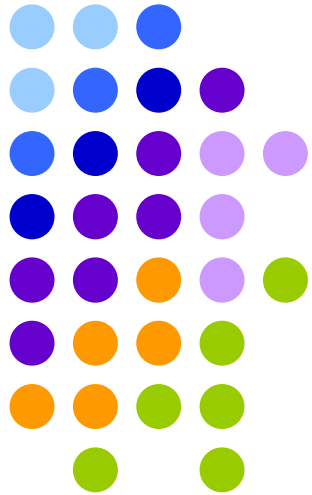
Measuring the effect of collaboration in an assessment environment

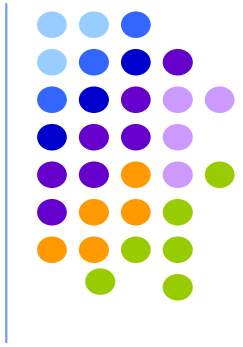
Barros, Guzmán & Conejo

Universidad de Málaga, Spain



AIED'2007,12th July

Motivation



In collaborative learning research there are several open challenges, some of them related with this work

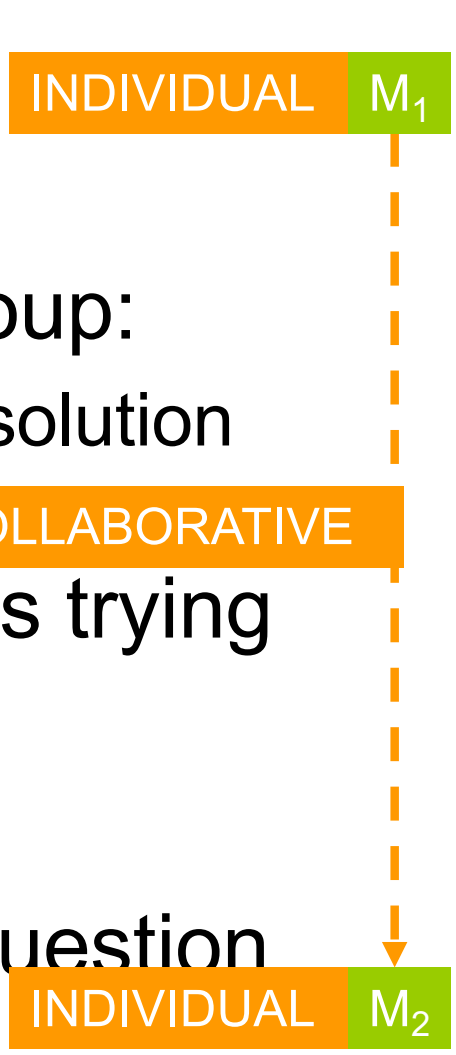
- Define authentic activities that promote collaboration
- Develop learning environments that focus the students in the learning objectives instead of dispersing the collaboration in aspects out of the topic
- Search for scenarios that allow to explore and measure the influence of collaboration in individual knowledge

Scenario

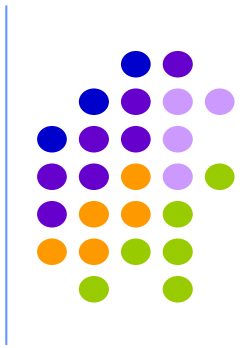
- Members of a group of studens solve individually a item/question of a test
- Individual results are shared in the group:
  - I can see your solution/ You can see my solution

Students disscuss about their solutions trying to understand what is the correct one

