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EXECUTIVE SUMMARY

This document describes the work carried out during the first 9 months of the DIALLS project within Workpackage 6, “Online Platform for Cultural Literacy Learning”. The principal task during these 9 months was the preparation of Deliverable 6.1 (D6.1) “Recommended online software suite for the DIALLS project” (M0-M9). D6.1 is structured into 3 main sections (Critical review of Computer-Supported Collaborative Learning (CSCL) Systems; Co-design workshops with users; and Functional recommendations) along with a comprehensive introduction and a concise conclusion. In the first part of D6.1 we present a systematic and critical review of the existing (currently available or not) CSCL systems supporting dialogue and collaborative argumentation practices. The aim of such a systematic and critical review is to identify the specific functions of existing CSCL systems that will be relevant and should be included in the DIALLS SUITE. Additionally, we highlight the limitations of existing CSCL systems by pointing out 2 important biases in their design and development: a) age-related bias and b) written language bias. Besides these two important limitations, the fact that they have not been tested in cross-cultural comparative studies presents important challenges for the DIALLS project (e.g., semi-automatic translation). In the second part of D6.1. we describe the work carried out during two consecutive co-design workshops with future users (researchers and teachers) of the DIALLS SUITE. The aim of which was to further specify the functionalities of the existing CSCL systems included in the systematic and critical review that were relevant for the DIALLS suite. To do so, workshop participants were asked to collaboratively design educational activities for the classroom. Thus, the main goal of both co-design workshops was to provide a detailed contextualization of the CSCL system functionalities analyzed in the critical review and how they could be adjusted to the DIALLS project. These were necessary steps for the design and development of the DIALLS suite. In the third part of D6.1. we provide a detailed description of the functional recommendations for the design and development of the DIALLS suite. The work done in the preparation of D6.1 constitutes the basis for the actual development and launch of the DIALLS online. The online platform must be successfully launched and ready for teacher to use by M17 (September 2019).

1. Introduction

1.1 Project background

The purpose of this deliverable is to present work carried out within **Workpackage 6 (“Online Platform for Cultural Literacy Learning”)** during the first **9 months of the project (M0-M9)** of the DIALLS project. We recall that DIALLS is a three-year European project with **three main objectives**:

- Develop an understanding of young people’s cultural literacy in formal education through the teaching of dialogue and argumentation as a means to understand European identities and cultures.
- Provide comprehensive guidance for the development of cultural literacy in schools through the creation and evaluation of a scale of progression for cultural literacy learning as manifested in students’ interactions and produced artefacts.
- Promote the emergence of young people’s cultural identities in a student-authored manifesto for cultural literacy and a virtual gallery of their cultural artefacts.

For these purposes, the main objective of Workpackage 6 (WP6) is to select, combine, adapt and provide a suite of online tools that will enable students and teachers to engage effectively in **co-constructive dialogue and argumentation** about the cultural learning resources. It is to be noted that the DIALLS project does not have a computer science research partner. Rather, the DIALLS Platform will be developed by modifying related CSCL software tools that are available within project partner 9, School of Education HUJI, with proven international expertise in educational technology.

Specific objectives of WP6 are as follows:

- To identify and analyse the suite of online tools that is most adapted to achieving the project’s aims, ensuring that they are usable by students and teachers
- To facilitate teachers’ use of the tools
- To launch a usable online platform for dialogic exchange between students
- To adapt pedagogical scenarios and teaching materials to online situations

The DIALLS SUITE is a platform (henceforth in this document referred to simple as “The DIALLS Platform”) designed to enable **text-based as well as open discussions among small groups**, training students to **reflect on their discussions**, and training teachers to **design and moderate discussions**. The DIALLS Platform adds support for the features necessary to **moderate multiple discussions**, share ideas and **cultural products** across remote discussants, **build on each other products** and **reflect on past activities**, thereby opens varying pedagogical opportunities for **building a shared culture**.

The principal goal of WP6 between M0-M9 was the preparation of Deliverable 6.1 (D6.1) “Recommended online software suite”. D6.1 is structured into 3 main sections:

1. Critical review of CSCL systems;
2. Co-design workshops with users (researchers and teachers);
3. Functional recommendation for the DIALLS Platform.

The work done in the preparation of D6.1 constitutes the **basis for the actual development and launch** of the DIALLS Platform. These were necessary steps for the **design and development of the CSCL system**. In the third part of D6.1. we provide a detailed description of the **functional recommendations** for the design and development of the DIALLS Platform. The online platform must be successfully launched and ready for teacher to use by M17 (September 2019).

The objective of the DIALLS Platform is to support the educational activities proposed by the project, to meet “user needs”. Three categories of users are defined:

1. **learners** (at three age groups (5-6, 8-9 and 14-15 years old), across the project participants’ countries;
2. **teachers**, relating to 1;
3. **researchers**, analysing data from use of the DIALLS platform.

At the centre of the DIALLS project are: (i) **the collective cognitive-linguistic processes of interpretation**, by learners, of wordless texts, designed to stimulate productive/constructive discussion on cultural literacy/identity concepts; (ii) **dialogue processes, particularly argumentation and dialogue** (see WP5); (iii) **teacher scaffolding** (with specific “prompts”) of (i) and (ii). These are the **macro-level activities** to be supported by the platform.

The overall guiding concept is that of “**blended learning**” (Beaver, Hallar & Westmaas, 2014), whereby so-called ‘traditional’ teaching approaches, that may involve use of ICT to a greater or lesser extent, are combined with new online activities. According to the DIALLS description of work, the particular blending of the platform and existing teaching (in specific sequences defined by WP3) is shown in Figure 1 below.

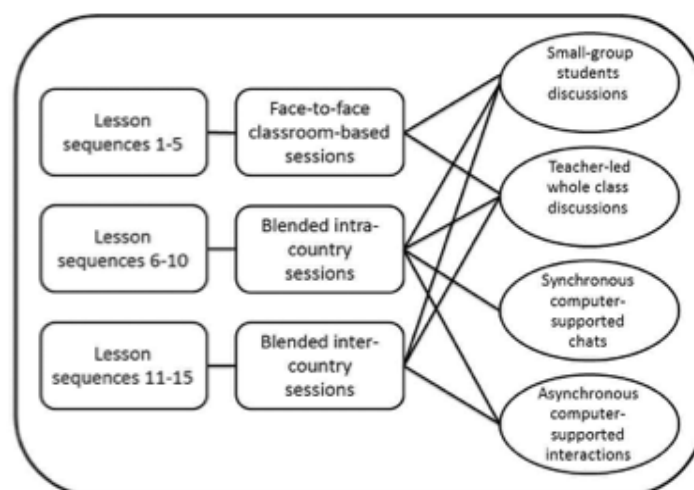


Figure 1: DIALLS situations for technology platform mediation (corresponds to DIALLS Description of Work Figure 3 “Structure of the CLLP lesson sequences”).

From Figure 1, it can be seen that the DIALLS Platform will be used in (a) **two spatio-temporal situations** — between schools within a given country, or else across different paired consortium

countries — crossed with choices between (b) **two general types of pedagogical activities** — small group discussions, teacher-led whole class discussions — with (c) **two types of computer-supported communicative interaction** — asynchronous or synchronous. In all cases, activity will be blended to the extent that it is contextualised — introduced, summarised, ... — by the teacher in ordinary face-to-face sessions. Note that in this case, an additional activity — to be supported by DIALLS technology or not — is that of the **requirement for collaboration between teachers**, in intra/inter-country sessions.

Figure 1 can be reformulated in tabular form, defining the general sets of situations/activities to be supported, as in Table 1 below:

Table 1: General computer-supported situations studied by DIALLS

| | | Spatio-temporal organisation | | | |
|-----------------------------|--|--|---|--|---|
| | | Intra-country [teaching sessions 6-10] | | Inter-country [teaching sessions 11-15] | |
| | | <i>Synchronous</i> computer- supported CHATS | Asynchronous computer- supported collective activity | <i>Synchronous</i> computer- supported CHATS | Asynchronous collective activity |
| General activity type | Teacher-led whole class discussions | YES | YES | NO | YES |
| | Small group student discussions | YES | YES | NO | YES |

As can be seen from the above table, both **asynchronous collective activity (e.g. on a forum)** and **synchronous CHAT** need to be supported online (simply, only the former is used between countries), for both **teacher-led** and **small group discussions**.

1.2 Work carried out in WP6 between M0 and M9

The principal task during the first 9 months of the DIALLS involved was the preparation of Deliverable 6.1 (D6.1) “Recommended online software suite” (M0-M9). In order to do so, we **developed a functional analysis of the user requirement inherent in the project**, including as they emerge from the development of Cultural Literacy Learning Programme (CLLP, currently under development) (WP3) and relevant characteristics of the range of **available online tools for collaborative argumentation-based learning** (Description of Work, p. 46). The functional analysis took into account all teaching materials and scenarios under development (WP3) in the project, to identify requirements. These included the software functionalities that enable:

- Typewritten or video dialogue between students
- Teachers being able to input specific prompts for students
- Teachers authoring and uploading pedagogical materials
- Students co-creating cultural learning resources
- Teachers and students re-using and modifying learning resources

- Systematic organisation of learning resources, automatic tracing of dialogues
- Co-creation processes, organised in a systematic and searchable manner
- Generation of automatic traces of its use by students and teachers, for both of these groups of users in reflexive activities, as well as constituting a source of research data to be analysed.

The output of this subtask was the first version of user software requirements document at M6. The document has been circulated around DIALLS partners and was treated as a living document rather than a deliverable, to be updated throughout the project, as its shared knowledge develops within an innovation approach¹.

We developed a systematic and critical review of existing tools supporting and co-creation of multimedia teaching resources (Section 2) on the basis of the functionalities described in the user requirements document. The DIALLS Platform should facilitate **dialogue both within countries and across them**, as well as **the sharing, use and co-creation of cultural resources** (such as multimodal texts, images, videos). The aim of such systematic and critical review is to **identify the specific functions of existing CSCL systems that will be relevant** and should be included in the DIALLS SUITE. Additionally, we highlighted the **limitations of existing CSCL** systems by pointing out 2 important biases in their design and development: a) **age-related bias** and b) **written language bias**. Besides these two important limitations, the fact that they **have not been tested in cross-cultural comparative studies** presents important challenges for the DIALLS project (e.g., semi-automatic translation).

Additionally, we organized **two co-codesign workshop with expert users** (researchers and teachers) of the DIALLS Platform (Section 3). The aim of which was to further **specify the functionalities of the existing CSCL systems** included in the systematic and critical review that were relevant for the DIALLS SUITE. To do so, workshop participants were asked to collaboratively design educational activities for the classroom. Thus, the main goal of both co-design workshops was to provide a **detailed contextualization of the CSCL system functionalities** analyzed in the critical review and how they could be **adapted to the DIALLS project**. Co-design workshops enabled us to validate the most of the tools included in existing software and to discuss the inclusion of new ones (e.g., semi-automatic translation tools).

Section 2 and 3 were the basis for the functional recommendations included in section 4 (Figure 2):

¹ This document is not included in D6.1. but it can be consulted here: <https://bit.ly/2FreO03>.

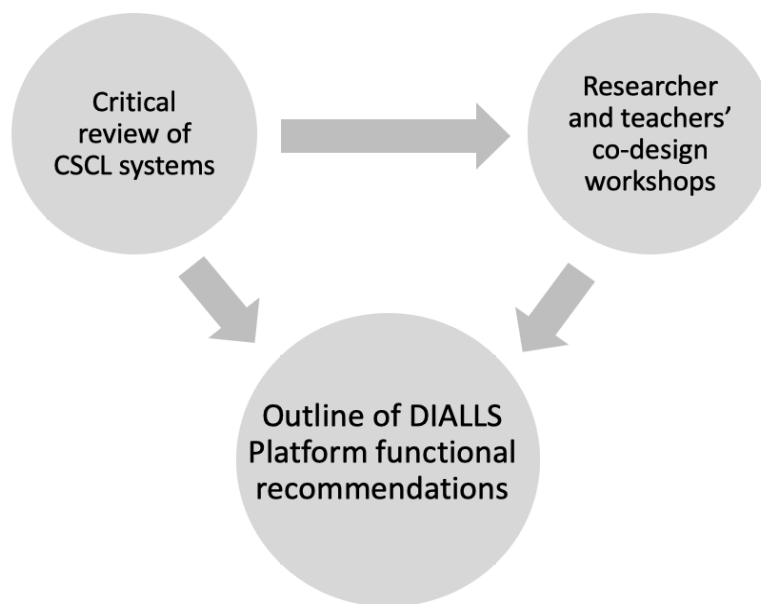


Figure 2: Work done in D6.1 as preparation of the actual DIALLS Platform

In section 4 provides a detailed description of the **functional recommendations** for the design and development of the DIALLS Platform. Functional recommendations **include mockup images of possible user interfaces**. Functional recommendations are defined according to the groups of users (teacher, learner, researcher) and activities supported and the basic DIALLS scenario. The work done in the preparation of D6.1 constitutes the basis for the actual development and launch of the DIALLS online. The online platform must be successfully launched and ready for teacher to use by M17 (September 2019).

1.3 The structure of this deliverable

The subsequent section 2 of this document, below presents our critical review of existing CSCL systems for computer-supported collaborative argumentation.

This is followed, in section 3, by a description of two co-design workshops with future users of the DIALLS Platform (researchers and teachers). Co-design workshops were held in Paris and Cambridge, in September and November 2018, respectively. The workshop conducted in Cambridge included **class observations** where teachers currently collaborating with the project applied some of the main features of the canonical pedagogical described in the Description of work.

Section 4 we propose a detailed description of each of the computer tools **retained from the critical and systematic review** and **validated in the co-design workshops**. And section 5 discusses our results and their implications for the recommended functionalities. We also present our current and future work. At the end of sections 2, 3 and 4 we included boxes summarizing main results.

Appendices reproduce the user-centered activity scenarios co-created by researchers and teachers in co-design workshops.

2. Critical review of CSCL systems

2.1 Background

Dialogue is an interactive and collaborative process of meaning making. It goes beyond the sum of individuals' thinking, as dialogue scaffolds individual and collaborative learning, and creates the conditions for the emergence of new knowledge (Wegerif, 2007). Teachers play a central role in guiding dialogic discussions in the classroom (Auckerman, 2013; Maine & Hoffman, 2016). From a dialogic teaching perspective (Alexander, 2017), teachers should make possible students' co-construction of new meanings and knowledge by creating dialogic spaces (Wegerif, 2011) where the exchange and emerge of alternative viewpoints are promoted. Teacher supported dialogic and collaborative processes enable students to explore and build on their own and other's viewpoints and develop new solutions. Alexander argues that dialogic teaching "harnesses the power of talk to engage children, stimulate and extend their thinking, and advance their learning and understanding" (Alexander, 2017, p. 37).

Argumentation is a specific type of dialogue, which aims to create conceptual gains in the participants involved, as they engage in a process of epistemic negotiation (Baker, 2016) where concepts are continuously refined. When students collaborate in argumentative activities in the classroom, the learning goals may be either **learning to argue** or else **arguing to learn** (Andriessen, Baker, & Suthers, 2003) - or some combination of both. When viewed as a collaborative practice, **argumentation can help learners to accomplish a wide variety of important learning goals**. There are many ways that argumentation can contribute to learning. First, argumentation involves knowledge **elaboration, reasoning, and reflection**. These activities have been shown to contribute to **thinking** (Wegeriff, 2011) and **deeper conceptual learning** (Bransford, Brown, & Cocking, 1999). Second, participating in argumentation helps students **learn about argumentative structures** (Kuhn, 2001). Third, because productive argumentation is a form of collaboration, it can help **develop social awareness and collaborative ability** more generally (Wertsch, 1985). Fourth, groups of people, at work, at home, in social contexts, often share a common tradition of argumentation (Billig, 1987), and effective participation in these groups can **enable learning how to argue** competently within them (Koschmann, 2003).

Research on collaborative learning in the learning sciences has shown that this pedagogical approach is many but not all cases at least as effective in terms of knowledge elaboration, as other methods (Dillenbourg, 1999; Wegerif, Mercer, & Dawes, 1999). However, collaborative activities can be associated with a much broader set of learning outcomes, such as higher self-esteem and motivation for school work (Slavin, 1989). The adoption of collaborative learning in schools is not only a question of efficiency of learning but also response to societal changes such allowing the emergence of more horizontal modes of organization.

Nevertheless, a large body of research has shown that most people have difficulty arguing collaboratively (see Schwarz & Baker, 2017, chapter 6, for a review). Computer technology offers a potential solution. For example, **CSCL systems can support and guide productive dialogue and argumentation**, leading to deeper understanding in the sense of knowledge building (Bereiter &

Scardamalia, 2003), or in the sense of knowing the other across cultural differences (Wegerif et al., 2017).

CSCL systems can play an important role in such learning to the extent that they enable task sequences and interpersonal communication media to be structured in ways that favour the co-elaboration of knowledge (e.g. Baker, 1999; Dillenbourg, 1999).

