

Appendix

Table A.1.: Questionnaire about the current teacher inquiry practice in the two schools (N=33).

What is the current teacher-led inquiry practice in different school communities?	
Likert scale: 1-Never, 2-Rarely, 3-Sometimes, 4-Often, 5-Always	
a.	Learning design
1.	How often do you design your own learning activities for your students?
2.	How often do you document the learning activities which you do with your students? ("Documenting" means writing in detail the descriptions of the activities, e.g. tasks, tools and resources used, etc.)
3.	Please provide comments for your answers (if you use tools to document activities, indicate which tools).
b.	Formative evaluation of learning activities
4	How often do you reflect (e.g. using your own feelings, thoughts) about the impact of the learning activities to improve them for the next course or lesson?
5	How often do you collect data from what students do in the learning activities to understand their impact?
6	How often do you collect data for the students' opinion about the learning activities?
7	Please provide comments for your answers. If you use tools for these aspects, indicate which tools.
c.	Teacher collaboration
8	How often do you collaborate with other teachers in the design of activities?
9	How often do you share with other teachers the activities which you design?
10	Please provide comments for your answers. If you use tools to work with other teachers, indicate which tools.

Table A.2.: Sample of Interview questions about the teacher inquiry process (N=7).

a.	Technology-supported teacher inquiry
1.	Please explain your experience with the design, implementation and reflection of the learning designs which you created. Which were the main challenges or problems? Did you overcome them? How?
2.	What could be the role of technology to facilitate a teacher-inquiry cycle?
3.	What do you think are the challenges for you or other teachers to perform inquiries with technology? (e.g. with the use of the TILE tool, with the use of Google forms, PyramidApp to collect data).
b.	Formative evaluation
4	Which collected data and technologies were especially useful for the improvement of your design?
5	Can you give an example of data use for improving your learning design?
c.	Teacher collaboration
6	Which is the utility of having access to documented inquiry cycles of other teachers?
7	Are there benefits or challenges to reuse others' documented inquiries?
8	Are you willing to share your documented inquiries with other teachers within your school? Why? And outside the school?

Table A.3.: Phase 1: Teachers' demographics in the two schools

		School 1 (N=21)		School 2 (N=12)		Both schools (N=33)	
		N	Percentage	N	Percentage	N	Percentage
Gender	<i>Female</i>	12	57	7	58	19	58
	<i>Male</i>	9	43	5	42	14	42
Age	<i>20-34</i>	5	25	4	33	9	27
	<i>35-44</i>	9	45	4	33	13	39
	<i>45-54</i>	6	30	4	33	10	30
	<i>55+</i>	1	5	0	0	1	3
	<i>Teaching experience</i>	<i>5 or fewer</i>	3	14	3	33	6
	<i>6-10</i>	5	24	4	44	9	27
	<i>11-15</i>	4	19	1	11	5	15
	<i>16-20</i>	5	24	1	11	6	18
	<i>21 or more</i>	4	19	3	33	7	21
	Teaching subjects	<i>Arts/Music</i>	1	5	0	0	1
<i>Language</i>		2	9	0	0	2	6
<i>Foreign Language</i>		1	5	1	11	2	6

	<i>Social sciences</i>	3	14	1	11	4	12
	<i>Maths</i>	2	9	0	0	2	6
	<i>Science</i>	3	14	5	41	8	24
	<i>Other</i>	9	42	5	41	14	42

Table A.4: Phase 2: Sample of classroom implementations and teacher inquiry cycles in the two schools

	School 1			School 2		
Teacher code*	T S1.a	T S1.b	T S1.c	T S2.a	TS2.b	TS2.c
Subject	Economics and Business	Philosophy	Biology and Earth Sciences	Biology and Chemistry	Earth Sciences	Maths and technology
Teaching experience	24 years	25 years	20 years	5 years	14 years	7 years
Problem/ Questions	Collaborative conclusions from a questionnaire	Brainstorming to define a concept	Brainstorming to define a concept	Identify theories from text in groups	Student distraction in group work	Equity of participation, increasing motivation
Intervention/ Evaluation	CL activity about conclusions in collected data from students	CL about initial definitions and final conclusions	CL about initial definitions	CL text comprehension activity with quotes about theory	CL activity-solving a case	CL activity-solving a case
Collected student data	Engagement, Content, Observations notes	Engagement, Content	Engagement, Content, Observation notes	Engagement, Content, Student feedback	Student feedback, peer-assessment	Student feedback
Reflections for learning (re)design	Time management, Off-task discussions, Student understanding, Emerged open student attitude, Improving instructions before-during task	Time management, Achieved brainstorming, Management of students' groups, Teacher's presentation of the task	Time management, Off-task discussions, Control of the tool, Participatory approach, Collecting students' ideas	Time management, Off-task discussion, Revising feedback questions, Dynamic-enriching activity, Improved student capacity	Time management, Distraction in groups, Preparing students for complex task with smaller activities	Time management, increased participation, better role distribution

