metacognition
- ≡ awareness
- ≡ group synchronisation

We identify three levels of reflexivity: **individual**, **extended** and **group**.

Let's have a look at them!

Why reflexivity?

Reflexivity of activity allows:

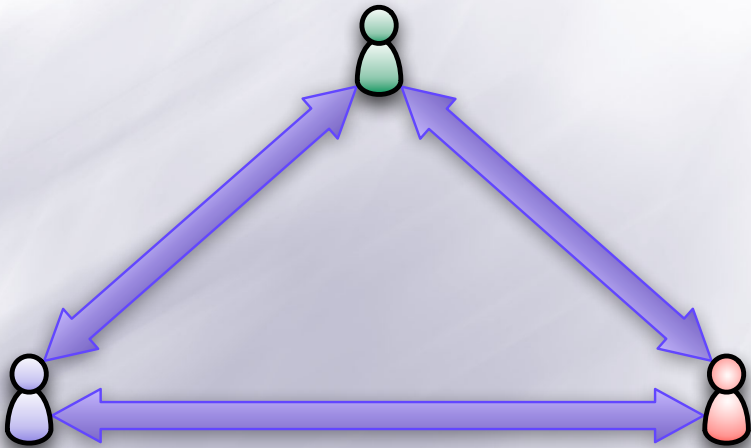
- ≡ metacognition
- ≡ awareness
- ≡ group synchronisation

We identify three levels of reflexivity: **individual**, **extended** and **group**.

Let's have a look at them!

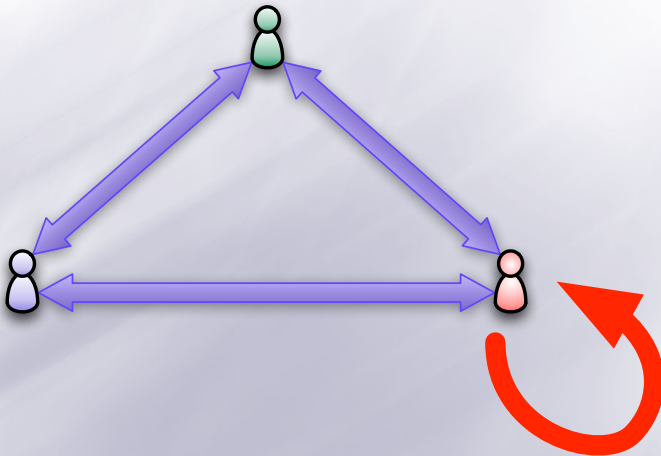
Basic synchronous collaborative activity

Situation of **synchronous collaboration**: 3 users working together



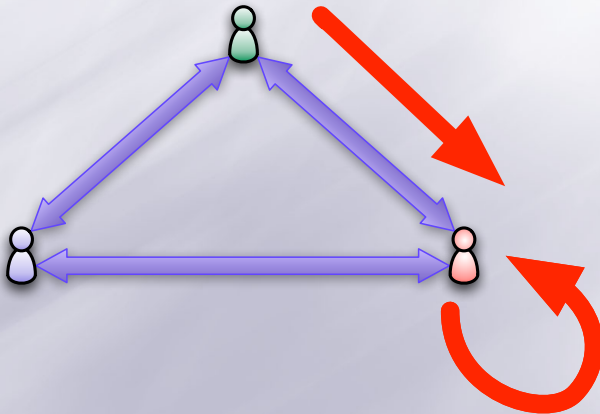
Different levels of reflexivity

Individual reflexivity: me, watching myself



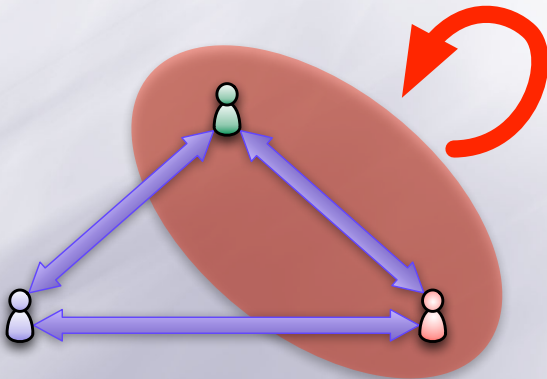
Different levels of reflexivity

Extended reflexivity: me, watching you and myself together



Different levels of reflexivity

Group reflexivity: me, watching *us*



Different levels of reflexivity

Conclusion : a need to **filter** and to **share** reflexivity within a group:

- ≡ on an individual base
- ≡ on a collective base

Our approach : we use **modelled traces** for working with reflexivity

What is a modelled trace?