This critical review provides a systematic assessment of users' experiences with existing CSCL systems (currently available or not) supporting dialogue and collaborative argumentation. In this context, users are basically understood as learners, teachers and to a lesser extent researchers. The decision to include in the review CSCL systems which are not currently available was based on the following reasons: a) **very few CSCL systems employed to conduct empirical studies with users are currently available** for downloading and installation; and b) **not currently available CSCL systems contain computer tools that are essential** to support the activities and functions considered in the DIALLS project (e.g., asynchronous communication and co-creation of cultural artefacts).

Our critical review has two main goals. Firstly, we aim at **identifying the basic characteristics shared by most CSCL systems** as described and assessed in systematic reviews of user's experiences (e.g. representational guidance and collaborative scripts). Secondly, we aim at **providing a first insight into the computer tools that the DIALLS Platform should contain** in order to support the functionalities described in the Description of Work (p. 46-7).

2.2 Method

CSCL systems supporting the activities described in Description of Work (p. 46-7) were identified through: a) systematic review articles in the CSCL literature published between 2010 and 2018 that have consistently assessed the computer tools provided by CSCL systems in articles reporting empirical studies; b) the articles reporting empirical studies included and reviewed in those systematic review articles; c) those empirical studies should have been conducted with primary and secondary school students (not university students). Irrelevant articles were of course excluded at a later step, based on their reading. The exclusion criteria are indicated on figure 3 which presents the overall process of identification of relevant publications.

We decided to base our identification of relevant CSCL systems on a systematic search on the studies that have consistently assessed in the literature because **most of those CSCL systems are not currently available for downloading, installation and in-house examination and testing** (see Figure 1). Although most of those CSCL systems are not currently available, we decided to include them in our critical review because they contain tools that are relevant for the functions that the DIALLS Platform will have to support. Additionally, a review only based on technical documentation guidelines of non-available and available CSCL systems would have not provided useful information about the actual capabilities of their tools when tested with primary and secondary school students.

2.2.1 Systematic reviews

In May 2018, we performed a thoroughly search for systematic review articles of CSCL systems supporting dialogue and argumentation activities published between 2010 and 2018. Two digital libraries were searched: the network of 42 libraries that are part of the University of Paris-Saclay institutional system (<https://www.universite-paris-saclay.fr/en/libraries>) and Scopus. Searches were facilitated using four sets of keywords covering 'CSCL', 'argumentation', 'dialogue' and 'review'. We found 14 systematic reviews published in the following journals:

- *International Journal of Computer-Supported Collaborative Learning* (N=5)
- *Educational Research Review* (N=3)
- *Computers in Education* (N=2)
- *Educational Psychologist* (N=2)
- *Education and Information Technologies* (N=1)
- *Journal of Computer-Assisted Learning* (N=1)

Additional search criteria were used to find systematic reviews that could serve as an entry point for: a) the identification of relevant software; b) gathering information about the functions supported by their tools; and c) how teachers and students used those tools in empirical studies. We applied these criteria to the 14 articles found in our first search. The three articles met those requirements were published in the following journals:

- *The International Journal of Computer Supported Collaborative Learning* (Scheuer, Loll, Pinkwart, & McLaren, 2010)
- *Educational Research Review* (Noroozi, Weinberger, Biemans, Mulder, & Chizari, 2012)
- *Education and Information Technologies* (Major, Warwick, Rasmussen, Ludvigsen & Cook, 2018).

Our next step in the search process was the **identification of relevant CSCL systems** included in the empirical studies assessed in Scheuer et al. 2010; Noroozi et al., 2012, and Major et al., 2018 systematic reviews of the literature.

2.2.2 Identification of relevant CSCL systems

We identified CSCL systems used in the empirical studies reviewed by Scheuer et al. 2010; Noroozi et al., 2012, and Major et al., 2018. Currently available web-based systems such Empatico® (<https://empatico.org/>) and Generation Global ® (<https://generation.global/>) were not included in the critical review because users' experiences have not yet been systematically assessed in the CSCL literature.

The following **34 CSCL systems were found** after removing redundancies:

- AcademicTalk (e.g., McAlister, Ravenscroft, & Scanlon, 2004)
- ARGUNAUT (e.g., De Groot, Drachman, Hever, Schwartz, Hoppe, et al., 2007)

- AVD (e.g., Nussbaum & Edwards, 2011)
- Belvedere (e.g., Schwarz, Neuman, Gil, & Ilya, 2003)
- BioBlast (e.g., Crossa, Taasoobshirazib, Hendricksc, & Hickeya, 2008)
- Blackboard TM (e.g., Jeong & Frazier, 2008)
- C-CHENE (e.g., Baker & Lund, 1997)
- COFFEE (e.g., Ligorio, Tateo, Manno, De Chiara, & Iannaccone, 2007)
- CONNECT (e.g., De Vries, Lund, & Baker, 2002)
- CoStructure (e.g., Ertl, Fischer, & Mandl, 2006)
- Digalo (e.g., Schwarz, & De Groot, 2007)
- DREW (e.g., Lund, Molinari, Sejourne, & Baker, 2007)
- FL3 (e.g., Oh & Jonassen, 2006)
- Knowledge Community (Yiong-Hwee & Churchill, 2007)
- Knowledge Forum (Prinsen, Volman, Terwel, & Van den Eeden, 2009)
- Metafora (e.g., Schwarz, de Groot, Mavrikis, & Dragon, 2015).
- NetMeeting (e.g., Veerman, Andriessen, & Kanselaar, 2000)
- Ntool (e.g., Beers, Kirschner, Boshuizen, & Gijselaers, 2007)
- PhysHint (e.g., Ding, 2009)
- REACH (e.g., Tsukahra, Zisheng, Akamatsu, Anma & Okamoto, 2007)
- SAVER (e.g., Monteserin, Schiaffino, & Amandi, 2010)
- SimSketch (e.g., Bollen & van Joolingen, 2013)
- Talkwall (e.g., Nesnass & Toussiant 2016)
- T3 (e.g., Tewissen, Lingnau, & Hoppe, 2000)
- TC3 (e.g., Erkens, Prangsmas, & Kanselaar, 2005)
- VCRI (e.g., Janssen, Erkens, Kirschner, & Kanselaar, 2010)
- Village (e.g., Taasoobshirazi & Hickey, 2005)
- VisualGroup (e.g., Buder & Bodemer, 2008)
- WebCrossing (e.g., Kim, Anderson, Nguyen-Jahiel, & Archodidou, 2007)
- WebCT (e.g., Golanics, & Nussbaum, 2008)
- Web Forum (e.g., Prinsen, Volman, Terwel & Van den Eeden, 2009)
- Web-tool (e.g., Marttunen & Laurinen, 2009)
- Wikis (e.g., Woo, Chu, Ho, & Li, 2011)
- WISE (e.g., Clark, D'Angelo, & Menekse, 2009)

Then we **excluded from our review the CSCL systems that were only tested with university students** because this is not a student population included in the DIALLS project. Eight CSCL systems were excluded from our review: **AcademicTalk; Blackboard™; Knowledge Community; NetMeeeting; SAVER; VisualGroup; WebCT; and WebForum**. Twenty-six CSCL systems were kept for inclusion in our review (Figure 1).

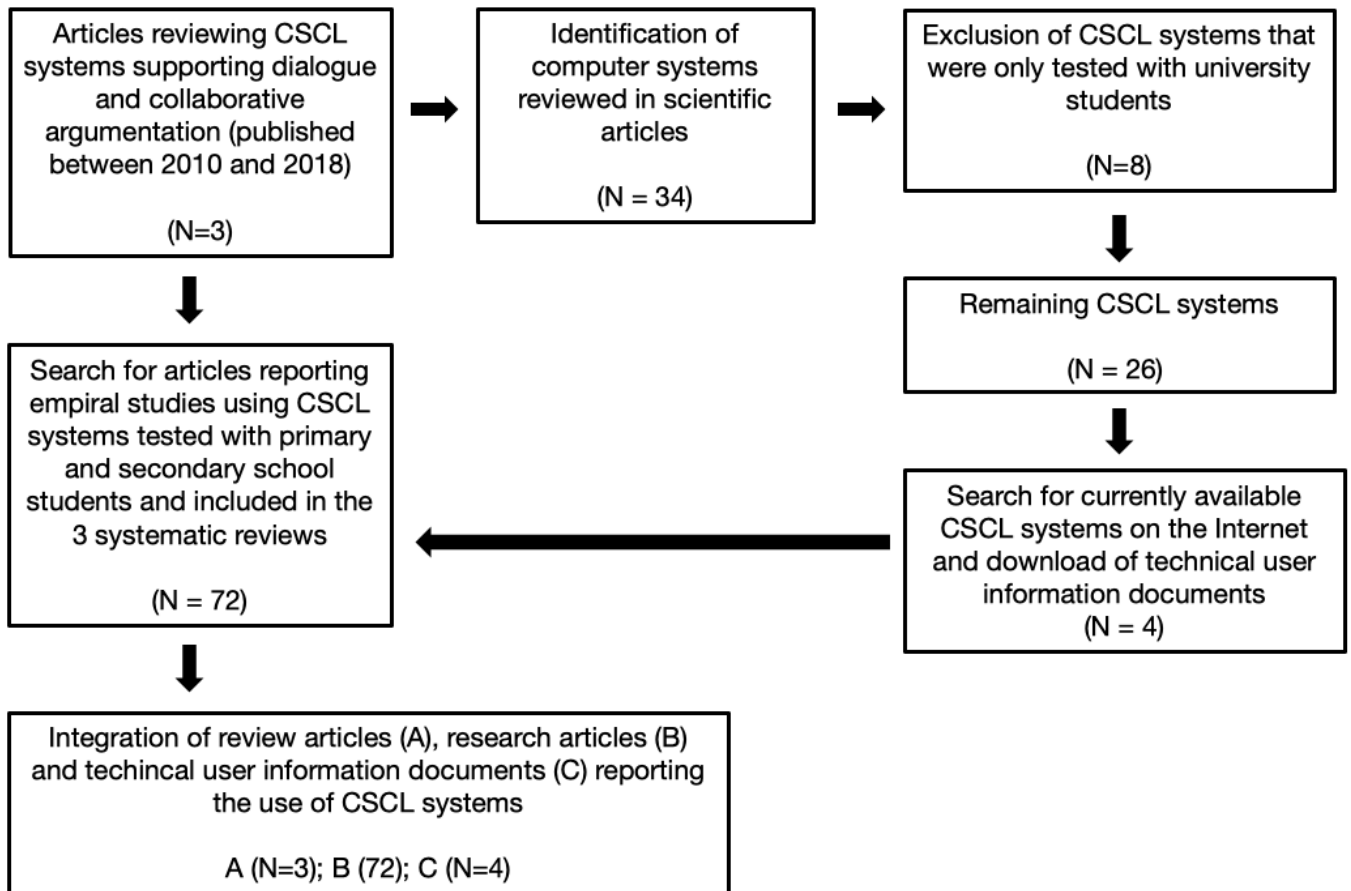


Figure 3: Exclusion and inclusion criteria for CSCL system, systematic review articles, research articles and technical user information documents.

2.2.3 Search for currently available CSCL systems

At this stage we checked how many the relevant CSCL systems found in the three systematic reviews were available for downloading and installation. We found URL addresses of 9 out the 26 CSCL systems retained for the review (**Belvedere**; **CoFFEE**; **Digalo**; **DREW**; **FLE3**; **Knowledge Forum**; **Metafora**, **SimSketch** and **Talkwall**). However, only four CSCL systems were available for downloading and installation (**CoFFEE**, **FLE3**², **SimSketch** and **Talkwall**). Although websites of the remaining 4 systems were operating, systems were not in use and were no longer supported. We downloaded **technical user's information documents for the four CSCL systems** and included them in our review. Documents were downloaded from the following websites:

- CoFFEE: <https://sites.google.com/a/unisa.it/coffee-soft/product/resources>
- FLE4: <http://blog.growingcos.org/search/label/FLE3%2FFLE4>
- SimSketch: <http://modeldrawing.eu/our-software/simsketch/>
- Talkwall (https://www.talkwall.net/#!/_)

² The current available version of FLE3 is FLE4. See <http://fle4.aalto.fi/>.

2.2.4 Search for articles reporting empirical studies in systematic reviews

We searched for the empirical articles using the 26 previously selected CSCL systems that were included in the three systematic reviews found at the beginning of the search process (see Section 2.2.1). Seventy-two new records were found. These articles were published between 1997 and 2016 and appeared in the following journals:

- *International Journal of Computer-Supported Collaborative Learning* (N=11)
- *Journal of the Learning Sciences* (N= 5)
- *Computers and Education* (N=5)
- *Computers in Human Behavior* (N=5)
- *Journal of Computer-Assisted Learning* (N=4)
- *Instructional Science* (N=3)
- *Educational Psychologist* (N=2)
- *International Journal of Science Education* (N=2)
- *British Journal of Educational Technology* (N=2)
- *Learning and Instruction* (N=1)
- *Journal of Science Education and Technology* (N=1)
- *Journal of Research in Science Teaching* (N=1)
- *Educational Psychology Review* (N=1)
- *Journal of Research on Technology in Education* (N=1)
- *Education Research Review* (N=1)
- *Journal of Educational Technology and Society* (N=1)
- *Education and Information Technologies* (N=1)

These journals are ranked within the top 10% of SCOPUS citation database journals in 'Education' (for a complete list of journals from where articles were extracted, see Bibliography). The documents that we included in our review were (Figure 3):

- 3 systematic review articles published between 2010 and 2018;
- 4 technical user's information documents of the currently available CSCL systems; and
- 72 research articles reporting the use of relevant CSCL systems published between 1997 and 2016.

2.2.5 Thematic analysis

We performed two types of thematic analysis of the included studies and technical user's information documents both deductively and inductively.

First thematic analysis

The first thematic analysis we conducted was focused on the **description of the basic global characteristics shared by most of the CSCL systems** supporting dialogue and collaborative argumentation. By global characteristics we refer to those basic features that CSCL systems should

include in order to positively respond to the following key premises in CSCL dialogue argumentation research (see Noroozi et al., 2012):

- High-quality interactions between inexperienced learners typically do not occur naturally, without external support
- CSCL systems should propose user interfaces aimed at steering collaboration in "fruitful" directions
- The goal is to motivate group members to interact in supportive ways with one another;
- CSCL research investigates ways how technology can facilitate, guide, and scaffold high-quality interactions between learners
- CSCL research puts particular emphasis on peer interactions, group-level processes, such as knowledge co-construction, and true group tasks involving ill-structured problems;
- Specific knowledge representation formats and collaboration scripts guide group-level processes such as knowledge co-construction and shared reasoning

Some of the basic global characteristics shared by most CSCL systems in dialogue and argumentation research (e.g., collaboration scripts) are based on the premise that they allow students to reach optimal solutions in relation to specific learning problems. Here It is important to acknowledge that some but by no means all of the computer-supported dialogues to be supported within the DIALLS project will include arguing to resolve a point – or viewing pros and cons/proposal and rebuttals. In the case of primary school children, dialogic spaces are created by the teacher, who in many cases encourages children to explain or justify their proposals (this is a certain understanding of the process of “argument”). It is only with older children, at secondary schools, that argumentation dialogue, or debate, will be proposed, amongst other types of educational dialogue. Indeed, cultural literacy (Segal, 2014) involves about the sharing of cultural values and celebrating diversity (DIALLS Description of Work, p.10), this being a process that can occur across a broad range of dialogue types, some of which may be predominantly argumentative, hopefully in a collaborative manner (cf. Schwarz & Baker, 2017, ch. 7).

We analyzed the publications included in the review in order to identify these global characteristics generally found in most CSCL. We prepared summaries of each of the publications, made annotations of these summaries, and classified these summaries into the thematic categories emerging from these analyses. We contrasted this analysis to the results of the three systematic reviews included in our corpus for validation. This process was carried out iteratively until we were satisfied the thematic categorization. We wrote a synthetic review for each category (see Results section).

Second thematic analysis

The **second thematic analysis was guided by the analysis of the DIALLS project educational concept** (see Description of Work and supporting literature, e.g. Maine, 2015; Maine & Hofmann, 2016) and the **functional requirements document** that we circulated among DIALLS partners. These documents presented the educational activities that are part of the DIALLS project and provide a first approximation of the basic functionalities that the DIALLS platform should contain in order to support

them – e.g., to support dialogue processes, particularly dialogue and argumentation (see WP5) the DIALLS Platform (CSCL system) should include online forum and synchronous CHAT tools (See Figure 1). Thus, we paid particular attention to the following **9 themes (or tools)** of which their importance for the DIALLS Platform was hinted in the Description of Work and it is explained above.