- Students solve again the same item/question individually



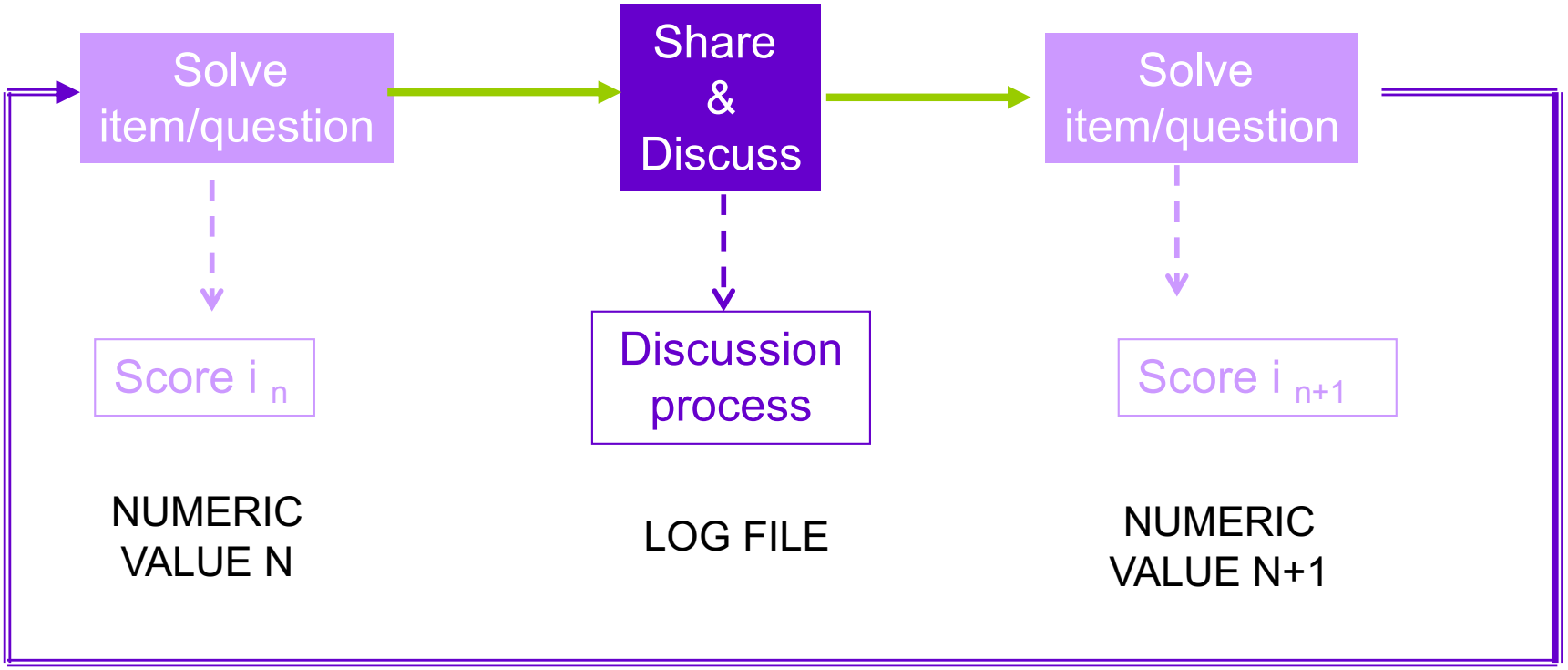
Objectives



- Define a scenario that combines individual and collaborative learning
- Observe how students tackle the discussion and collaboration during a evaluation process