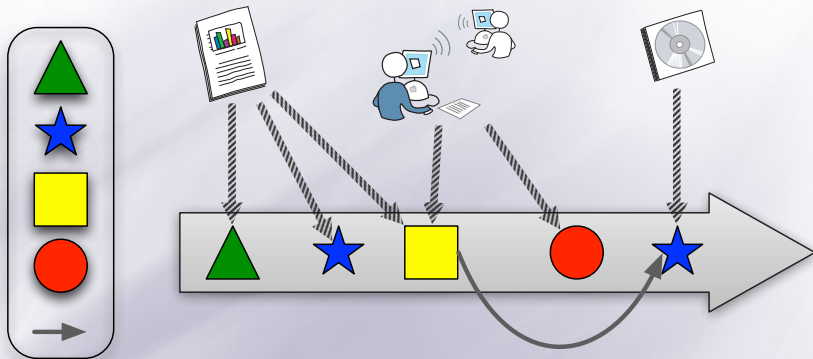
Modelled trace

We call “modelled trace” a collection of observations, temporally situated, associated to an observation model.

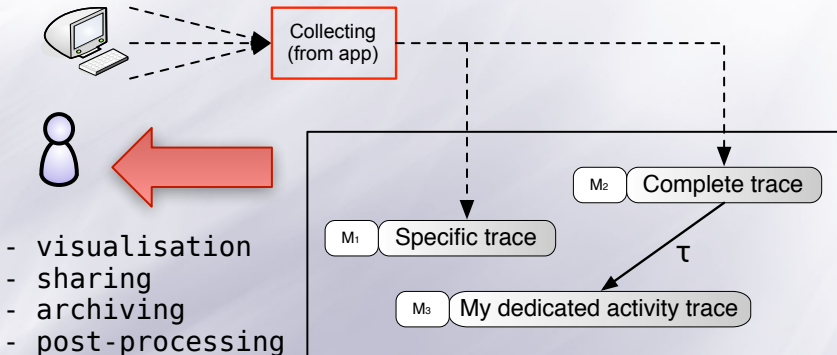
⇒ for short : a modelled trace is a formal representation of user's interactions

A modelled trace can be processed, transformed, shared and visualised.