- Session set-up tools: these tools enable teachers to initiate sessions and invite learners to join those sessions. Teachers and learners have to choose nicknames and passwords as authentication mode and to create their user' identities. These are standard tools in CSCL systems and should be included in the DIALLS Platform.
- Lesson management: these tools allow teachers to broadcast messages to the groups, to observe their activities and degree of participation in the task. Lesson management tools are essential for secondary school teachers recruited for the DIALLS project. They will enable them to monitor small groups dialogues occurring in parallel through the DIALLS Platform.
- Text display tools: these are tools that learners use to have access to texts, video and multiple forms of media included in the activities. They also enable teachers to send talk prompts to learners whenever needed. Text displays tools will play a key role in the DIALLS Platform as they will be used to display wordless texts and send prompting questions to learners.
- Online discussion tools: Online forum for asynchronous discussions and synchronous chat are the most common online dialogue and discussion tools found in CSCL systems. Some systems also include videoconferencing tools. These are crucial tools for the DIALLS Platform to contain as they will create the conditions for in and in-between classes computer-mediated dialogues.
- Awareness tools: these tools allow learners know who else is the in the group and to keep track for learner's group membership over the course of the activity, in case it is required for them to be members of multiple groups. Awareness tools also enable teachers to receive notifications of who is online and to regulate group thinking and dialogue processes in and in-between classrooms. The DIALLS platform will benefit from the inclusion of awareness tools as they will permit teachers (in primary school settings) and learners (secondary school settings) to know what other dialogue partners are doing and regulate behaviors accordingly.
- Co-creation tools: learners' production of cultural artifacts in the form of co-written texts, co-drawn sketches and diagrams is supported by these tools. In the DIALLS project, one of the outcomes of in class and in-between classes dialogue processes is the learners' co-creation of cultural artefacts. These artefacts will then be shared with other school learners across the DIALLS partner countries. Thus, co-creation tools are essential features for the DIALLS Platform to support.

- Document repository: These tools allow users (teachers and learners) to store and share text (e.g., co-written texts) and image (e.g. co-drawing) files. Users can decide whether to keep these files private or make them public. Such tool will enable DIALLS Platform users to store and share cultural artefacts.
- Annotation tools: These are basic features in CSCL systems which are in line with the key premises in CSCL research presented above – i.e. annotations tools provide external scaffolds for learners to produce high quality discussion. In DIALLS, dialogue and collaborative activities surrounded by wordless text and prompted by teachers' questions are externally scaffolded by annotation tools such as 'argument ontology labelling' and highlighting tools.
- Activity analysis tools: these tools are designed to assist researchers in their management, synchronization, visualization and analyses of data collected in CSCL systems. Activity analysis tools will facilitate DIALLS researchers' search for relevant words in dialogues and employ teachers and learners' user names to search for contributions over time. This is an important tool if we take into consideration the amount of data that will be collected in the DIALLS project (data will be collected in 300 classrooms from the UK, Portugal, Spain, Germany, Cyprus, Lithuania, and Israel, Description of Work, p. 16).

We applied these thematic categories to each of 72 research articles reporting the use and assessment of CSCL systems included in the corpus. Additional technical information about each of these tools was obtained from the three technical user's information documents. We classified articles into the 9 thematic categories presented above and made summaries of the results reported in the studies. In these summaries we highlighted the different ways in which users' (teachers and learners) interacted with these tools.

2.3 Results

In this section we include both the results coming from the analysis of a) basic global characteristics shared by most of the CSCL systems in dialogue and argumentation (Section 2.3.1) and b) CSCL tools possibly required for supporting the expected DIALLS Platform's functionalities hinted by the teachers and learners' activities included in the Description of Work (Section 2.3.2).

2.3.1 Analysis of basic global characteristics in CSCL systems

Our analysis of the basic global characteristic found in the CSCL systems covered by the publications included in the corpus resulted in the identification of three main features shared across all systems:

- A general theory of representational guidance (Suthers, Connelly, Lesgold, Paolucci, Toth, et al. 2001) that all systems reviewed seem to incorporate
- The concept of 'collaborative scripts' (Kollar, Fischer, & Hesse, 2006) as main external scaffold not only supporting but often enabling individual and collaborative computer-

- supported dialogue and argumentation
- The possibility that CSCL systems have to provide automated argument and dialogue analysis feedback (Scheuer, McLaren, Loll, & Pinkwart, 2012)

Representational guidance

CSCL system are based on a general theory of **representational guidance** (Suthers et al., 2001) which is mainly about how the affordances of different representational notations affect the way learners jointly create, manipulate, and discuss external knowledge representations. Computer-based representational tools (e.g., argument diagrams, see Scheuer, McLaren, Weinberger, & Niebuhr, 2014) support and **facilitate the working and learning with representations**. Such tools allow users to explore, create, modify, organize, analyse, share and store individual and shared representations produced in the CSCL environment. Since representations are shared between multiple learners, changes must be coordinated and agreed between them, and thus, facilitating negotiations of meanings (Suthers et al., 2001). Co-constructed representations also operate as external anchors for collaborative thinking enabling the coordination verbal and non-verbal coordination processes which are crucial for the **co-creation of common ground** (Clark, 1996). A common ground serves a **shared focus of visual attention** that users can exploit to more easily refer to ideas previously dealt with in dialogue but are still present in the representation. Over a longer timescale, external representations constitute a useful tool in the co-construction of group memories in learning projects. Within the Learning Sciences, from a sociocultural perspective (Lemke, 2001), **learning is understood in terms of intersecting timescales of activity** — the *hic et nunc*, hours of a lesson, years, historical time — and trajectories of participation (Ludvigsen, Rasmussen, Krange, Moen, & Middleton, 2011). In practical terms, from a longitudinal perspective, **learning sequences must build on previous ones and therefore on remembering them**. Thus, external representations **help students to reconsider previous ideas** which can be brought into the present and recontextualized in order to be put into in relation to more recent ideas aiming at accomplishing specific shared goals.

Collaborative scripts

Collaborative scripts are one of main kind of external representations in CSCL systems (Dillenbourg & Jerman, 2007; Fischer, Kollar, Haake, & Mandl, 2006; Fischer, Kollar, Stegmann & Wecker, 2013; Kobbe, Weinberger, Dillenbourg, Harrer, Hämäläinen, & Fischer, 2007; Kollar et al., 2006). In contrast to representational tools discussed above (e.g., argument graphs) which are focused on the content and conceptual levels of the activities, **collaborative scripts operate as scaffold on the interaction and process levels** (Fischer et al, 2006). Collaborative scripts **help students improve their coordination behavior** during dialogues and their conceptual knowledge about target concepts (Kollar et al., 2006). They may operate to inhibit the application of students' internal scripts that have resulted to be ineffective in learning situations. They depend on the students' goals and situational constraints and affordances. Collaborative scripts are often composed of following components:

- Objective: instructional scaffolds designed with specific instructional goals in mind
- Activities: specification of activities conducive to achieving given learning goals

- Sequencing: may specify the chronological order of activities
- Roles: may assign specific roles to learners
- Type of representation: use different means to present instructions to learners or to impose structure on the learners' interactions

These components can be configured dynamically enabling students to flexibly respond to a variety of situations, including situations they are initially unfamiliar with (Kollar et al., 2006). Hence, collaborative scripts have the **potential to empower students to engage in collaborative activities that they may be unfamiliar with** and often could be beyond their capacities. Collaborative scripts may also come with **different coercion degrees** (Dillenbourg & Jernan, 2007). While those with low coercion degrees may be ineffective because they can give students too much freedom and they can decide to not follow them, collaborative scripts with high coercion degrees may excessively constrain students' activities, undermine collaborative practices and decrease students' motivations (Dillenbourg & Jernan, 2007).

In secondary school students, collaboration scripts in **WISE** (Clark & Sampson, 2008) were used to display conflict opinions about similar topics. Clark and Sampson reported that **collaboration scripts** led to higher learning gains compared to a condition in which conflicts were not made explicit by the collaboration scripts. High structured external collaboration scripts supported learning of general and specific knowledge (Kollar, Fischer, & Slotta, 2007). Other computer systems (see **NTool**, Beers et al. 2007) does not only provide collaboration scripts to make conflict more explicit and boost debate but also include the possibility of **adding low and coercion degrees to the collaborative processes** occurring between secondary students. While low coercion degrees may be ineffective since students may decide to not follow the script, high coercion degrees may restrict students too much, and run counter to the very idea of collaboration, and decrease students' motivation (Kollar et al., 2006). Beers et al. have shown that high coercion degrees increased negotiation activities during interaction but did not lead higher common ground than when low coercion collaboration scripts were used to structure dialogue and collaborative argumentation. The ultimate goal of collaborative scripts is that students were able to a) gradually **appropriate and internalize the behaviors and practices** displayed by the external scripts and subsequently b) **apply those behaviours and practices** to learning situations where the external scripts were no longer available.

Automated argument and dialogue analysis feedback

CSCL systems are not only designed to provide representation guidance and scaffold group activities with the support of collaborative scripts. CSCL systems are computer platform that are often able to generate automatic feedback in response to students' behaviors. CSCL systems tend to adapt to students' needs and usually have the capacity to provide tailor-made support (Scheuer, et al., 2012). Computational analysis enables CSCL systems to single out significant characteristics of the ongoing learning process, and thus, adapt to the specific needs of students and give tailor guidance and support. For example, **automated feedback should boost students' reflection on their own dialogue and argumentation diagrams** in order to identify possible weaknesses. In CSCL system supporting collaborative argumentation practices, the purpose of such **feedback is to provide support for the creation better quality argument diagrams and to promote productive group discussions** (Gweon,

Penstein Rosé, Albright, & Cui, 2007). CSCL systems have different ways to provide **automated systems**, each for which entails specific benefits and costs for students' learning process:

- On-demand feedback: This type of feedback is provided only **upon students' request**. Thus, it does not interrupt the flow of naturally occurring activities and does not overwhelm students with unnecessary messages. Another benefit is that students can assume more control of the activities which sometimes may lead to higher student motivation. On the other hand, one of the main costs of on-demand feedback is that **students may not ask for support** even there is an obvious need for assistance.
- Immediate system feedback: This kind of feedback is provided **without request and immediately after the CSCL system identify the problem**. Although it works very well to scaffold and improve students' current activities, it often **interferes in their natural development**. Such interferences may decrease students' motivations and engagement with the activities.
- Summative system feedback: This is the third type of feedback often found in CSCL systems. Summative system feedback is provided **after the learning session has finished**. It creates the conditions for **students' reflection on their own behaviors and practices** during the actions. Thus, it does not interfere with the natural unfolding of the activities. However, the cost of summative system feedback is that **it does not give useful scaffolding while the activities are occurring**.

The rationale behind automated argument and dialogue analysis feedback in CSCL system is the notion of 'fading scaffold' (Belland, Kim, & Hannafin, 2013). **Fading scaffold** refers to the gradual reduction of the level of support provided by automated feedback which is able to monitor students' progression in the activities. That is, as the CSCL is able to notice students' progress, the level of automated feedback decreases accordingly.

2.3.2 Analysis of CSCL tools relevant for the DIALLS Platform

Our analysis of the CSCL tools possible required for the DIALLS Platform relied on the examination of how the empirical studies included in the corpus assessed teachers' and students' user experience with them.

Session set-up tools

Logon management, session creation and document upload tools are the most frequent features reported in the literature. Generally, session set-up tools are not the focus of empirical studies evaluating the use of specific CSCL systems. Therefore, the information about teachers' and students' user experience is rather scarce.

Limited studies have examined how users interact with logon management tools in computer systems (Kim, Anderson, Nguyen-Jahiel, & Archodidou, 2007). The logon management tool requires

students' knowledge of their identification numbers and passwords. While analyzing the dialogue patterns during primary students' collaborative online discussions in **Webcrossing**, Kim et al., have observed that primary school students experienced problems when using the logon management function. Some children **could not recall their identification numbers and passwords** which resulted in increasing feelings of frustration and blockage. In dialogue and argumentation tasks with secondary school students, logon management tools in **PhysHint** (Ding, 2009) have been used to control the time each student had access to the information provided by the system to solve science problems. The tool was designed in such a way that only gave individual students working in pairs access to the information only when both partners were logged onto the system.

CSCL systems such as **Digalo** (Schwartz & De Groot, 2007), **PhysHint** (Ding, 2009) and **CoFFEE** (Ligorio et al., 2007) allow teachers to upload wordless texts and instructions onto the platform in order to stimulate and structure students' discussions. For example, the document upload tool has been used to present questions to students for later reflection and discussion on the online forum between primary (Kim et al. 2007), and secondary (Ding, 2009) students. In addition, **teachers' use of prompts (e.g., wordless texts) have positively affected students discussions and engagement with the activities** (Kim et al., 2007).

Lesson management

These kinds of tools are usually found in the teachers' dashboard, and they allow teachers to observe activity in groups and broadcast messages to individual and groups. **Meters** (Jermann, Soller & Lesgold, 2004) represent a lesson management tool found CSCL systems (e.g. see **CoFFEE**) that **enables the visualization of group processes** such as who communicates with whom and how frequently as well as individual processes such as users' activity rates (Tchounikine, Rummel, & McLaren, 2010). If students have access to this information, **meters can also support awareness and meta-cognition**, and thus, they can serve as **tool for the modification and improvements of behaviors and practices** (Dragon et al. 2006; Goodman et al. 2005; Pinkwart et al. 2009; Suthers et al. 2001).

Several CSCL systems include tools for broadcasting messages to individual and groups. For example, **Knowledge Forum** provides teachers with the possibility to **give feedback to students**. Prinsen and colleagues have investigated the impact of positive and critical feedback comments on degree of primary school students' degree of participation in an online dialogue forum (Prinsen, Volman, Terwel & van den Eeden, 2009). They found that girls benefited more than boys from teachers' feedback in terms of the degree of participation as well as elaboration of their arguments. The possibility that computer systems have to broadcast messages to groups also include "hints" options. In **PhysHint** (Ding, 2009), hints were used to provide external structure to the discussion and problem-solving situations in pairs of secondary students.

Text display tools

Text display tools include a) video/image display; b) task instructions display; c) talk prompts box; and d) annotated text and video files display. These are CSCL tools that are generally taken for granted in the literature, therefore, there is limited information reporting teachers' and students' user experience in the corpus we selected for the review. However, CSCL systems such as **ARGUNAUT** (De Groot et al, 2007), **Belvedere** (Schwarz et al. 2003), **CoFFEE** (Ligorio et al, 2007), **DREW** (Lund et al., 2007), **Knowledge Forum** (Yiong-Hwee & Churchill, 2007) and **WISE** (Clark et al. 2009) contain all or some of those tools (the video display tool can be found in more recent software only).

Online discussion tools

These are one of most tested set of CSCL system tools that we found in the literature. These tools include **online forum**, **synchronous CHAT** and **videoconferencing features**. They are essential components of all of the 26 CSCL systems included in the review. CSCL systems supporting asynchronous communication (e.g., **Knowledge Forum**) generally support an online forum only whereas those supporting synchronous and asynchronous communication (e.g. **ARGUNAUT**, **C-CHENE**, **CoFFEE**, **CoStructure**, **Metafora** and **Digalo**) support an online forum and a CHAT system. However, not all of those systems support videoconferencing (e.g. **CoStructure**, see Ertl, Fischer, & Mandl, 2006).

Kim and colleagues have found that primary school students experienced problems using online forum due to **low proficiency in keyboarding or use of the computer systems**, and some were concerned about spelling errors (Kim et al. 2007). This finding has been validated by studies that used other computer systems too (for **Knowledge Forum** see, Prinsen, Volman, & Terwel, 2006) and were also associated with the children from immigrant background who sometimes did not feel completely confident with their English skills. **Low proficiency in keywording and writing skills required frequent interventions from research assistants** that interfered with the progression of the task. Kim et al. reported that although student's names were accessible to other members of the online forum, no gender or ethnic differences were found in number of contributions. Kim et al. showed that **online forum facilitated the increased participation of students from minorities groups when compared to face-to-face oral dialogues**. However, these findings have not been supported across the literature. When using **Knowledge Forum**, Prinsen and colleagues observed that girls contributed more than boys and that students with **immigrant parents wrote fewer contributions than those whose parents are not immigrants** for the reasons explained above (e.g., low confident in writing skills) (Prinsen et al., 2006, 2009). Additionally, researchers have found that popularity among classmates constituted an important predictor of degree of participation in the online forum (Prinsen et al. 2006) even when 'golden rules' for the collaboration (e.g., participants should read each other's' contributions and ask each other questions) were established and agreed upon beforehand (Prinsen et al., 2009).

Online forum tools sometimes allow students to elaborate the information they want to share for dialogue. For example, the computer system **WISE** (Clark et al., 2009) contains a 'principle-builder interface' that enables students to construct scientific principles based on information that they

themselves collected from the Web. With this information **WISE** organizes groups with students who have created with different principles and sets the ground for dialogues in the online forum (Clark & Sampsom, 2007). **NTool** (Beers, Kirschner, Boshuizen, & Gijssels, 2007) is another computer system supporting online discussion forum that provides the possibility to structure and assign constraints to the negotiation processes in the forum.