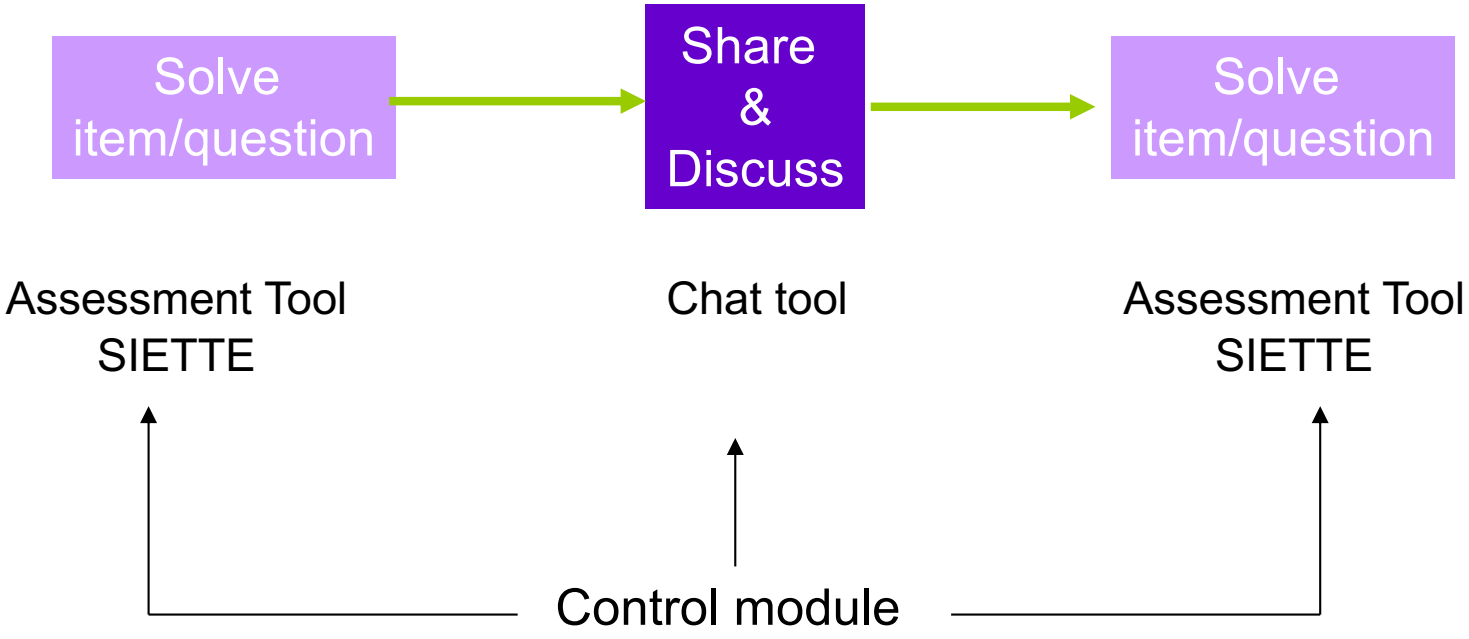
- **Measure** the effect of collaboration in a assessment environment

Collaborative Script



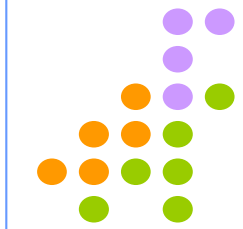
The script is repeated with n questions consecutively

Collaborative Script



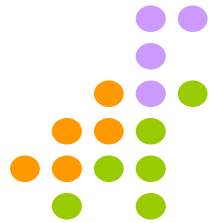
sequences the items
controls the chat tool
gives awareness information
saves the discussion process in the log file