*TS1= Teacher in School 1, TS2=Teacher in School 2

Table A.5: Main topics of teacher group reflections and excerpts of their comments in School 1

Topic and description	Excerpts
Level of participation: comment about student participation	"14 of the students who participated did not provide any answer." "The activity has been performed irregularly by the students."
Limited understanding of the activity: comment about student misunderstanding	"It seems they didn't clearly understand the purpose of the activity." "Some answers did not respond to the goals of the activity. Instead of a conclusion they made an assessment."
Ease to collect student data: comment about ease of data collection	"It is practical to quickly and globally collect the opinion of the students."

Proposed improvements: comment about improvements in the design based on the data	<i>"It would be better to have a presentation before the activity and clarify the objectives."</i> <i>"It might be good to do a test before directly entering this dynamic to make a final assessment."</i>
Assumptions: comment about teacher assumptions based on the data	<i>"[...]These two factors suggest that some of the students did not know how to use the tool or did not have enough time to complete it."</i>
Positive realization: comment about positive experience based on the data	<i>"I see it was a good experiment with this group."</i> <i>"It seems to me a very interesting activity."</i>

Table A.6: Main topics of teacher group reflections and excerpts of comments in School 2

Topics and description	Excerpts
Student feedback: comment about the collected data about student feedback	<i>"Positive assessment indicates that it is a methodology well received by students."</i> <i>"The collaborative aspect is highlighted in several student comments."</i> <i>"The activity seems suitable for learning. The students showed satisfaction for their learning and the methodology."</i> <i>"In this group their perceptions about the task (objectives, participation, learning) seem very interesting and makes them very aware of what and how they are learning."</i>
Help-seeking behavior: comment about the help-seeking behavior of students	<i>"In the student feedback, your item-question "I asked for help when I needed it?" received low ratings. We may need to know beforehand if students needed help during the task" "You may need to revise how students can help each other to solve the task since student feedback indicates that they have not requested help. Or maybe it was not necessary (?)."</i>
Time and pace of the activity: comment about the time and pace of the intervention	<i>"I guess at the beginning the pace is difficult to control." "There is a general feeling of lack of time by the students." "According to feedback, more than 30% of students say they have not had enough time to think. Therefore, surely, the timing of the activity should be checked to allow reading and reflection."</i>
Ease to collect student data: comment about ease of data collection	<i>"I think...it allows you to follow the process of the students in the chat."</i> <i>"It makes a comprehension activity dynamic and generates debate among the students. It also offers data that can be reviewed to improve the activity."</i>
Improving instructions before-during the task: comment about the instructions offered to students for the enactment of the intervention	<i>"Arguing guidelines could be set to make more profitable valuations," "Its should be improved and facilitated the presentation of the activity and have mechanisms to facilitate the understanding of what will be done."</i>
Familiarity of students with the tool: comment about student familiarity with digital tool	<i>"I think it would be useful a demonstration-tutorial or have some video on how to do it to facilitate the use of the tool."</i>