There is little research on primary school students' user experience with synchronous CHAT tools (Tsuei, 2011). However, the literature centered on secondary school students' interaction with these tools is vast. In secondary school students, research has been focused on the benefits of using synchronous CHAT compared to face-to-face dialogue in collaborative argumentation situations. For example, **C-CHENE** (Baker & Lund, 1997) allowed students to type messages in their own dialogue box and then by clicking on "send" bottom on the interface be able to share these messages with the group. In so doing, students added their messages to the end of the existing shared dialogue history and cleared their own dialogue box. Dialogue history allows student to review and reflect on previous messages, and thus, to significantly expand working memory capacity (Dillenbourg & Traum, 2006). This is an outcome that cannot be found in face-to-face dialogue in students' utterances are ephemeral. **Cognitive load is off-loaded by the synchronous CHAT**, and, thus, affects the entire individual and group performance during dialogue and collaborative argumentation. **C-CHENE** also included an option in the dialogue box interface to manage collaborative in blended communicative situations (face-to-face and computer-mediated) where overlapping speech and coordination problems are frequent. This option consisted of two bottoms that students clicked on when they were either constructing their utterances in their own dialogue box and or when they wanted to communicate and make those utterances public.

DREW (Baker et al., 2007) contains a chat module and that has been used widely with secondary school students. **DREW's** chat module permits the automatic recording of students' dialogues about specific topics. Similar features have been found in **PhysHint** (Ding, 2008), **Digalo** (Schwarz & De Groot, 2007), **Belvedere** (Veerman, Andriessen, & Kanselaar, 2002), **Webtool** (Marttunen, & Laurinen, 2007), **ARGUNAUT** (De Groot et al., 2007), and **CoFFEE** (Belgiorno et al, 2008). While using **WebTool** with secondary school students (Marttunen, & Laurinen, 2007, 2009), research has shown that one of the disadvantages of synchronous CHAT tools was the mismanage of simultaneous students' contributions to the same thread. When cases in which students sent messages at the same time, many of those contributions were lost in the discussions. Newer synchronous CHAT tools (e.g., **REACH**, see Tsukahra et al. 2007) using technologies currently found in freeware and cross-platform messaging systems (e.g., WhatsApp Messenger ®) have solved this problem by displaying participants' typing activities to all partners involved in the chat session.

Research has shown that videoconferencing provides a fruitful environment for collaborative distance learning (Gagliardi, Smith, Goel & DePetrillo, 2003; Stork & Sproull, 1995) and dialogue and argumentation (Ertl et al., 2006). For example, Ertl and colleagues have found that videoconferencing with CSCL system **CoStructure** was beneficial for students' learning outcomes. They reported that learning outcomes increased when videoconferencing was supported by different types of conceptual support such as strategy visualization features. This finding seems to suggest that representational guidance and collaborative scripts still play an important role even when students can have access to group members' non-verbal information through the video platform. CSCL system

including videoconferencing tools should also incorporate high quality audio transmission tools (Anderson, O' Malley, Doherty Sneddon, Langton, Newlands, Mullin et al., 1997; O'Conaill et al., 1993) in order to avoid audio delays that can disrupt collaborative processes.

Awareness tools

Awareness tools provide an online description of group practices throughout the group collaborative activities. They collect and aggregate individual and groups behaviors and serve to improve reflection and collaboration (Miller & Hadwin, 2015). As such awareness tools enable **students to regulate self and other behaviors through meta-cognitive processes** (Pifarre & Cobos, 2010). Several studies have shown that students' use of awareness tools affects the ways in which student collaborate via CSCL systems in group activities (Clarebout & Elen, 2006; Janssen et al., 2011; Jiang et al., 2009). For example, in a study with secondary school students using **VCRI**, Janssen and colleagues found that how much time students displayed awareness tools on their computer screens was a predictor of a) their participation in dialogues practices, b) whether they contribute or not to co-writing activities and c) the better coordination and regulation of individual and group behaviors.

Co-creation tools

Collaborative writing and collaborative drawing tools are two most common set of co-creation tools. They allow students to co-create cultural artefacts that boost self and group reflection processes and help them to improve better learning outcomes (Tewissen, Lingnau, Hoppe, Mannhaupt, & Nischk, 2001). In primary school students, collaborative writing tools have been used to support the **acquisition of literacy-related skills** (i.e., reading and writing) (Tewissen et al., 2001). Research with first grades using the computer system **T3 (Today's Talking Typewriter**, see Tewissen, Lingnau, & Hoppe, 2000) has shown that children quickly became familiar with the collaborative writing tool and that collaboration through the tool brought positive learning outcomes for children despite their previous reading and writing skill levels (Tewissen et al., 2001). The use of **Wikis** as collaborative writing tools has also resulted in significant learning benefits in literacy-related skills in primary school students (Woo, Chu, Ho, & Li, 2011). Positive learning outcomes using **Wikis** as collaborative writing tool with primary school students have also been observed in science education (Pifarré & Kleine Staarman, 2011).

Another CSCL system that incorporated co-writing tools is **DREW** (Lund et al., 2007). **DREW** enables students to write and re-write notes individually and collaboratively and that has been tested with secondary school students (Noroozi et al., 2011). Individual and collaborative writing tools helped students to **re-construct, organize and reflect on their own and other students' ideas, opinions and arguments** (Noroozi et al., 2011) and play a key role in learning and the co-construction of knowledge through dialogue (De Jong et al., 2002; Veerman, 2000). Co-writing tools were also tested in secondary school students using the computer system **CONNECT** (De Vries et al., 2002). De Vries et al. have shown that co-writing tools enabled students to create shared goals and co-construct individual arguments in particular ways in order to achieve those common goals.

Collaborative drawing tools have been used with primary school students (Gijlers, Weinberger, van Dijk, Bollen, & van Joolingen, 2013). The computer system **SimSketch** (Bollen & van Joolingen, 2013)

is a software that integrate **drawing, modelling and simulation features**. **SimSketch** has been used in several studies with primary school students in science education (van Dijk, Gijlers, & Weinberger, 2014). In **SimSketch** students use pen-based input devices to create and transform their individual and collaborative drawings. Studies using this tool have shown that collaborative drawing **contributes to the design of scientific modelling** and that these positive outcomes can only be observed when the teachers' designed activities provide students a sufficient level of scaffolding (Bollen, Gijlers, & Van Joolingen 2015). **PhysHint** is another computer environment used in science education includes a collaborative drawing tool. This tool has been used with secondary school students in physics education allowing them to draw variables and vectors using geometric forms, arrows and lines (Ding, 2009). Such tool gives the possibility of adding different colors to the shapes and objects created by students. The effectiveness of collaborative drawing tool has not been tested in **PhysHint**.

Document repository

Although document repositories are tools largely supported by most of the 26 CSCL systems included in the review (see **ARGUNAUT, Belvedere, CoFFEE, CoStructure, Digalo, Knowledge Forum, Metafora, Ntool, VCRI, Wikis, WISE**, etc.), their systematic assessment in literature seems to be rather limited. In primary school students, document repositories have used to store teachers' comments and feedback on quality of arguments produced by children in online discussion forum (e.g., Knowledge Forum). Prinsen et al. have shown that a **record of teachers' feedback on children's argument facilitated students' appropriation of positive behaviors and inhibited the use of ineffective behaviors** in future collaborative argumentation tasks (Prinsen et al. 2009). Another functionality investigated in literature was the use of **WISE** in secondary school students (Clark et al., 2009). The possibility that **WISE** affords for gathering data from the Internet for storage and later use in the online forum has positively affected group discussion (Clark et al. 2009).

Annotation tools

Together with online discussion tools (see above), annotation tools have been the most evaluated set of features of CSCL systems. They general encompass highlighting of discussion tools as well as argumentation ontology labelling tools. Forty-eight empirical studies included in our corpus dealt with annotation tools in general, and argumentation ontology labelling tools in particular. Research has shown that **highlighting of relevant portions of an argument diagram may help students easily identify parts of the solution they need to pay special attention to** (Dragon et al 2006). Highlighting is provided together with some textual message that explains what to do or what is wrong with the highlighted portion of the diagram (Goodman et al., 2005; Suthers et al., 2001). The use of argumentation ontology labelling enabled primary school students to make their arguments explicit fostering the participation of other members in the online forum supported by **Webcrossing** (Kim et al., 2007). Arguments maps have helped primary school children to construct better collective arguments than tables in **Digalo** (Schwarz et al., 2003) and a variety of sentence openers scaffolded children online dialogues (Prinsen et al., 2009) in **Knowledge Forum**.

DREW (Baker et al. 2007) has been used to investigate the co-construction and effectiveness of argument diagrams in synchronous dialogue and argumentation in secondary school students (Lund et al., 2007; Noorozi et al., 2011; Van Amelsvoort, Andriessen, & Kanselaar, 2008). **Argument diagrams were employed to integrate arguments produced by individual students**, pairs and small groups. Such diagrams are composed of boxes and arrows that students can fill with text. Arrows along with plus (+) and minus (-) are used to establish positive (pro) and negative (contra) relations between boxes, and thus, enabling students to build and integrate individual arguments into larger and more complex argumentative sequences (Baker et al., 2007; Van Amelsvoort et al., 2008). Similar features (e.g., arrows) for linking individual arguments and create relationship (e.g., pro vs. contra) between argument boxes have been found in other computer systems such as **Digalo** (Mirza et al., 2007), **CoStructure** (Ertl et al., 2006) and **WeTool** (Marttunen, Laurinen, 2007).

The effectiveness of argument diagrams in secondary school students' dialogues and argumentation processes often did not reach researchers' predictions (see Noorozi et al., 2011). The use of argument diagrams generally did not deepen and broaden the 'debate space' (Noorozi et al., 2011) and for this to occur depended on whether students were allowed to communicate via a CHAT system while integrating their arguments into the diagram (Lund et al., 2007). However, some computer systems (e.g., **Digalo** and **FL3**) enabled students to use argument diagrams to co-construct more comprehensive argument maps (Mirza et al., 2007). Argument maps provide interactive visualizations of the evolution of discussions making explicit who said what, when, and to whom in relation to specific topics and threads (Mirza et al., 2007).

Activity analysis tools

These are CSCL system tools that are of general interest of researchers and sometime teachers. They are means for supporting evaluation processes (Marcos, Martinez & Dimitriadis, 2005; Reffray & Betheder, 2009). Activity analysis tools include: a) tracing, recording and replay tools; b) searching tools; and c) tools for documentation of the activities on the systems' log (documentation of progress for future analysis). **Webcrossing** contains searching tools that have helped researchers to navigate through the online discussion forum in order to single out significant traces for subsequent analysis (Kim et al., 2007). Another CSCL system that incorporate a whole range of activity analysis tools was **CoFFEE**. **CoFFEE** gives the possibility for researchers and teachers to integrate a separate set of activity analysis tools called **TATIANA** (Dyke, Lund, & Girardot, 2009). **TATIANA** is a computer environment that helps researchers and teachers to manage, synchronize and visualize the data collected in **CoFFEE** enabling them to more easily detect patterns and produce better understanding of students' behaviors and practices within the CSCL system.

2.4 Discussion and implications for the DIALLS Platform

The aim of our critical review of the literature and the CSCL systems supporting dialogue and argumentation was to a) **to identify the basic characteristics shared by most CSCL systems** as described and assessed in systematic reviews of user's experiences (e.g., representational guidance and collaborative scripts) and b) **to provide a first insight into the computer tools that the DIALLS**

Platform should contain in order to support the functionalities described in the Description of Work (p. 46-7). In order to do so, we searched for systematic reviews of CSCL systems supporting dialogue and argumentation published between 2010 and 2018. These reviews systematically assessed how users (learners and teachers) interacted with the CSCL systems and whether specific interface design options (e.g., co-writing tools) facilitated dialogue processes that led to better quality group discussions and learning outcomes. Such systematic reviews included empirical articles that evaluated 34 CSCL systems supporting collaborative argumentation. We decided to exclude 8 CSCL systems from our critical review because they were only tested with university students, mostly undergraduates from North American (mostly US) and West-European (Germany, the Netherlands, Finland and the UK) universities – the few studies conducted in France were done with secondary students (see Baker et al., 2007). After excluding eight of the CSCL systems assessed in the empirical studies included in the systematic review, we searched on the Internet for which of those 26 remaining CSCL systems was still available for download and installation. At the time of doing this search (June 2018), we found that **only four of those 26 CSCL systems were still available**:

- CoFFEE: <https://sites.google.com/a/unisa.it/coffee-soft/product/resources>
- FLE4: <http://blog.growingcos.org/search/label/FLE3%2FFLE4>
- SimSketch: <http://modeldrawing.eu/our-software/simsketch/>
- Talkwall (https://www.talkwall.net/#!/_)

We downloaded their **technical user information requirement documents** and added them to our corpus. Afterwards, we searched for each of the articles that reported empirical studies testing CSCL systems with primary and secondary school students and were included in the systematic reviews of the literature we examined first. We ended with **72 research articles that complemented the three systematic reviews and the four technical user information documents**. The total number of records we included in our critical review was **79 documents**.

We employed **inductive and deductive methods for the analysis of the literature**. Inductive methods were used for the identification of the basic characteristics shared by most the CSCL systems included in the corpus. Deductive methods we employed for the analysis of the CSCL tools that would support the functionalities that the DIALLS Platform should support. That is, our search and analysis was based on an already existing list of possible functionalities and computer tools generally found in CSCL systems. Our first analysis focused on the identification of the basic characteristics found CSCL systems resulted in the differentiation of three fundamental features shared by most CSCL systems:

- A general theory of representational guidance (Suthers et al, 2001),
- External scaffolds in the form of ‘collaborative scripts’ (Kollar et al, 2006)
- Automated argument and dialogue analysis feedback (Scheuer et al. 2012)

These three basic characteristics were found in CSCL systems tested with primary and secondary students and are related to theoretical and methodological principles in CSCL. Such principles state that: a) external support is needed to create the conditions for high quality interactions between inexperienced students; and that b) the CSCL system or their interfaces should provide that support and guide dialogue practices in fruitful directions. These two fundamental principles in CSCL seem to apply to primary and secondary school students’ computer-supported collaborative practices.

Numerous experimental studies in ‘cognitive load theory’ (e.g., Sweller, 1988) have shown that a **general theory of representational guidance should be carefully taken into consideration at the time of designing instructional support materials for students**. Such materials should enable students to **off-load cognitive demands into the environment in the form of external representations**. External representations serve to **lighten working memory demands**, allowing students to manage, manipulate and re-construct representations more efficiently. This applies to individual and group activities in primary and secondary school students. However, when paying a closer look at the other two basic characteristics found in CSCL systems - i.e., collaborative scripts and automated argument and dialogue analysis feedback – the situation seems different. External scaffolds in the form of collaborative scripts and automated argument and dialogue analysis feedback features were almost exclusively tested with secondary school students. In the few cases in which primary school students were tested they were 10-11 years old (e.g., Tsuei, 2011). This finding has important implications for the design of the DIALLS Platform. It clearly shows the **limitations that existing (currently available or not) CSCL systems have to incorporate younger children as active users**, and in particular the age groups of 5-6 and 8-9 years old that are included in the DIALLS project. It also demonstrates the existence of a **written language bias** (Linnell, 2005) in the design of CSCL systems. Such finding is also confirmed by the fact that only **6 out of the 72 research articles included in the corpus reported the use of CSCL systems with primary school students**. The co-existence of these two biases (written language bias and age-related bias) in the design and testing of CSCL systems make perfectly sense: **older children and adolescents are proficient in reading and writing**.

Our second analysis was focused on examining the computer tools that the DIALLS Platform should accommodate in order to support the following functionalities described in the Description of Work (p. 46-7):

- Typewritten or video dialogue between students
- Teachers being able to input specific prompts for student
- Teachers authoring and uploading pedagogical materials
- Students co-creating cultural learning resources
- Teachers and students re-using and modifying learning resources
- Systematic organization of learning resources
- Automatic tracing of dialogues
- Co-creation processes, organized in a systematic and searchable manner
- Generate automatic traces of its use by students and teachers, for groups of users in reflexive activities and a source of research data to be analyzed

The 26 CSCL systems we reviewed included different tools to support these functionalities. While some CSCL systems were more specialized in the students’ co-creation processes (e.g. co-writing tools) and co-creation of learning resources (e.g., cultural artefacts) others were more focused on providing more naturalist synchronous CHAT environments in order to manage simultaneous students’ contributions to the same thread (see **Talkwall**, Nesnass & Toussiant 2016; **REACH**, Tsukahra et al. 2007). More comprehensive CSCL systems (e.g., **ARGUNAUT**, **DREW** and **CoFFEE**) included tools supporting most the functionalities described in the Description of Work. Such tools included: **a) session set-up tools, b) lesson management tools; c) text display tools; d) online discussion tools; e) awareness tools; d) co-creation tools; e) document repository tools; f)**

annotation tools and g) activity analysis tools. It is important to point out for 63 out the 72 empirical studies included in the corpus their main concern of inquiry were online discussion tools (e.g., online forum, synchronous chat and videoconferencing), annotation tools (e.g., effectiveness argument diagrams in group discussion quality and learning outcomes), co-creation tools (e.g., co-writing), and awareness tools (e.g. how descriptors of group activity regulate students' meta-cognitive processes). Generally, empirical studies took for granted that the CSCL system used to test specific hypotheses (e.g., effectiveness of argument diagrams in the quality of group discussions) included session set-up tools, lesson management tools, text display tools and activity analysis tools. The very few studies that tested users' experiences with some of these less examined tools (e.g., session set-up tools, see **Webcrossing**, Kim et al., 2007) with primary school students have found that children faced problem when dealing with logon management features as feeling of frustration arouse when they could not remember their identification numbers and passwords (Kim et al. 2007).