Implementation

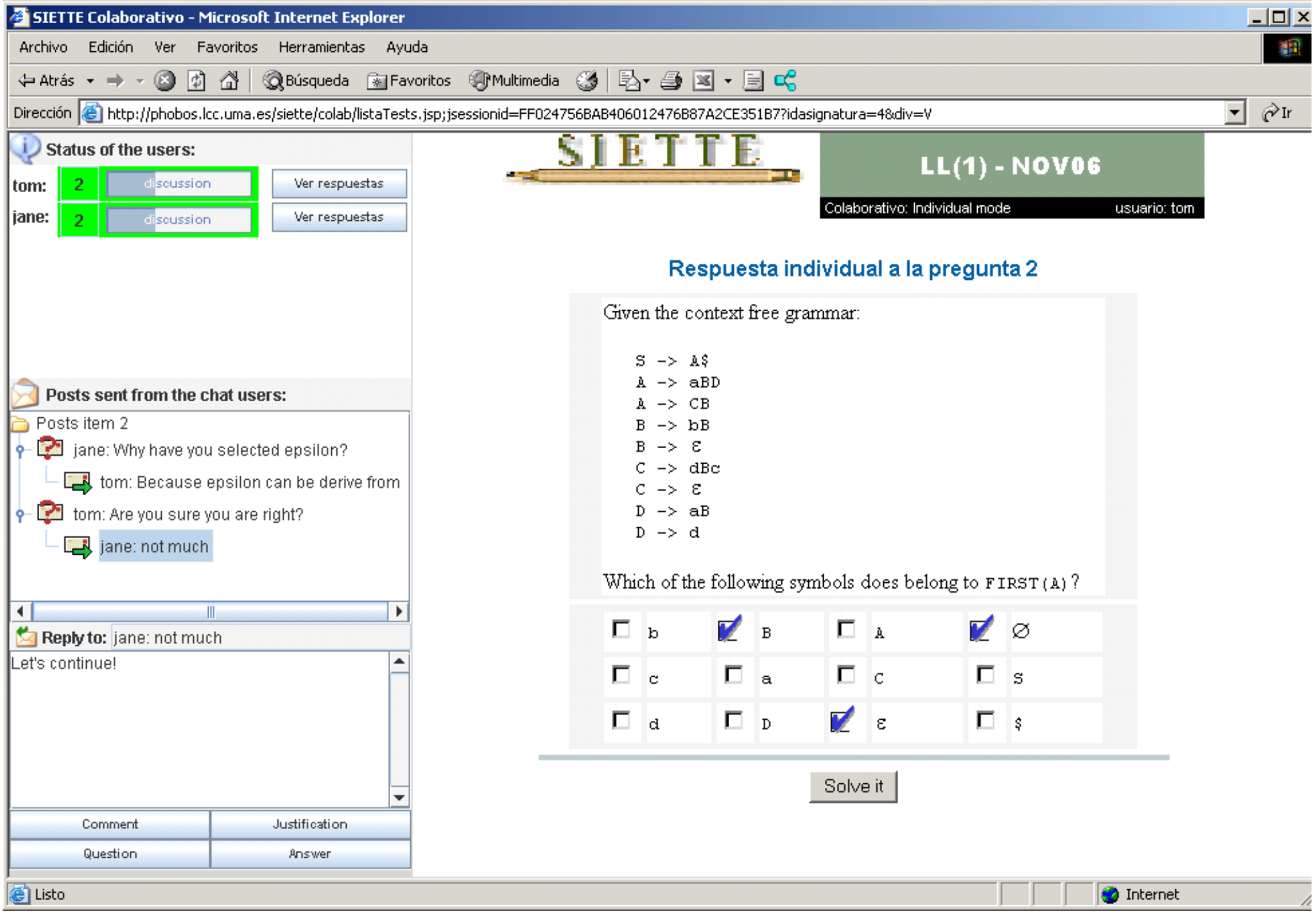


- The control module has a web-based interface that shows the assessment tool and the collaborative tools (for sharing, chatting and awareness facilities)
- They are active or not depending on the state of the question
- The awareness tool helps to understand what's happening in the group

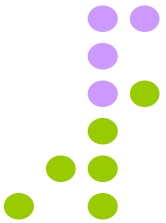
Assesment Tool. SIETTE



- SIETTE is a web-based system for building computerized tests
- The control module is an envelope around SIETTE supporting student collaborative testing
- It collects the answers of the students and the events that describe the activity of the user, in is shown in the awareness panel

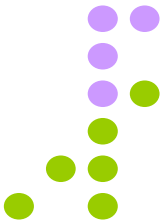

SIETTE Colaborativo - Microsoft Internet Explorer
Archivo Edición Ver Favoritos Herramientas Ayuda
Atrás Búsqueda Favoritos Multimedia
Dirección http://phobos.lcc.uma.es/siette/colab/listaTests.jsp;jsessionid=FF024756BAB406012476B87A2CE351B7?idasignatura=48&div=V
Ir
Status of the users:
tom: 2 discussion Ver respuestas
jane: 2 discussion Ver respuestas
SIETTE
LL(1) - NOV06
Colaborativo: Individual mode
usuario: tom
Respuesta individual a la pregunta 2
Given the context free grammar:
S -> A$
A -> aBD
A -> CB
B -> bB
B -> ε
C -> dBc
C -> ε
D -> aB
D -> d
Which of the following symbols does belong to FIRST(A)?
b B A ∅
c a C S
d D ε $
Solve it
Posts sent from the chat users:
Posts item 2
jane: Why have you selected epsilon?
tom: Because epsilon can be derive from
tom: Are you sure you are right?
jane: not much
Reply to: jane: not much
Let's continue!
Comment
Justification
Question
Answer
Listo
Internet

Evaluation.