Table A.7.: Excerpts from teacher interviews in the two Schools

Topic	Excerpt
Teacher inquiry cycle (TILE)	<p><i>“If we would be doing it in all the didactic activities, it would be great.” TS1.c., Philosophy Teacher, School 1</i></p> <p><i>“I think we intuitively ended up doing this process, but we did not have it documented. [...]but I also wonder ... Is it necessary to document it? I do not know ... surely the teachers would have more objective data, but it is also a bureaucratization of a process “ TS1.d, Biology teacher, School 1</i></p> <p><i>“The idea of the cycle is very good, but I can not do it for each class. I have to do it by unit or by quarters” TS1.e, History teacher, School 1</i></p> <p><i>“The fact that it's separated in different steps helps you to be more aware of what you're doing. In the step “Problem and Questions” the formulation of a question was one thing that I liked a lot because then, maybe you evaluate it after a long time, and it allows you to go back at the beginning” TS2.a, Biology and Chemistry teacher, School 2</i></p> <p><i>“A good and interesting change because it shows me where I can fail. Maybe I emphasize on some of the steps and not on the others. The more visible is this, the better I build the didactic sequence. Good, good and necessary.” “I usually do the review in the summer and see what has worked and what has not. But if I collect data throughout the year, the review I do in the summer will be much better because I will be able to consult all this information, which maybe I did not remember.” TS2.d, Philosophy teacher, School 2</i></p> <p><i>“I think the steps have helped me. Even so, it depends on what things are important to share this reflection together with other teachers” TS2.c, Math and technology teacher, School 2</i></p>
Formative evaluation	<p><i>“In the feedback of the students, they indicated that they were stressed and had not enough time to develop a good argument. I realized from their feedback that 20 minutes was not enough... that I had to use all the time” TS2.a, Biology and Chemistry teacher, School 2</i></p> <p><i>“[...]For example, having the discussions of the students allows you to see that, sometimes, they have not understood the concept you wanted to convey. Sometimes they all tell you that they have understood and it is not like that.” TS1.d, Biology teacher, School 1</i></p>
Teacher collaboration	<p><i>“It is useful to find joint solutions and have empathy with the same problems that others have.”, TS1.d, History teacher, School 1</i></p> <p><i>“I have the feeling that sometimes more have been given in informal spaces, in the staff room, while we are eating, that we are commenting “I have used this”, “this has helped me for that” ... etc.” We do not have many spaces for shared reflection with other teachers.” “For example, the implementation of X gave me an idea to apply it in another subject.” TS2.a, Biology and Chemistry teacher, School 2.</i></p> <p><i>“It is very useful because you can always find a way to connect with your subject.” “To know that in mathematics the students are working in groups ... and see, for example that, my students work individually. It is nice to be able to compare your classes with other teachers ... It seems super important to see the strategies of others.” TS2.d, Philosophy teacher, School 2</i></p>

"It is useful to see how other teachers think in the teacher inquiry cycle." TS2.c, Math and technology teacher, School 2

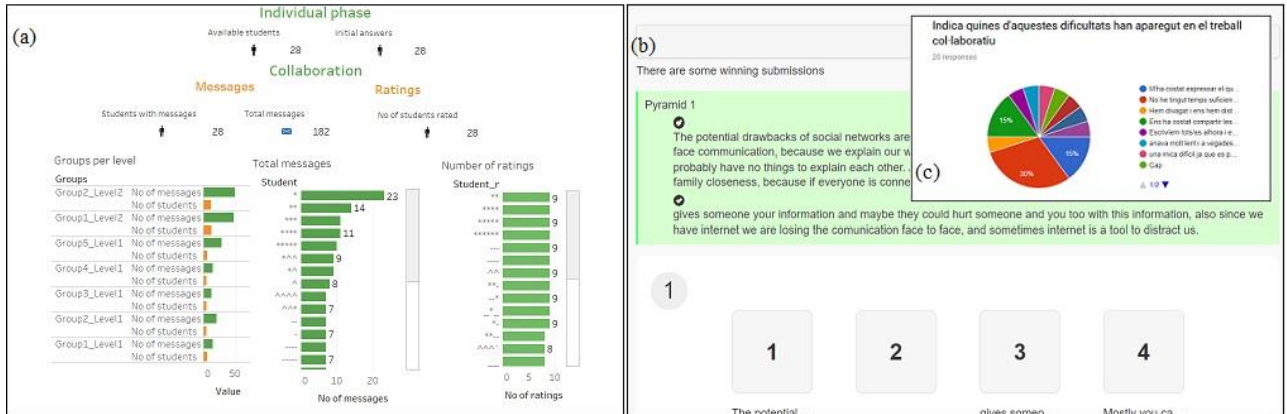


Figure A1: Example of collected data in inquiry cycle (TILE): a) Engagement analytics during the collaborative activity; b) Content of student answers and discussions in the collaborative activity; c) Student feedback.