The degree of the complexity and sophistication of the computer tools that the DIALLS Platform should accommodate in order to support the its expected functionalities as described in the Description of Work must be adapted to **a) the specificities of the local practices, infrastructure and normative of the countries and schools where data will be collected and b) to the three learners' age-groups (5-6, 8-9 and 14-15 years old) represented in the project.** After carefully reviewing the literature and the computer tools that each of the 26 CSCL systems included in the review encompass, there is no single existing system that satisfy all the requirements of the DIALLS Platform. However, these are the overall tools of currently available systems (e.g., **CoFFEE, FL4, SimSketch, and Talkwall**) that we retained for the design of the DIALLS Platform. These tools meet the requirements for the older children almost exclusively (Table 2).

In the DIALLS project It is expected that for pre-primary and primary school children **teachers will collect ideas from children and mediate dialogues in the class, between classes in the same country and between classes located in different countries.** Therefore, teachers will be responsible for typing responses in the DIALLS Platform, because it would not be appropriate expect younger children to read and write responses.

Besides the **written language bias** and **age-related bias** observed in existing CSCL systems, both at basic characteristic and computer tools levels, **none of the CSCL systems included in this review contained a semi-automatic text translation option.** This is a crucial feature for the DIALLS Platform to include considering its multi-cultural and multi-lingual perspective on computer-mediated cultural literacy learning in schools in Europe and Israel.

Table 2: Tools retained from the 26 CSCL systems included in the review

| Functionalities | Tools retained |
|---|--|
| Session set-up: | • logon management; • session creation; • doc upload |
| Lesson management (teacher dashboard): | • observe group activity |
| Text display tools: | • video/image display; • task instructions; • talk prompts |
| Online discussion tools: | • online forum; • synchronous CHAT; • notifications; |
| Awareness tools: | • who's online |
| Co-creation tools: | • collaborative writing; |
| Document repository: | • personal repository; • doc sharing |
| Annotation tools: | • discussion highlighting |
| Activity analysis (researcher/teacher): | • recording, tracing; • searching |

Thus, the best solution to provide an adequate computer system to support DIALLS' activities as presented in the Description of Work is to design and develop a flexible and adjustable software suite. The DIALLS Platform should contain a comprehensive set of tools that teachers could easily adapt to the specificities of their classroom ecologies. Such ecologies would be determined by students' age groups and local practices, normative and infrastructure. Thus, we will be able to adjust the DIALLS Platform to each particular classroom ecology rather than the classroom ecology to the CSCL system.

Highlights

- Only 4 out the 26 CSCL systems included in the critical review are available for downloading and installation.
CSCL systems (currently available or not) have not been adapted for pre-primary (5-6 years old) and primary (8-9 years old) school children.
- Strong written language and age-related biases in the design CSCL systems.
- Lack for comparative cross-cultural studies reporting users' experiences with same CSCL systems - how children from different cultures and who speak different languages interact with the same CSCL environment.
- None of the CSCL systems contained a semi-automatic text translation option.

3. Co-design workshops with users

3.1 Background

In September and November 2018, two co-design workshops with future users of the DIALLS Platform (researchers and teachers) were held in Paris and Cambridge, respectively. The second workshop, held in Cambridge, also included a school visit to the University of Cambridge Primary School. This is one of the primary schools participating in the DIALLS project. The aim of both co-design workshops with researchers and teachers **was to further specify the functionalities of the existing CSCL systems** (currently available or not) included in the critical review. In order to do so, workshop participants were asked **to collaboratively design educational activities for the classroom**. These basic organization of those educational activities was taken from the Description of Work (Figure 1) and corresponded to the kind of pedagogical situations included in the DIALLS project. Thus, the main goal of both co-design workshops was to provide a **detailed contextualization of the CSCL system functionalities** analyzed in the critical review and how they could be **adapted to the DIALLS project**. These were necessary steps for the design and development of the DIALLS Platform.

It is important to point out that the educational activities proposed for future users of the DIALLS Platform proposed in this document are provisional, being based on a literature review and co-design workshops with researchers and educators, this being a necessary process for generating recommendations for the DIALLS platform at month 9 of the project. These (computer-mediated) activities will be further refined on the basis of analyses of the activities that occur in DIALLS classrooms over the ensuing months of the project.

The co-design workshop technique proposed for the development of the DIALLS suite is rooted in the **concept of scenario-based design** (Carroll, 1997). The aim is to contextualize design proposals at the heart of activities, anticipated in narrative form, allowing **flexible language simulations at the beginning of the projects** (Nicolas, 2000). This is important because as the design of the DIALLS platform progresses, the possibilities for changes and modification decrease. Therefore, the co-design workshop technique **provided a space where potential users of the DIALLS Platform could collaborate in the co-construction of design features** of the platform and test out different ideas in a simulated environment. This occurs before designers and developers made irreversible technical choices. That is, the co-design workshop held in Paris and Cambridge were of crucial importance to anticipate at the beginning of design of the DIALLS suite, what and how future educational activities may be, which was essential for the further specification of the DIALLS Platform functionalities.

The rest of Section 3 is structured as follows. Firstly, we present a description of the DIALLS canonical activities scenarios as introduced in the Description of Work. Such description will enable us to provide an initial specification of the functionalities reviewed in the Section 2 (critical review). Secondly, we provide a detailed description of the first co-design workshop held in Paris in September 2018 and of the second co-design workshop that took place in Cambridge in November 2018. We include explanatory summaries of both collaborative activities. Thirdly, we explain how these two co-design workshops with future users of the DIALLS Platform enabled us to a) narrow down and

validate the list of functionalities assessed in the critical review, and b) propose new ones more in accordance with the requirements of the DIALLS project.

3.2 The DIALLS canonical activities

Co-design workshops were organized following the DIALLS core educational activities as described in the Description of Work. These involve (1) **observing and interpreting wordless texts** (framed by the teacher) and (2) **discussing interpretations in order to co-create meanings/interpretations**. These core activities are supported by the teacher, using specific sets of “prompts” (Maine & Hofmann, 2016) that have been developed prompts for reading comprehension. It is expected to adapt them and develop new ones for dialogue and argumentation practices in line with the CLLP.

Teachers need to introduce the goals of these interactive encounters, in online intra- or inter-country situations teachers will need to collaborate on overall introductions and prompting, as well as in re-contextualising the ‘outcomes’ of the discussion within teaching sessions. Such recontextualisation will involve learners producing collaborative-creative artifacts (such as texts, drawings). The way in which both co-design workshops were developed (Section 3.3 and 3.4) to ensure that future users of the DIALLS Platform would be able to co-construct detailed educational scenarios that would very much resemble those included in the actual foreseen classroom activities. Both co-design workshop activities accounted for the basic, most general or canonical DIALLS educational activities, corresponding to specific interactive ‘encounters’, that the platform should support, would therefore be as follows (Table 3).

Table 3: Canonical DIALLS computer-supported scenarios

| | Social actors/users | Activities | Platform support |
|----------------------------------|--|--|--|
| Session preparation | Teachers, within schools, across different schools, within a country, across countries (in collaboration with researchers) | Collaborate to design the lesson, choose the wordless text, agree on overall lesson plan, organisation of groups | <ul style="list-style-type: none"> Tools for authoring pedagogical scenarios |
| Session introduction | Teachers: in each collaborating school, discussing across schools, with their students | Teachers: lead introduction of dialogic goals; Students: ask questions | <ul style="list-style-type: none"> Functionalities for creating and presenting task instructions Discussion tools – CHAT, forum |
| Text observation, interpretation | Students Teachers | Small-group or whole class small-group or whole class watch text, make notes, annotate; observe in accordance with talk prompts Teachers: note points to raise for discussion | <ul style="list-style-type: none"> Functionalities for displaying ‘text’ – jpeg, video functionalities for displaying talk prompts functionalities for annotation of ‘text’ teacher note-pad |
| Discussion | Students: small group Students and teachers: whole class | Students discuss the text (wordless) | <ul style="list-style-type: none"> synchronous CHAT, asynchronous FORUM ‘text’ displayed during discussion, with annotations |
| Co-creation | Students | Produce an artefact – co-written text, diagram, ... relating to outcomes of interpretation/discussion | <ul style="list-style-type: none"> co-text writing tool |

| | | | |
|-------------------|----------------------|--|---------------|
| Contextualisation | Teachers Students | Teachers summarise discussion, refine what could have been learned, ... students intervene | • CHAT, FORUM |
|-------------------|----------------------|--|---------------|

The activities described in Table 3 are provisional at month 9 of the DIALLS project, given that variations will occur across participating countries (e.g. not all sessions will lead to cultural artefact creation and designed discussions must be organised within lesson timings). Within a blended approach (See Figure 1), not all foreseen activities were supported by the structure of the co-design workshops. For example, although it would be possible to provide tools to support teacher preparation, these were not specifically proposed in the educational scenarios co-design activities included in the workshops.

DIALLS core educational activities considered in the design of the materials that future users of the DIALLS platform were invited to manipulate and interact with were 1) observing and interpreting wordless texts (framed by the teacher) and 2) discussing interpretations in order to co-create meanings/interpretations. These core activities are supported by the teacher, using specific sets of “prompts” (Maine & Hofmann, 2016). Teachers need to introduce the goals of these interactive encounters, in online intra- or inter-country situations teachers will need to collaborate on overall introductions and prompting, as well as in re-contextualising the ‘outcomes’ of the discussion within teaching sessions. Such recontextualisation will involve students producing collaborative-creative artifacts (such as texts, drawings). These were the building blocks of the activities we developed for both co-design workshops. The workshop held in Cambridge had the particularity of including a visit to the University of Cambridge Primary School in order **to observe a set of teacher-led collaborative activities**. It is important to note that the lesson plans followed by teachers at the University of Cambridge Primary School did not follow the CLLP criteria. Teachers were asked to facilitate class discussions so DIALLS researchers could observe the types of activity the DIALLS Platform should support. Classroom observations were complemented with **interviews with teachers**.

The next sections present a detailed description of both co-design workshops, including examples of the most comprehensive user-centered activity scenarios co-created by future users of the DIALLS Platform. In addition, we provide explanatory summaries of both meetings, as well as a final general conclusion that highlights how co-design workshops have helped us to validate the functionalities taken from existing CSCL system and propose new ones (e.g., semi-automatic translation tools). These are all necessary steps of the precise definition of the proposed Functional Recommendations (Section 4).

3.3 Paris co-design workshop

In order to more precisely define user-centered scenarios of dialogue and argumentation activities that could be supported by the DIALLS Platform, we organized a two-day co-design workshop in Paris. We invited researchers from DIALLS partners’ institutions (UCAM, UNIC, JYU, NOVA, WWU, LUES, UB, HUJI & CNRS) to attend the workshop. The two-day team creativity workshop was held at Telecom

ParisTech in September 27-28, 2018. We use creativity methods for defining user-centered scenarios for the design of the DIALLS Platform. It should be borne in mind that the user-centered scenarios co-created by DIALLS researchers were not necessarily indicative of the final pedagogical activities expected to be included in CLLP, which is currently under development.

The Paris co-design workshop was the first instance where DIALLS researchers could gather to discuss the possible computer system requirements for the DIALLS Platform. The workshop was organized in two complementary day sessions. In the first day session DIALLS researchers participated in small group collaborative creativity activities where multiple user-centered activity scenarios for the age-groups included in the DIALLS project were co-created and discussed. Such collaborative creativity activities were aimed at co-constructing teacher-led classroom activities in order to facilitate students' dialogue processes about the cultural values presented and explained in the **DIALLS' Cultural Analysis Framework (CAF) document** (see deliverable 2.1). In the second day, DIALLS researchers participated in small group collaborative creativity activities where they elaborated further some of the scenarios co-structured and discussed the previous day. Such further elaborations were based on inclusion of computer tools into the teacher-led students' collaborative activities produced on day 1. That is, how computer tools likely to be found in existing CSCL systems could support the scenarios co-created on the previous day. In the following sections we present a detailed description of a) the activities we invited DIALLS researchers to participate in the two-day co-design workshop and b) the user-centered activity scenarios co-created discussed in both days. We conclude by presenting a general overview of the kinds of technology-supported scenarios produced during the workshop in relation to each age group.

3.3.1 Method

In this section we present the general methodology that we employed to conduct the team creativity sessions with DIALLS researchers.

3.3.2 Pedagogical situations

Goal

Co-construction in dialogue and argumentation learning practices

Task

The task consisted of two collaborative creativity sessions. Researchers working in groups of four participants were asked to design possible two scenarios that did not necessarily included the use of technology. Participants had to draw four cards from a deck produced by CNRS team members (Appendix 2). These cards provided the constraints that groups had to follow for the scenario design. Cards included information about students' age group (e.g., pre-primary school students, primary school students, and secondary school students), number of groups and type of collaboration (e.g., one class or two classes, same school or different schools/countries, small groups or whole class) and cultural values (e.g., empathy, tolerance and inclusion). The fourth card participants had to draw was

a disrupted card. Disrupted cards included drawings depicting a human brain, a cactus, lightbulb or a waterfall (Appendix 2). These kinds of cards enabled participants to imagine the possible larger political contexts within which the school pedagogical activists could be embedded (e.g., the card with an image of a cactus led one group to think about the immigration situation between Mexico and the USA and then transposed this case to the European context in relation the Mediterranean Sea). Groups had to draw four cards for each of the scenarios they had to produced. Each group had at their disposal comic book templates originally designed for the workshop (e.g., storyboard format), sheets of paper, sticky-notes, and markers. Both collaborative creativity sessions were unstructured allowing free-flowing interaction. Each session lasted 30 minutes and groups had additional 10 minutes to present their scenarios to other groups. Presentations were video-recorded for documentation and analysis.

Procedure

One member of the CNRS team presented the collaborative activity, explained the procedure to the invited researchers from the DIALLS consortium. He also referred to the general aims of the collaborative creativity sessions and their possible impact as starting point for the design of the DIALLS Platform. DIALLS researchers were instructed to form four small groups of four participants each trying to avoid teaming up with colleagues from the same institution. CNRS team members distributed specialized paper templates originally designed for the workshop (e.g., storyboard format), additional sheets of paper, sticky-notes, and markers among the small groups. Then, one member of the CNRS asked participants to draw four cards from the deck produced by CNRS team members for the collaborative creativity workshop. This step was repeated twice, once for each of the scenarios groups had to design. These were the only constraints that groups had follow when imagining and designing the scenarios. The second time participants had to draw the four cards constraints occurred right after they announced the finalization of first scenario. When groups finalized the scenario design task, they were invited to present each of the scenarios to other groups. Groups decided who of their members would be responsible for the presentation. Participants glued to a large whiteboard the comic book templates originally designed for the workshop where most the scenarios that they used to described and developed their scenarios. Groups had 10 minutes to present both scenarios and answered questions from other participants during and after the presentation. After the presentation of the eight scenarios (two scenarios per group), CNRS team members collected the specialized paper templates along with sticky notes, etc. and stored them for the second collaborative creativity session that was held on the following day.

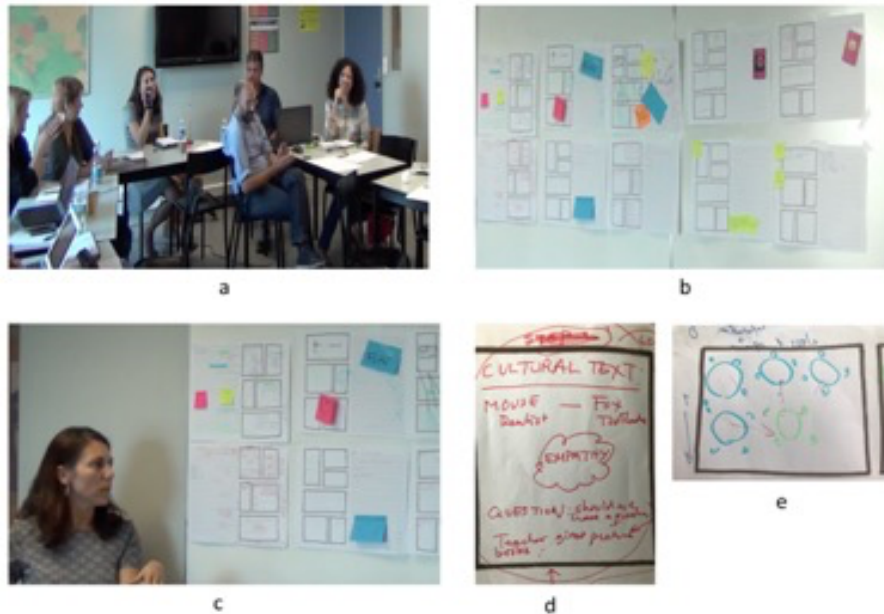


Figure 4: Co-design workshop day 1. a) DIALLS researchers collaborated in the co-creation of user-centered activity scenarios. b) Scenarios were glued to a whiteboard for whole group discussion. c) DIALLS researcher presented the scenarios her group had created. d) Example of cultural values discussed in scenarios. e) Graphic description of students' interactions.