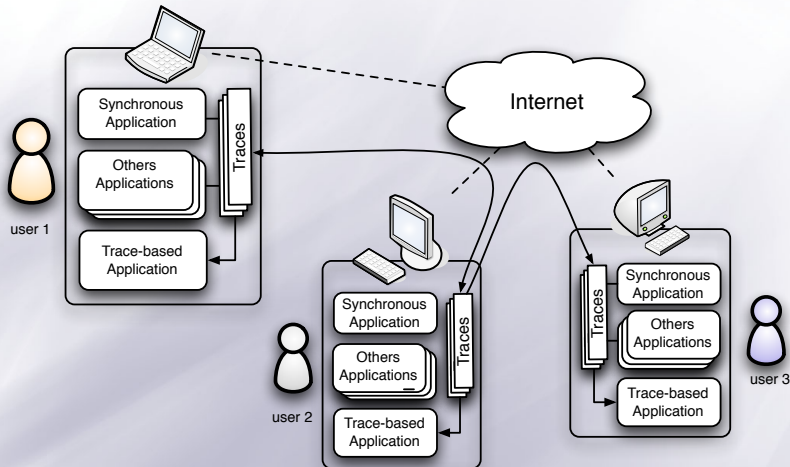
Modelled trace



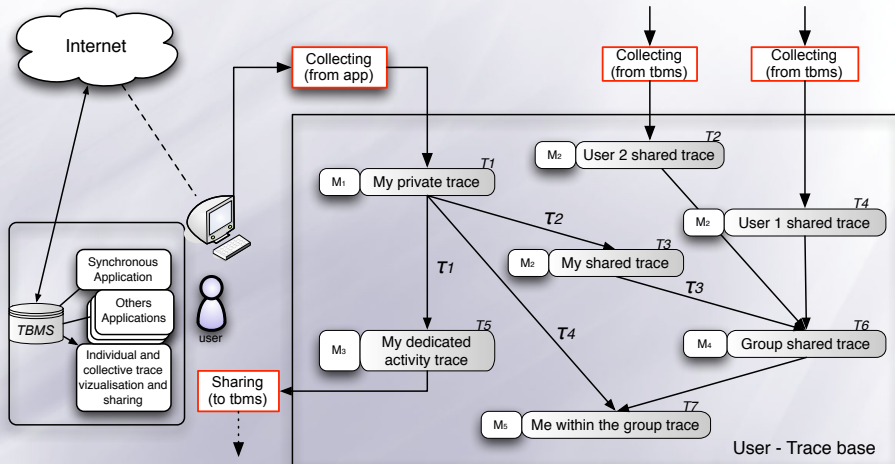
Single user and his trace based management system



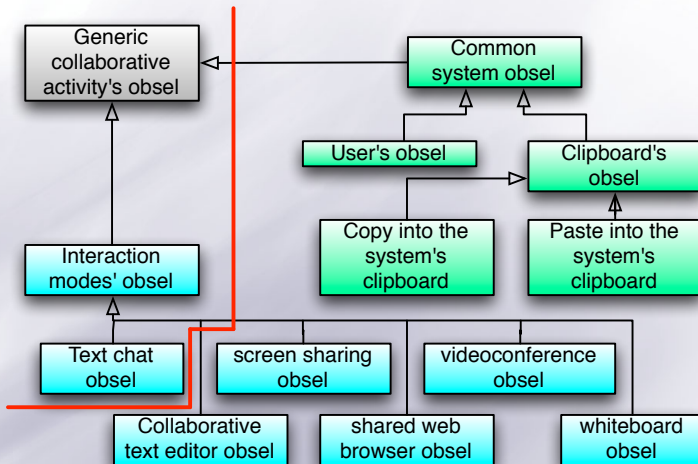
Collaboration with traces



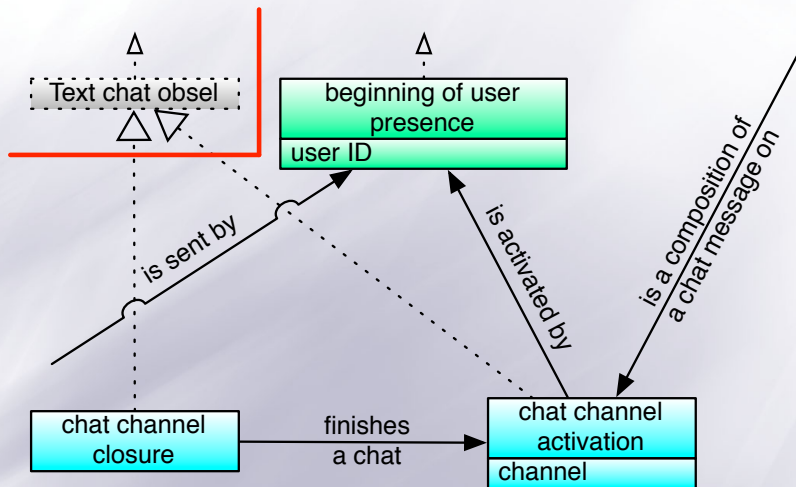
Reflexivity improved by traces sharing



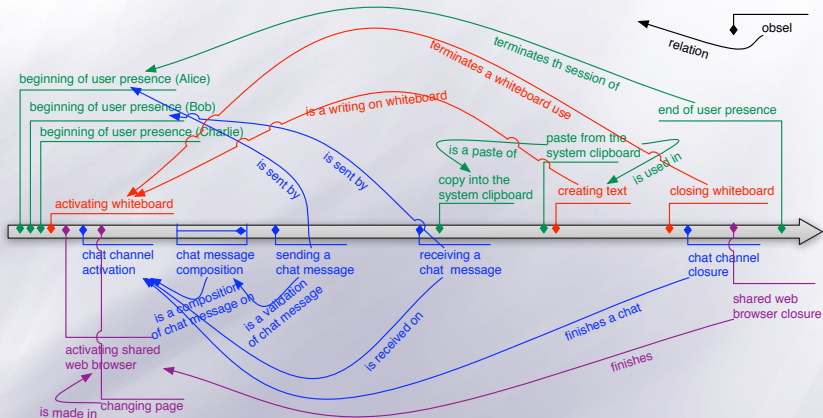
Generic model of synchronous collaborative activity