- Test with 10 questions, about Compilers and LL(1) grammars
- 24 students in two sesions
- 9 groups with two people and 2 groups of three people
- Sharing and discussion active when the student sends their solution
- Student can decide when to finish collaboration and answer again the question

Evaluation.

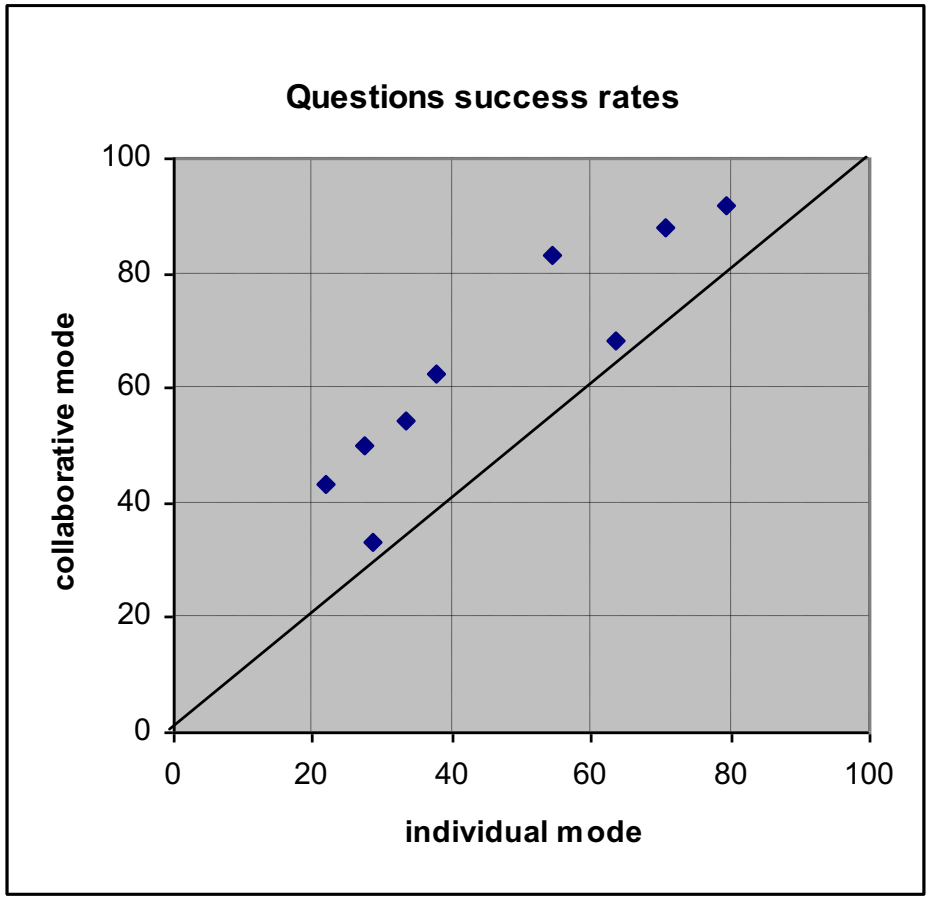


- Test with 10 questions, about Compilers and LL(1) grammars
- 24 students in two sessions
- 9 groups with two people and 2 groups of three people

  - It has been collected data of score of each question (before and after collaboration)
  - And data about the discussion process