3.3.3 Technology platform

Goal

Collaborative design of user-centered scenarios for possible consideration and implementation into the DIALLS SUITE (researchers' perspective only).

Participants

Fifteen researchers from UCAM, UNIC, JYU, NOVA, WWU, LUES, HUJI & CNRS participated in a collaborative creativity session. Researchers working in three groups of five participants each had to elaborate only three out of the eight scenarios created in day 1. CNRS and HUJI team members selected these scenarios after their whole group presentation the previous day. CNRS and HUJI selection criteria: three out eight scenarios were selected by CNRS and HUJI team members on day 1. The criteria for selection was based on the level of development and detailed added to the scenario. These features were reflected on whether groups could include information about steps, specific activities, setting, actors and artefacts involved and specific objectives.

Task

The task consisted of one collaborative creativity session. Researchers working in groups of five participants were asked to further elaborate three previously selected scenarios (1 scenario per

group) taking into consideration the role of technology in the activities. Groups were asked to produce detailed descriptions of the scenarios and to specify for which activities technology mediation would be a requirement for the successful completion of the tasks. Each group had at their disposal specialized paper templates originally designed for the workshop (e.g., storyboard format), sheets of paper, sticky-notes, and markers. The collaborative creativity session was unstructured allowing free-flowing interaction and lasted 45 minutes. Groups had additional 10 minutes to present their detailed scenarios to other groups. Presentations were video-recorded for documentation and analysis.

Procedure

CNRS and HUJI team members selected the three out the 8 scenarios produced in day 1 (please see selection criteria above). One member of the CNRS team presented the collaborative activity as a continuation of the collaborative creativity task conducted the previous day. He explained the procedure to the invited researchers from the DIALLS consortium and mention the specific goals of the session. DIALLS researchers were instructed to form three small groups of five participants each trying to avoid teaming up with colleagues from the same institution. CNRS team members distributed the three selected scenarios described in the specialized paper templates originally designed for the workshop among the three groups. When groups finalized the detailed scenario design task, they were invited to present each of the scenarios to other groups. Groups decided who of their members would be responsible for the presentation. Groups had 10 minutes to present the enhanced scenarios and answered questions from other group members during and after the presentation. CNRS team members collected the specialized paper templates along with the sticky notes, etc. produced by the three groups and stored them for analysis.

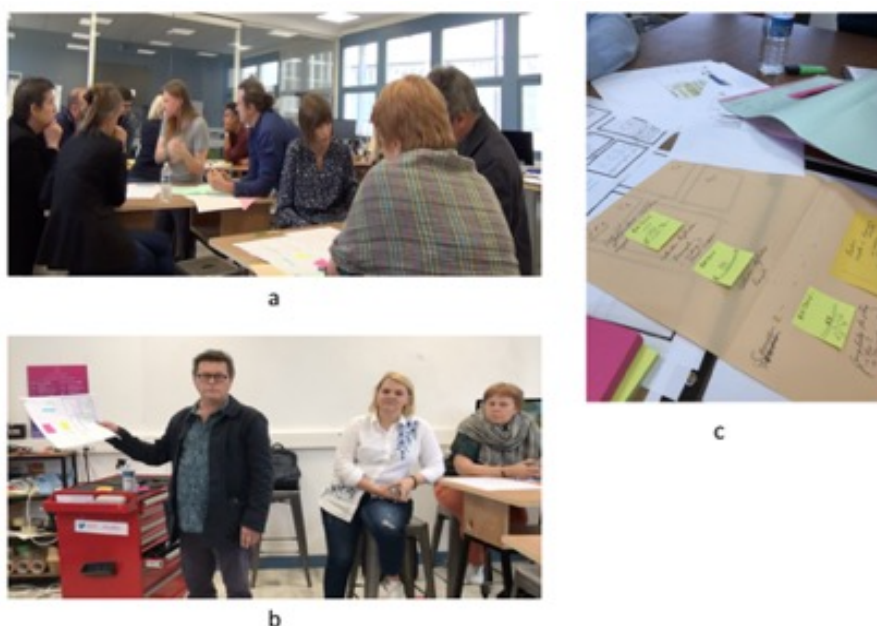


Figure 5: Co-design workshop day 2. a) Small groups' construction of technology-supported user-centered activity scenarios. b) DIALLS researcher presents his group technology-supported user-centered activity scenario. c) Detailed description of scenarios for primary school students.

3.3.4 Results

In this section we present the results from both day team creativity activities. On day 1, all groups were able to **develop narratives describing possible scenarios for dialogic teaching and learning**. Six scenarios provided information about the specific organization of the collaborative activities in terms of steps that teachers and students should follow, description of the setting (classroom vs. computer laboratory), specification of actors (students from different countries), artefacts (e.g. wordless texts) and precise objectives (e.g. exchange of perspectives for the development of intercultural empathy). The way in which scenarios were structured depended on each particular age group (see figure 6, 7, and 8 for pre-primary, primary and secondary school students, respectively). **We reiterate that the scenarios co-created by DIALLS researchers cannot as yet fully account for actual activities to be implemented, since at month 9 of the project, the CLLP is currently under development.**

Pre-primary school children

- Picture books were the wordless texts that participants included in their scenarios (e.g., scenario 1.1, Appendix 1)
- Dialogues took place in small groups, the whole class and between classrooms in different countries
- Teachers had an active role
- Technology was limited to computer systems similar to Skype™ or FaceTime™ to connect classroom located in different countries (e.g. Portugal and Lithuania) in order to promote intercultural dialogue

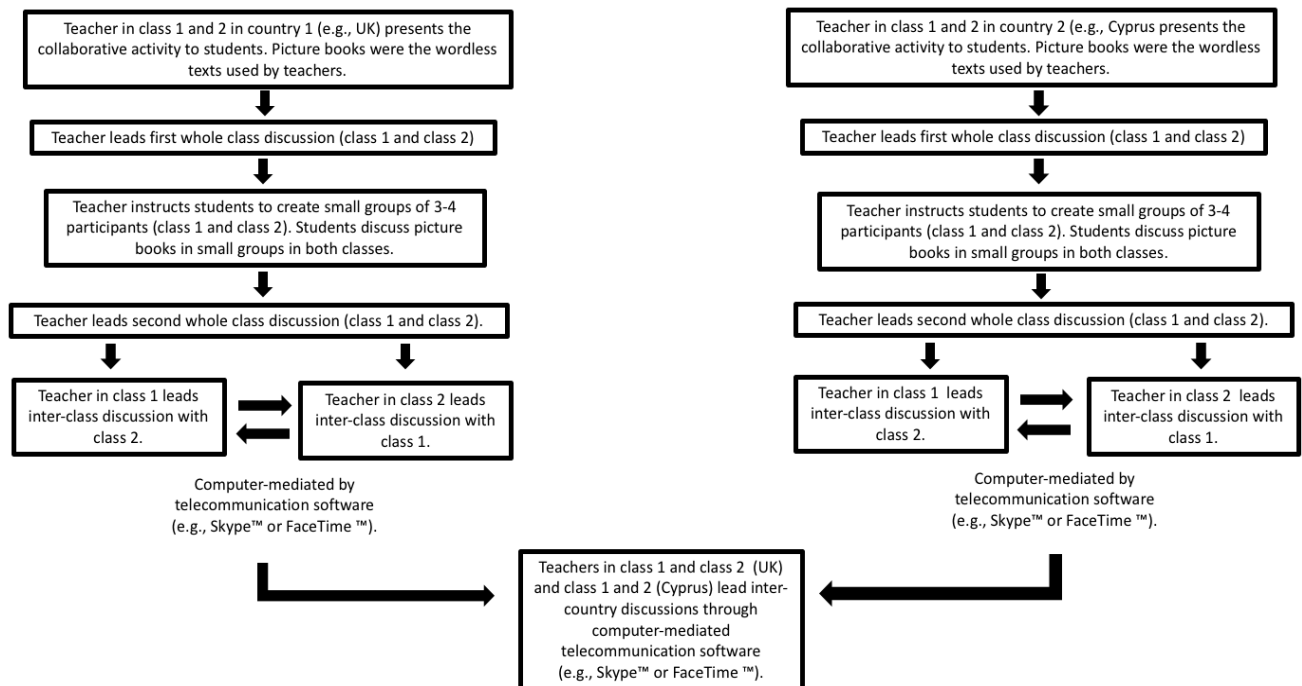


Figure 6: Description of prototypical user-centered activity scenario for pre-primary school students (5-6 years old).

Primary school students

- Wordless texts specifically designed to promote dialogues relating to themes from the CAF (e.g., how we can live sustainably, how we can celebrate differences)
- Discussions took place in small groups, the whole class and between classrooms in different countries
- Students produced short narratives individually; then justified their choices in small groups and to the whole class and finally each class in country A had to reflect on the short narratives produced by the other class in country B
- Inter-class dialogues and reflections were supported by computer systems

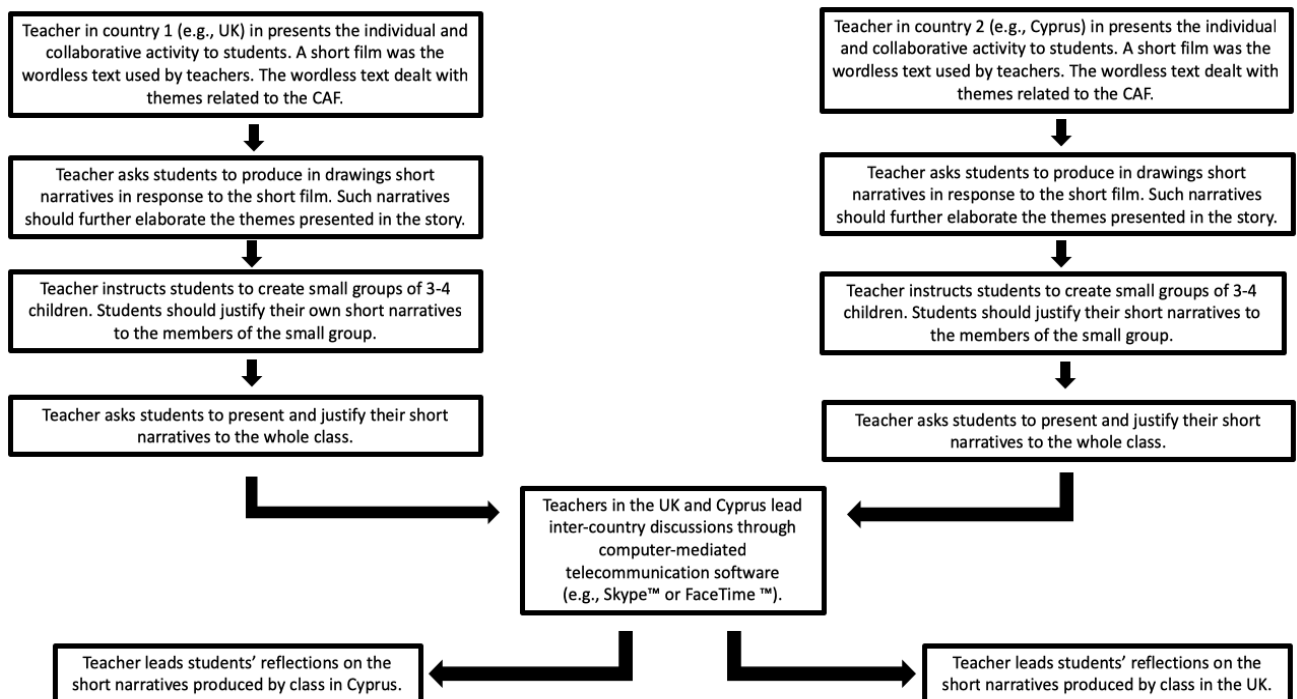


Figure 7: Description of prototypical user-centered activity scenario for primary school students (8-9 years old).

Secondary school students

- Students were given wordless texts (picture books or short films (scenario 2.1, Appendix 1) about themes related to the CAF
- Teachers asked students to design environmental policies based on tolerance in relation to specific national contexts
- Teachers played a limited role in the scenarios
- Discussions took place in small groups in the classroom and between classrooms
- Technology was used to support communication and negotiation of values between two countries

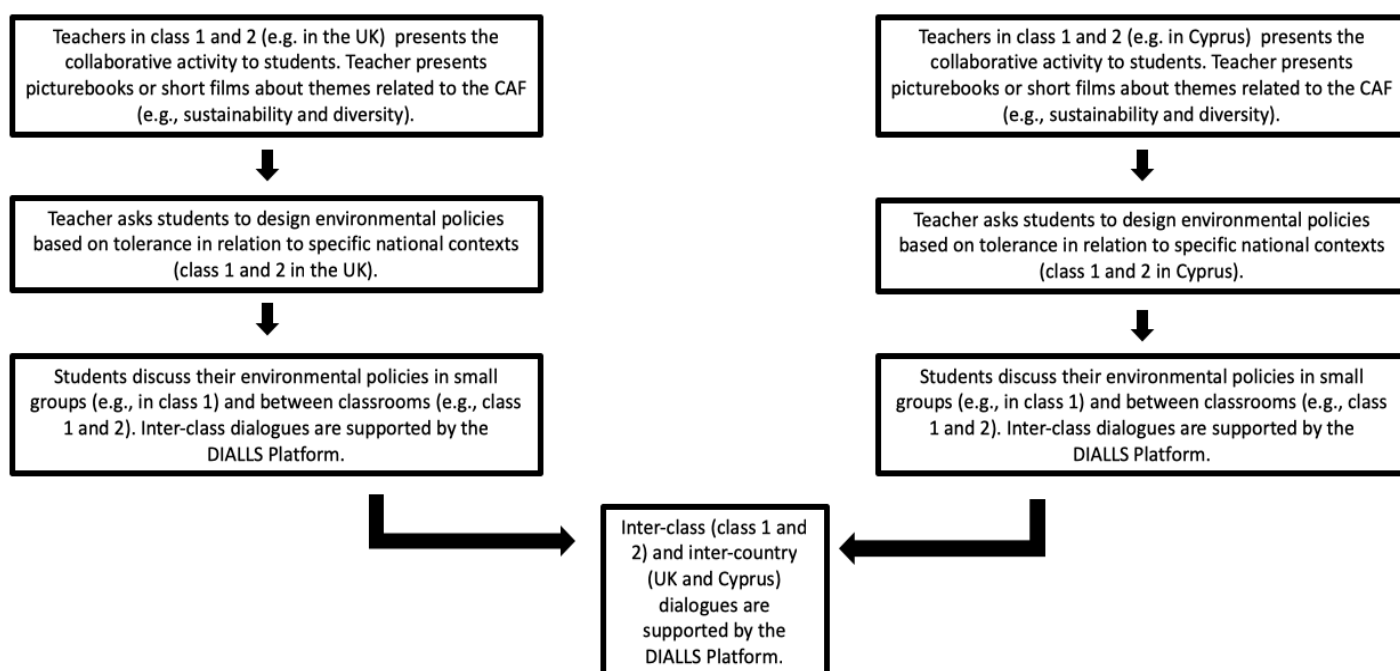


Figure 8: Description of prototypical user-centered activity scenario for secondary school students (14-15 years old).

On day 2, three groups elaborated further the scenarios selected by CNRS and HUJI members taking into consideration the possible role of the DIALLS Platform. Scenarios produced by participants included more steps than those created on day 1 (e.g. from four to eight steps, see scenario 3.1 and 3.2 in the Appendix 1); had information about the duration of each of those students and included more details about teachers' and students' roles. **The role of the DIALLS Platform varied depending on age group: from platforms that facilitated dialogues between classroom and countries (primary school students) to more sophisticated computer systems that i) allowed teachers to form and manage small groups and moderate discussions; ii) enabled students to view and annotate wordless texts; and iii) included chat and forum tools for small group dialogues.** The way in which scenarios were structured depended on each particular age group. Only two of the three scenarios are described because they dealt with different age group and topics (see figure 9 and 10 for pre-primary and secondary school students, respectively).