Zoom into the text chat model



Concrete example: Alice's trace in a group activity



Technical works on 3 axes

Development of several software, covering all aspects:

1. collecting traces : instrumented applications
2. processing traces : traces management system
3. using traces : interactive visualisation of traces

Instrumented chat client producing modelled traces

```

[14:54:55] --> dclauzel (n=dclauzel@134.214.142.157) a rejoint #LIRIS
[14:54:55] -@- Pseudos #LIRIS: [Damien_portable dclauzel LT-P]
[14:54:55] -=- Canal #LIRIS: 3 pseudos (0 op, 0 halfop, 0 voice, 3 normal)
[14:54:55] -=- Canal créé le Tue Sep 1 00:43:47 2009
[14:55:07] != #LIRIS: [freenode-info] if you're at a conference and other people are having
trouble connecting, please mention it to staff:
http://freenode.net/faq.shtml#gettinghelp
[14:56:12] dclauzel | et hop
[14:56:23] Damien_portable | hop hop
[14:57:57] dclauzel | idéalement, je suis capable de produire une trace  $\gamma$ -enrichie de notre
conversation
[14:58:23] Damien_portable | Damien_portable: oui, idéalement...
[14:59:11] Damien_portable | en attendant, nous ne récupérons que des observés pour les présenter à
l'utilisateur
[14:59:28] dclauzel | oui, mais c'est interactif !
[15:00:42] Damien_portable | j'espère bien :)
[15:00:48] Damien_portable | aller zou
[15:01:04] <- Damien_portable (n=dclauzel@liristpq.univ-lyon1.fr) a quitté #LIRIS ("au
boulot")
3 freenode 2 #LIRIS +sn Act: 3
15:01:42 octobre, lundi 05 2009
[dclauzel()]

```

User feedback

Adobe Flash Player 9

Fichier Affichage Contrôles Signets Aide

URL: OGVIT.swf

Weechat activity trace

My actions

| Temporality | Type | Content |
|---------------------|---------------------|-------------------|
| 16:00:05 | beg. user presence | Alice |
| 16:04:12 → 16:04:13 | message composition | http://www.examp- |
| 16:05:45 | sending message | <...> |
| 16:05:55 | receiving message | from Charlie |
| 16:07:15 | end user presence | Alice |

Community activity

| Temporality | Person | Type | Content |
|---------------|---------|----------------|-------------------|
| Thu. 7, 16:00 | Bob | beg. user pre- | Alice |
| Thu. 7, 16:00 | Charlie | beg. user pre- | Alice |
| Thu. 7, 16:05 | Charlie | receiving mes- | http://www.ex- |
| Thu. 7, 16:05 | Charlie | sending mess- | OK |
| Thu. 7, 16:06 | Bob | message com- | I will be right - |
| Thu. 7, 16:06 | Bob | sending mess- | to Charlie |

Conclusion and perspectives


Theoretical work:


- ≡ **applications models:** genericity, automatic generation
- ≡ **conception:** theory of modelled trace visualisation
- ≡ **validation:** evaluating benefits in learning with our reflective system

Technical work:

- ≡ **trace visualisation:** software for interactive visualisation of traces
- ≡ **trace manipulation:** sharing, processing
- ≡ **traces management system:** extending core functionalities

References

 Flavell, J. (1976).
Metacognitive aspects of problem solving, chapter 12, pages
231–236.
Routledge, Pittsburg.

 Worrall, L. and Bell, F. (2007).
Metacognition and Lifelong E-learning: a contextual and cyclical
process.
E-Learning, 4:161.

And of course :

- ≡ Google: “trace modélisée interaction”
- ≡ our research team: <https://liris.cnrs.fr/silex> (French and English)