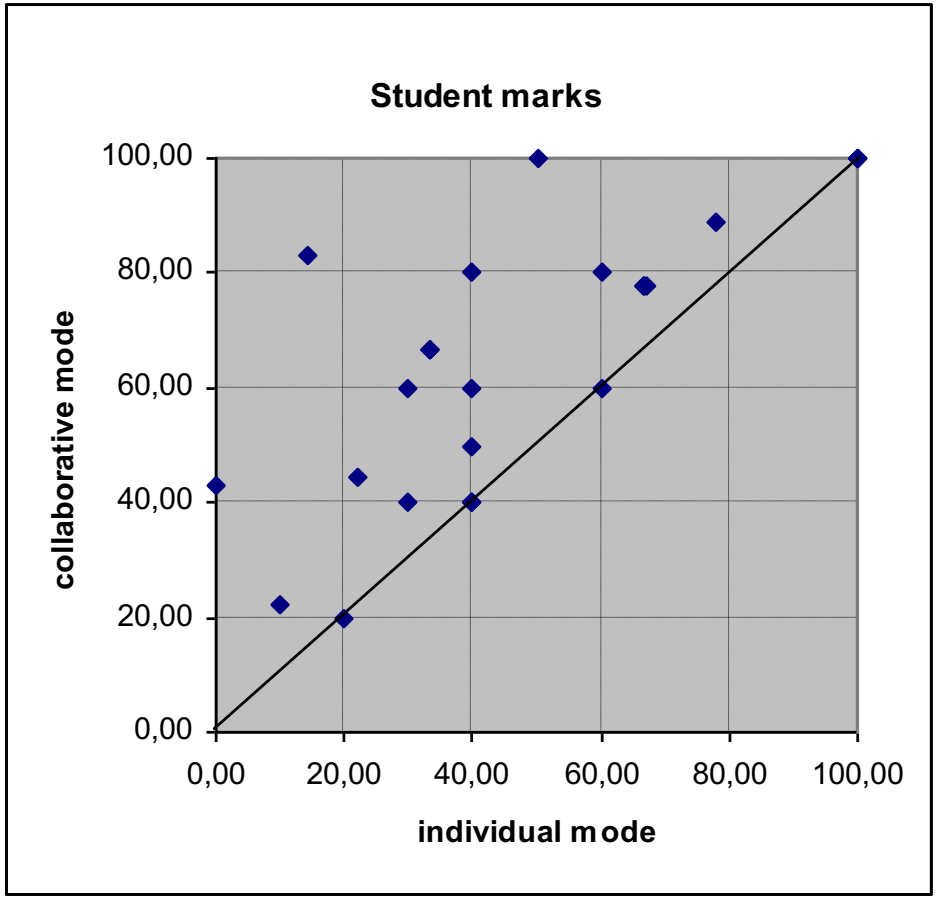
Evaluation. Results

- Average of correct responses before and after the collaborative phase



Evaluation. Results

- Student marks



Evaluation. Results

Table 1: *Performance of students according to their estimated knowledge level*

	Number of cases n	Average of absolute improvement	Average of relative improvement $\bar{x}$	Standard deviation of the relative improvement s	Confidence interval at 95% $\bar{x} \pm t_{0.025} \frac{s}{\sqrt{n}}$
A-class	10	+11.7%	0,30	0,32	0,30±0,23
B-class	14	+23.1%	0,31	0,25	0,31±0,15

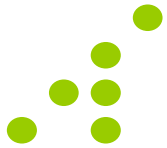
Table 2: *Performance of students according to their relative knowledge level in their groups*

	Number of cases n	Average of absolute improvement	Average of relative improvement $\bar{x}$	Standard deviation of the relative improvement s	Confidence interval at 95% $\bar{x} \pm t_{0.025} \frac{s}{\sqrt{n}}$
H-class	10	+6,33%	0,16	0,19	0,16±0,14
L-class	12	+30,34%	0,47	0,27	0,47±0,17

Conclusions and Future work

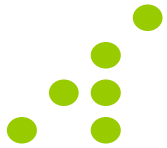
- From our experiments, it can be statistically concluded that collaboration increases the performance in assessment
- Observed:
  - Majority of students improved the results
  - Students chatted about their knowledge and their colleagues'
  - Discussion is centre on the question meaning
  - The discussion can help to discover their own failures but not in all cases
  - The bigger the interaction level within the group the better the students' performance

Conclusions and Future work



- Advantages of this scenario
  - It is possible to measure quantitatively the effects of collaboration
  - Due to time schedule, students focus the discussion on the topic of the question (the knowledge itself)

Conclusions and Future work



- Future work
  - Evaluate other scripts:
    - individual – sharing & group_discussion – agreement – group_answer
    - Individual – sharing – individual
  - Measure with other tools

Demo….

http://www.lcc.uma.es/siette