Primary school students

- Further development of scenario 6.1 (see Appendix 1) where students were presented wordless texts relating to themes taken from the CAF (e.g., how we can live sustainably, how we can celebrate differences)
- Students had to produce short narratives in response to wordless text and present their stories in small groups discussions, to the whole class and between classes in the same school/country and between countries
- Small class discussions and whole class discussions were moderated by teachers

- Inter-class (class 1 and 2 in the UK) and inter-country (class 1 in the UK and class 1 in Cyprus) were supported by the DIALLS Platform and led by teachers
- Teachers used the DIALLS Platform to display students' productions to the whole class and other classes and to promote collective reflection

Secondary school students

- Further development of scenario 2.1 (see Appendix 1) where students had to produce environmental policies based on wordless texts that dealt with themes from the CAF (e.g., how we can live sustainably in contexts of water scarcity)
- Students dialogues took place in small groups in blended learning situations (face-to-face and computer-mediated via the DIALLS Platform)
- Students were able to annotate and comment on the wordless texts and had to explain to other students their opinions on the subject
- Prompts such as "How can we make water distribution policies more inclusive and tolerant in contexts of water scarcity?" were used by teachers
- Students had to produce individual and collective essays at different stages of the scenarios
- Teachers were able to moderate chat dialogues via the teacher's moderator tool;
- Teachers had computer tools to display students individual and collective essays to the whole class and between classes for further reflection and evolution.

3.3.5 Summary

The user-centered activity scenarios produced by DIALLS researchers during the co-design workshop held in Paris have shown some general features depending on each of the specific age groups included in the DIALLS project (5-6, 8-9 and 14-15 years of age). Here is a description of the general features for pre-primary (5-6 years old), primary (8-9 years old) and secondary (14-15 years old) students. We decided to group 5-6 and 8-9 years old students together because user-centered scenarios did not display major differences for each of the age-group.

Pre-primary (5-6 years old) and primary school (8-9 years old) students

- Small groups and whole class collaborative activities
- Use of wordless texts (e.g., picture books and short films)
- DIALLS Platform was used as a tool to connect classrooms in different countries and display cultural artefacts produced by students in order to promote collective reflection and dialogue
- Teachers played a key role in the collaborative activities

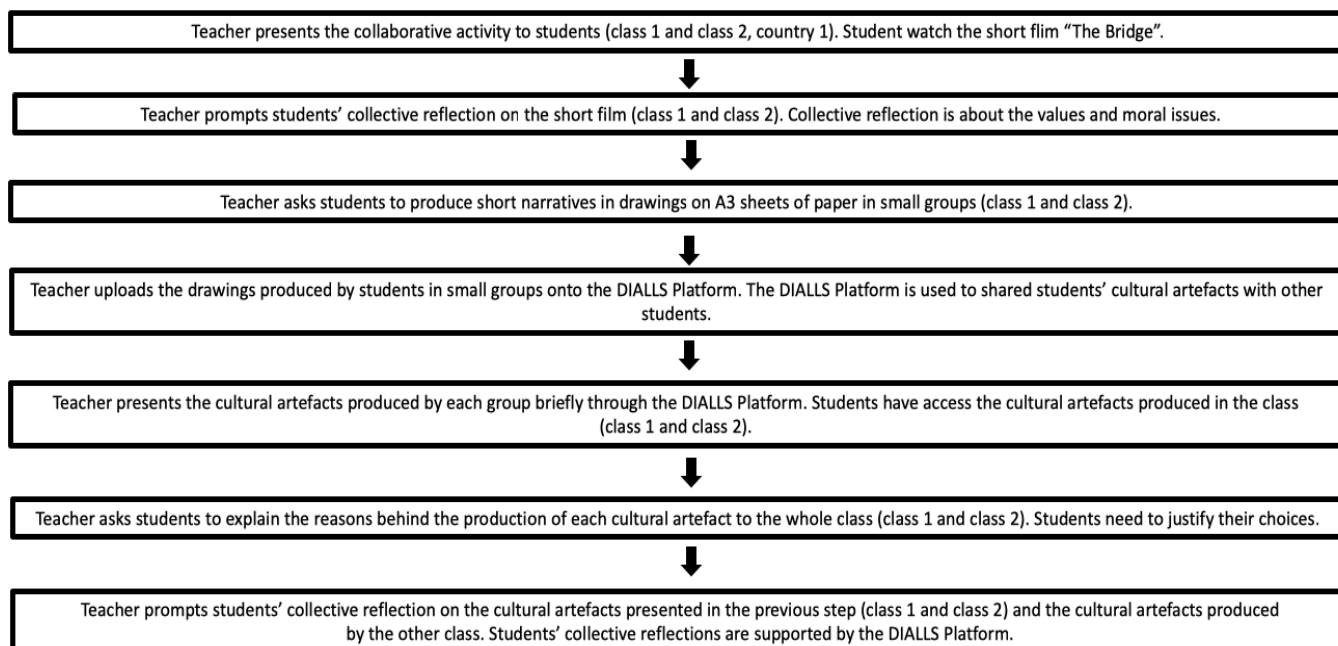


Figure 9: Description of prototypical technology-supported, user-centered activity scenario for primary school students.

Secondary school students

- Individual, small groups and whole class activities
- Students were given wordless texts (e.g., picture books and short films)
- DIALLS platform was used as a tool to structure and support individual, small groups and whole class activities (blended approach)
- DIALLS platform was used to connect classrooms in different countries and display cultural artefacts produced by students in order to promote collective reflection and dialogue
- The role of the DIALLS Platform was central and it resembled the CSCL systems included in the critical review (e.g., **CoFFEE**)
- Teachers played a limited role in the individual and collaborative activities

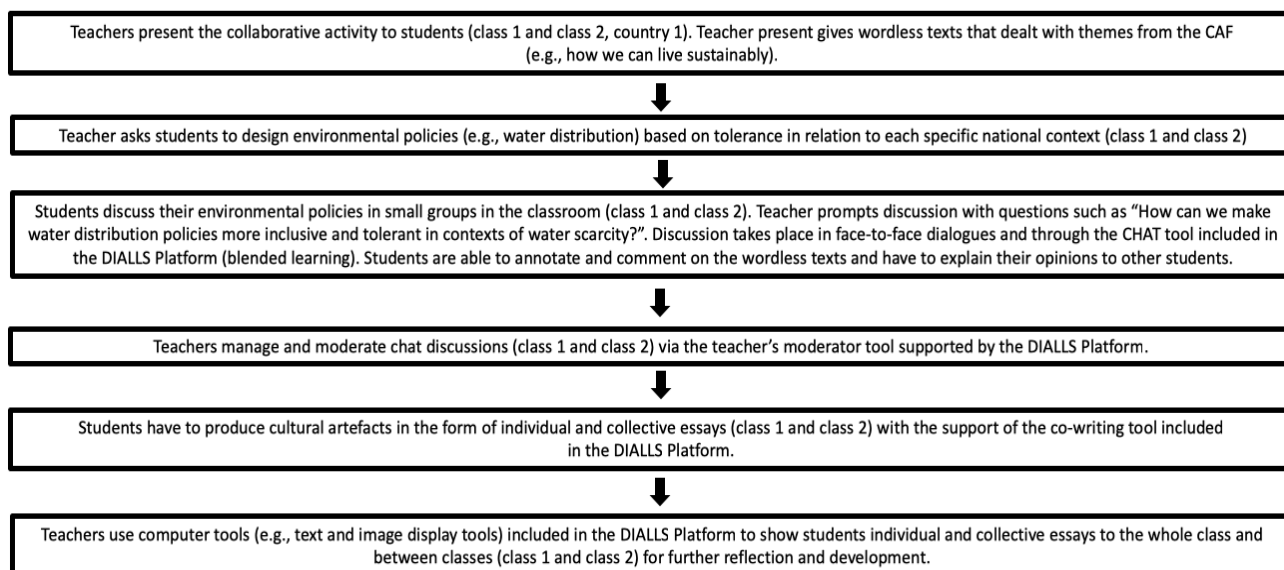


Figure 10: Prototypical technology-supported, user-centered activity scenario for secondary school students.

The user-centered activity scenarios co-created by DIALLS researchers **confirm our analysis of the literature reviewing the users' experiences with currently available (or not) CSCL systems** (see critical review, Section 2). For younger children (5-6 and 8-9 years old) the DIALLS Platform would represent **a computer environment to share cultural artefacts produced by students in order to encourage dialogue and group discussions in class**, between classes at the same school or country and between classes located in different countries. Wordless picture books will be presented to the classes as real books. Short films will exist on the DIALLS website (<https://dialls2020.eu/>) and usefully embedded within the DIALLS Platform for annotation. On the other hand, for adolescents (14-15 years old) the DIALLS platform would **resemble more one of the CSCL computer systems reviewed in Section 2**. That is, a CSCL system that contains computer tools supporting, blended form of collaborative learning, chat synchronous discussions, co-writing activities as well as individual and group awareness processes. Interestingly, although most of the user-centered scenarios produced by DIALLS researchers included dialogues between classes located in different countries (e.g. UK and Cyprus), none of them dealt with the problem of translation. That is, how educational scenarios supported by the DIALLS Platform would support dialogue processes and discussions between classes located in countries where students speak different languages.

3.4 Cambridge co-design workshop

Members of the CNRS, HUJI and UCAM participated in a two-day co-design workshop with primary school teachers at the Faculty of Education, University of Cambridge in November 14-15, 2018. This workshop was organized by the leader of the DIALLS project consortium, Dr. Fiona Maine and her team. The goal of the workshop was to obtain a **first insight into how children from two primary school classes at the University of Cambridge Primary School responded to a set of teacher-led collaborative activities that teachers were asked to plan for DIALLS researchers**. The Cambridge co-

design meeting also represented an opportunity to receive crucial feedback on the possible functions that the DIALLS Platform could support from some of the teachers currently collaborating with UCAM in the DIALLS project. In order to do so, CNRS and HUJI team members were invited to **observe two classes** at the University of Cambridge Primary School and had the opportunity to **interview the teachers responsible for both classes**. The age groups represented by the two primary school classes corresponded to the age groups included in the Description of Work (pre-primary, 5-6 years of age and primary 8-9 years of age).

Our critical review of the literature of CSCL systems supporting collaborative argumentation suggested that so far little attention has been paid to younger learners' user experiences with those computer tools. Such age-related bias in CSCL research is reflected on the fact that out of the 72 empirical studies that we reviewed only six were cases in which CSCL systems were tested with primary school students. Interestingly, even those studies conducted with primary school students were **mainly focused on testing 10-11 years old instead of younger students**. We understand that **testing CSCL systems on younger children present many challenges. To a large extent, these challenges are linked to children's ability to read and write quickly and efficiently so that dialogue can flow**. These concerns were also reflected in the user-centered activity scenarios produced by DIALLS researchers during the CNRS Paris collaborative creativity workshops. In those scenarios the role of the CSCL platform for pre-primary and primary school students was also very limited (see above, Figures 9 and 10).

3.4.1 Classroom observations

In the first day of the Cambridge co-design workshop with teachers, DIALLS researchers from UCAM, HUJI and UCAM visited the University of Cambridge Primary School in order to observe a set of teacher-led collaborative activities that resembled the type of activities that should be supported by the DIALLS Platform. We were invited to witness those activities in two classrooms: a) a Y1 classroom with children of 5-6 years of age and b) a Y5 classroom with children of 10-11 years of age. The pedagogical scenarios and the use of technology proposed by teachers presented slight differences in the two classes. We observed a reduction in the number of teachers' prompts to facilitate whole class discussions in the Y5 classroom. As mentioned above, the lesson plans that were devised by Y1 and Y5 did not fully follow CLLP criteria. These class discussions nevertheless provide a useful starting point for reflection on the types of activities for which technology support could be given.

We had the opportunity to interview teachers after class observations and ask them about how the functions and tools that they would want the DIALLS Platform to include. The two teachers we had the chance to interview were teachers actively involved in the DIALLS project, and thus, they were familiar with the project methods and planned school activities. The first day of the Cambridge co-design workshop ended in a three-hour co-design session with other teachers from the University of Cambridge Primary School (including the deputy headmaster) and members of the UCAM, HUJI and CNRS teams at the Faculty of Education, University of Cambridge.



Figure 11: Main entrance of the University of Cambridge Primary School.

Pedagogical design

These are the steps of the pedagogical design that the teacher of Y1 class followed:

- Introduction to the activity and presentation of the short film “Baboon on the Moon”
- Children were sitting on a colorful carpet in front of an interactive whiteboard
- Teacher prompted students’ reflection while watching the video with verbal cues such “think in your head during the video because afterwards they will all discuss it”
- First whole class discussion right after video presentation
- Children raised ‘thinking thumbs’ to sign their willingness to take the floor
- Teacher asked children to relocate around small tables and engage in discussion in pairs
- Discussion in pairs were organized a role-playing, one child played the role of a scientist and the other the role of baboon
- Teacher invited children to sit all together in circle in front of the interactive whiteboard
- Teacher prompted second whole class discussion with questions such as “what did you talk about?” to trigger children recollections of the discussion they just had with classmates and encourage participation in the group activity
- Teacher led second whole class discussion by using the following questions as prompts at different stages of the group activity: a) “Is a house the same as a home?”; b) “Why is a house and a home different?”; c) “How does home make you feel?”; d) “Does the Baboon on the Moon show those feelings of happiness?”; and e) “Why do you have those feelings”?
- Some of the questions acting as prompts appeared on the whiteboard screens
- Teacher thanked children for their participation

The teacher of the Y5 class followed most the steps presented above. The main differences in the pedagogical design were related to the ways in which she managed the second whole class group discussion after the discussions and role-playing in pairs around small tables:

- Introduction to the activity and presentation of the short film “Baboon on the Moon”
- Children were sitting on a colorful carpet in front of an interactive whiteboard
- Teacher prompted students’ reflection while watching the video with verbal cues such “think in your head during the video because afterwards they will all discuss it”
- First whole class discussion right after video presentation
- Children raised ‘thinking thumbs’ to sign their willingness to take the floor
- Teacher asked children to relocate around small tables and engage in discussion in pairs
- Discussion in pairs were organized a role-playing, one child played the role of a scientist and the other the role of baboon
- Teacher invited children to sit all together in circle in front of the interactive whiteboard
- Teacher used less prompts in the form of questions to facilitate whole class discussion but still employed questions to facilitate the exteriorization of children’s feelings (e.g., “How did you feel when...?”)
- Teacher relied on the interactive whiteboard to display images of well-known stories related to the theme “moon landing” that children seemed to be familiar with (e.g., Neil Armstrong walking on the moon and conspiracy theorists about the event)
- Following teacher’s proposal and children’s agreement the short video “Baboon on the Moon” was played for a second time
- Teacher acknowledged children excellent participation in the activity and rewarded them with a longer outside break

Use of technology

In both classes the use of technology was restricted as a means for the playing the short film “Baboon on the Moon”. This is one of the types of wordless texts that will be used in the DIALLS project (see Description of Work, p. 13). Teachers’ prompts to facilitate second whole class discussions were also supported by the interactive whiteboard. In Y5 class, the teacher employed the interactive whiteboard to display images that made reference to other stories linked to the theme “moon landing”. This enabled learners to establish inter-textual relations with other materials and expand their capacities to collectively reflect on the short film used as wordless text.

Interview with teachers

We were invited to meet the teachers of both classes for a short and unstructured interview after class observations. Our meeting with teachers took place at the staff break room right before lunch break. We asked teachers about what technology they thought it could help them to have discussions with other classes in the UK and classes located in other EU countries. In addition, as these two particular teachers were familiar with the DIALLS project we asked them directly about the functionalities that they wanted the DIALLS Platform to support. These are the main points in relation

to the functions and tools that the DIALLS Platform could support that both teachers elaborated in their answers:

- A videoconferencing tool in order for children to see with whom they are collaborating with. This possibility would make children to be more curious about other countries/cultures and increase their motivation
- A tool for children to share cultural artefacts co-created in the class with other classes in the UK as well as classes from other EU countries
- An online forum tool that would allow children from different classes and countries to be engaged in dialogue processes. Inter-class and inter-country dialogues would be essential for the developing of children's perspective taking abilities regarding cultural values

The information that we could gather during our short interviews with teachers suggest that for them the DIALLS Platform could be considered as a set of tools, the aim of which would be a) to **facilitate dialogue between students from different classes** in the same country and across countries; b) to **provide a digital support for the sharing of cultural artefacts**; and c) to enable **children to flexible adapt their own perspectives on the cultural values depicted in the wordless texts** by considering and reflecting on other children's views on the same topics. Interestingly, although teachers stressed the fact that it would very positive if the DIALLS Platform could support dialogue processes between classes located in different countries, **they did not mention how they expected the text produced by one class in the UK be understood by another class located in a different European country** (e.g., Lithuania or Portugal), and vice versa.

First co-design session with teachers and DIALLS researchers

After the school visit members of the CNRS, HUJI and UCAM teams participated in a three hour co-design session with teachers from the University of Cambridge Primary School, including the deputy headmaster and other school authorities. The meeting was held at the Faculty of Education, University of Cambridge. The aim of this first co-design session was to obtain further information about teachers' requirements for the DIALLS Platform. Teachers and school authorities agreed on the fact that for pre-primary and primary school students the DIALLS Platform should be able to support the following functionalities and include the following tools:

- The DIALLS Platform should be designed and developed having in mind that all class work (e.g., wordless text annotations) and communication with other classes (e.g. asynchronous online forum with another class in the same country) will be mediated by teachers
- The DIALLS Platform should be relatively easy to learn to use and include a user-friendly interface for teachers to interact with
- The DIALLS Platform needs to include an online forum and text display tools to support teachers-mediated dialogue processes between classes in the same country and between classes in different countries. Text display tools were essential for the DIALLS Platform to support for teachers. They envisioned that cultural artefacts will be uploaded through the tool

Again, how the text produced by a class located in the UK would be intelligible by a class located in another European country (e.g., Lithuania) included the DIALLS project (and the other way around) was not a topic raised by teachers – even when it was stressed that the DIALLS Platform should contain tools to support inter-cultural dialogue.

3.4.2 Scenarios for pre-primary and primary school children

The second day of the Cambridge co-design workshop with primary school teachers was centered on the design of specific user-centered educational scenarios for pre-primary and primary school students (Figure 12). The main goal was to agree on the design of specific scenarios for a) asynchronous communication between classes located different countries (e.g., UK and Cyprus); and b) synchronous communication between classes located in the same country (e.g., UK). For the scenario design we took into account classroom observations, the interviews with teachers and the first co-design session held with teachers on the previous day. We also considered the age-related and written language biases found in CSCL systems and discussed in the crucial review (see Section 2) as well as the limited role of technology that DIALLS researchers included in the user-centered scenarios developed for younger children during the CNRS Paris team creativity workshop. Figure 13 shows a detailed description of the user-centered pedagogical scenario for asynchronous communication for pre-primary and primary school students from classes located in different countries (e.g., UK and Cyprus). Figure 14 displays detailed description of the user-centered pedagogical scenario for synchronous communication for pre-primary and primary school students located in same countries (e.g., UK). Below we present the main features of each scenario.

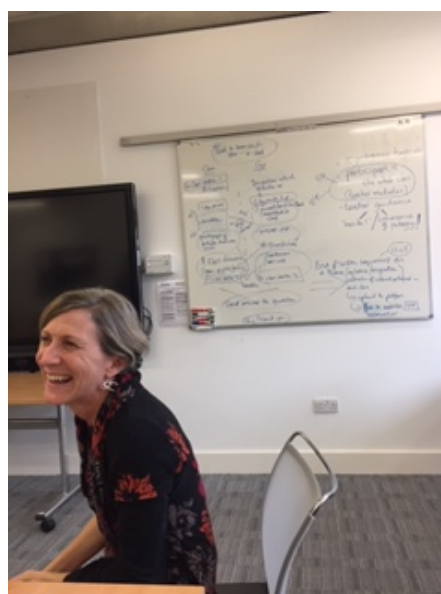


Figure 12: Scenario co-design in Cambridge (whiteboard), DIALLS project coordinator discussing possible solutions for the DIALLS Platform with WP6 project members.

User-centered pedagogical scenario for asynchronous communication

- All communication through the DIALLS platform is mediated by teachers in both countries (e.g., UK and Cyprus)
- Class activities are similar in the UK and Cyprus
- Teachers present wordless texts through the DIALLS Platform for children to discuss
- Class discussions are triggered by teachers' prompts in the form of questions
- Students decide when and where make annotations on the wordless text
- Teachers make annotations via the DIALLS Platform
- Students make drawings in response to previous annotations
- Teachers make pictures of those drawings and upload them onto the platform online forum
- Teachers send message containing the pictures and ending with a question to the class located in the other country
- Teachers receive notification that indicates that other class has sent a message through the DIALLS Platform online forum
- Teachers translate other class messages into their local language
- Class responds to message sent by class from a different country
- Last three steps are repeated until inter-country discussions through the DIALLS online forum are over
- Teachers send thank you note to the class located in another country
- Each class produces a cultural artefact that teachers upload onto the DIALLS Platform repository
- DIALLS webmaster uploads cultural artefacts onto the DIALLS website to make them public

User-centered pedagogical scenario for synchronous communication

- All communication through the DIALLS Platform is mediated by teachers from two classes in the same country (e.g., UK)
- Class activities are similar both classes
- Teachers present wordless texts through the platform for children to discuss
- Class discussions are triggered by teachers' prompts in the form of questions
- Students decide when and where make annotations on the wordless text
- Teachers make annotations via the platform
- Teachers send message ending with a question through the DIALLS CHAT tool to the other class
- Classes receive messages sent by the other class on the DIALLS CHAT tool
- With the support of the DIALLS Platform, teachers make other class' messages bigger to ensure whole class visualization
- Teachers use the pause bottom included in the DIALLS CHAT tool interface to signal the other class that they are reading message and preparing their response
- Both classes drawings are uploaded by teachers onto the DIALLS Platform

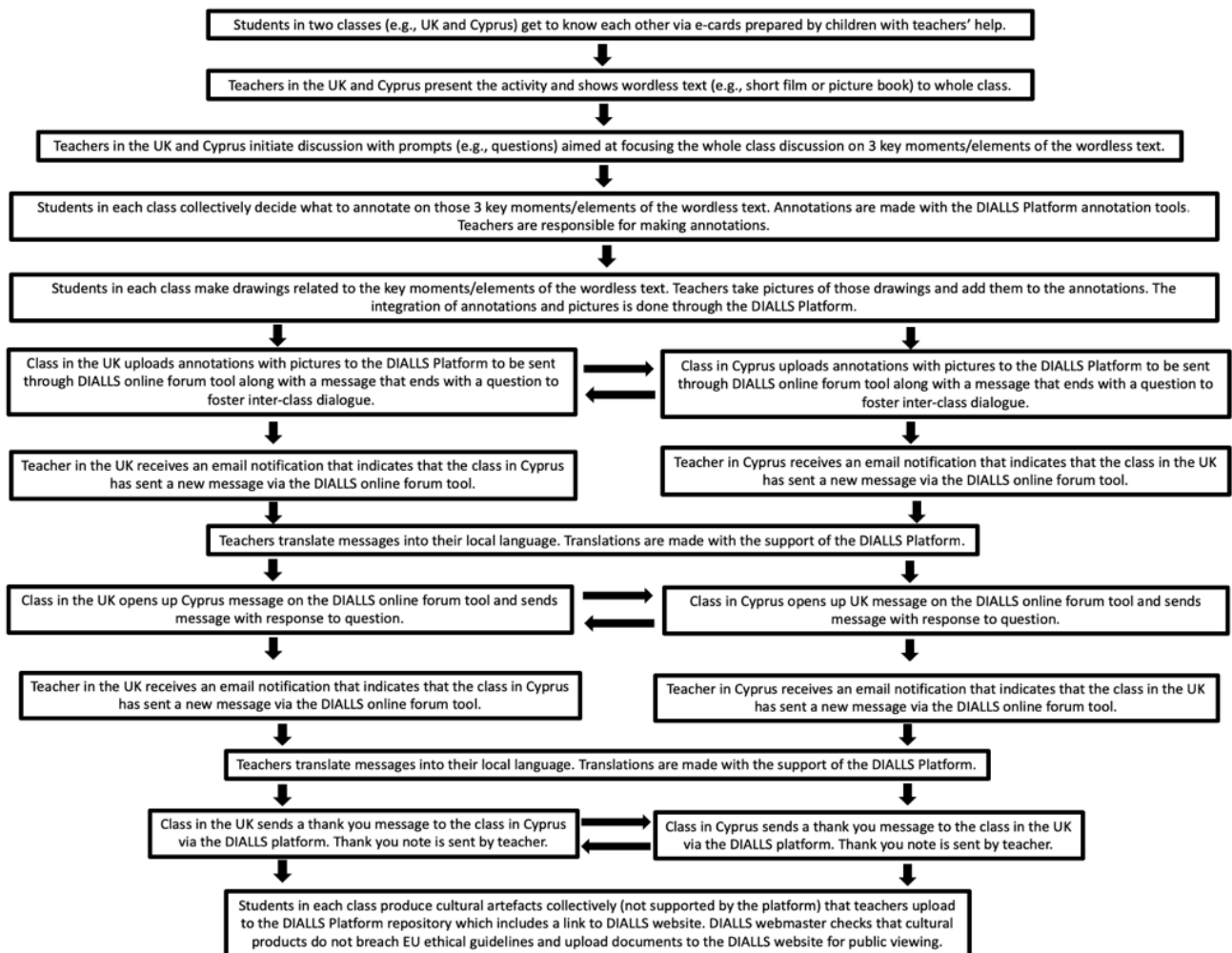


Figure 13: Description of prototypical user-centered pedagogical scenario for asynchronous group discussions in pre-primary and primary school students.

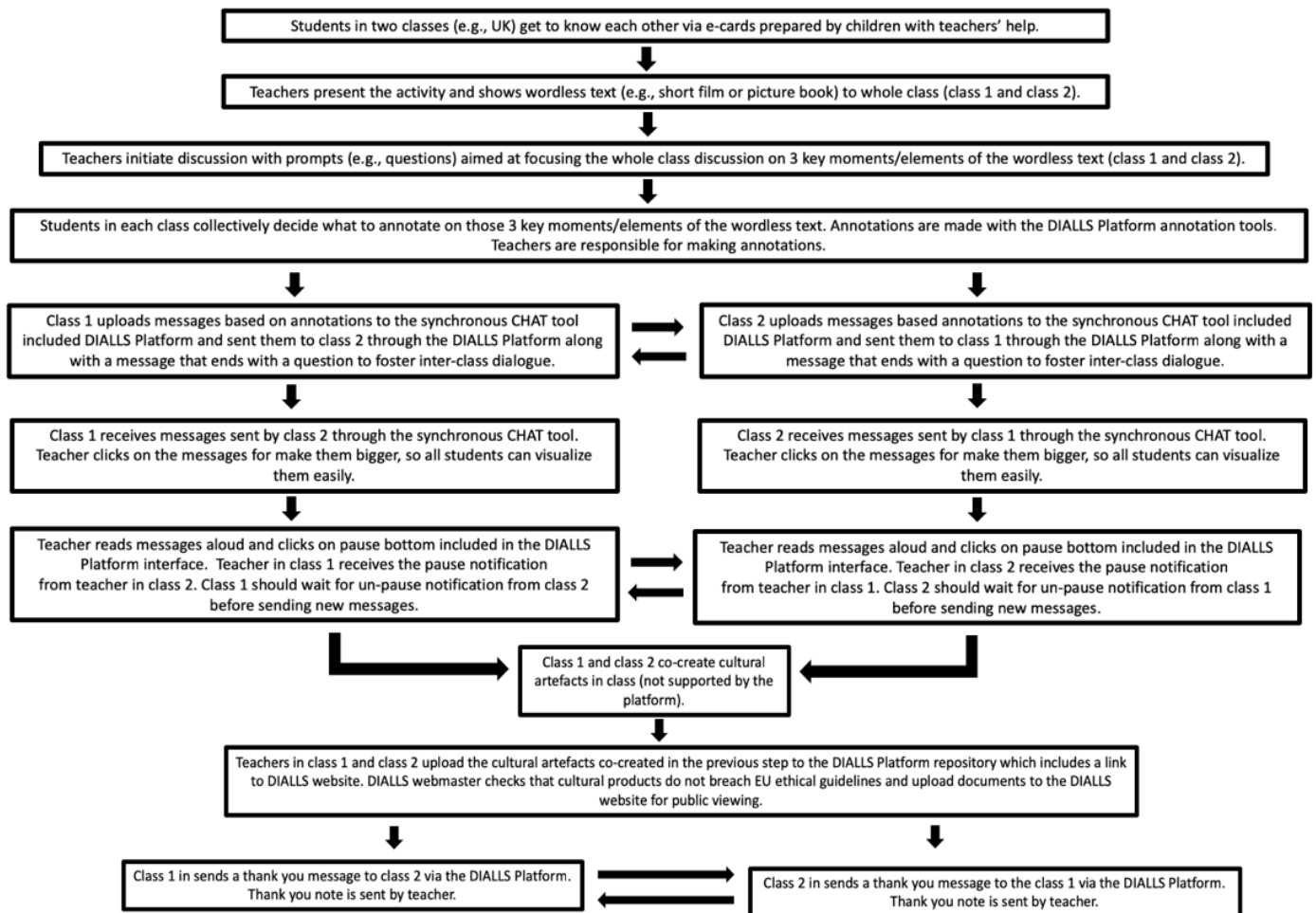


Figure 14: Description of prototypical user-centered pedagogical scenario for synchronous group discussions in pre-primary and primary schools' students.

3.4.3 Results

Pre-primary and primary school students have been a population **underrepresented in the CSCL literature**. This has occurred for **two main biases in CSCL research: a) written language bias and b) age-related bias** (see Section 2). The current situation in CSCL research has presented important challenges for the design and development of a CSCL system that could encompass younger children. The Cambridge co-design workshop with primary school teachers has been crucial for the further specification of the functionalities that the DIALLS Platform should support as well as for defining the tools that the software needs to include for 5-6 and 8-9 years old.

The school visit to the University of Cambridge Primary School has helped us to better understand the kind of pedagogical activities that the DIALLS Platform should support. What was clear from our class observation was that collaborative activities in both classes (Y1 and Y5) were led by teachers at all times. Thus, **the functions that the DIALLS Platform should support must take into consideration the key role that teachers will play in the pedagogical scenarios, in particular for 5-6 and 8-9 years old.**

Our interviews and first co-design session with teachers currently involved in the DIALLS project provided useful information about the functions they expect the DIALLS platform to support. The main functions that teachers expect the DIALLS platform to support are:

- Inter-class and inter-country communication through a videoconference system
- An online forum for children to be involved in dialogue processes with children from other classes and countries
- Co-creation activities that would enable children from different classes in the same country and classes located at different countries to co-write and co-draw cultural artefacts.

Teachers considered these functions as essential for the DIALLS Platform to support because they would allow students to become more curious about other countries/cultures and increasing their motivation (videoconferencing tool) and to participate in co-creation and dialogue processes with peers (from the same country and from different country). The participation in co-creation activities (co-writing) as well as the possibility to be engaged in dialogue processes (online forum) play a key role in children's abilities to take into account others' children's perspective when discussing cultural values and reflecting on those discussions. Teachers also stressed that the **DIALLS Platform should come with a user-friendly interface**. That is, teachers would prefer to interact with a relatively easy to learn and use interface that **would not require them to participate in an excessively long training program**.

Although teachers pointed out that the DIALLS Platform needs to support communication between classes located in different countries and inter-cultural dialogue process, **they did not refer to how speech (videoconferencing tool) and text (online forum) would be translated into local languages**. Semi-automatic translation tools were not part of the CSCL systems we included in our critical review and we did not find any currently available CSCL system supporting this function. The role of technology in the user-centered activity scenarios designed by DIALLS researchers in the co-design workshop held in Paris did not discuss and elaborate this important function either.

3.4.4 Summary

The aim of the second co-design session was to come up with two specific user-centered pedagogical scenarios for pre-primary and primary school students. While one scenario was focused on the support of asynchronous communication between classes located different countries, the other was centered on synchronous communication between classes located in the same country. The design of both user-centered pedagogical scenarios encapsulated what we have learned from the school visit, interviews with teachers and first co-design session. Our decision choices were also motivated by what we have learned from our critical review and the Paris co-design workshop.

3.5 Final remarks

Both co-design workshops have served to **validate the list of tools** that we retained from existing CSCL systems and **to propose new ones** in order to support the specificities of the DIALLS project.

The user-centered activity scenarios created by DIALLS researchers and teachers have allowed us to further specify those tools and to adapt them to the particular age groups. In the next section, we propose a detailed description of each of the computer tools along with mockup images of possible user interfaces.

Highlights

- Co-design workshops were organized following the DIALLS core educational activities as described in the Description of Work.
- Co-design workshops with researchers and teachers (future users of the DIALLS platform) were conducted to specify the functionalities of existing CSCL system.
- Future users co-created detailed educational activity scenarios that resembled those included in the DIALLS project.
- Future users co-define the functionalities that DIALLS Platform should support.
- Future users co-elaborated the set of tools that the platform should include in order to support those functionalities.
- Retained set of tools taken from existing CSCL systems were validated and a few others were proposed.

4. Functional recommendations for the DIALLS online suite

4.1 Background

This section presents our functional recommendations for the DIALLS Platform. These recommendations are based on the critical review of existing (currently available or not) CSCL systems supporting collaborative argumentation and the co-design workshops with future users of the platform held in Paris and Cambridge in September and November 2018, respectively. It should be mentioned that in more than one sense, **the following description of the suite and its functionalities is a maximalist description**: First, this is a general description that brings together functionalities that are aimed to different age groups. In practice, **the suite will be flexible and tailored to each age group**. Functionalities that are not useful for a specific age group will be part of the seen suite for this age group users. Second, the envisioned functionalities are presented while we are in the process of conducting usability tests. Therefore, **changes are expected in the suite's future versions, in terms of functionalities and design**.

The basic design of DIALLS SUITE provides a threaded discussion platform. Each discussion revolves around a specific issue. It can host unlimited number of participants, divided roles of: students, observers and moderator. Students can contribute to the discussion, and so can the moderator. Observers can only watch the discussion without intervening. There is an indication signaling who's online at the room at any given moment. Discussions can be in 'open' or 'locked' conditions, decided by the moderator. Discussions contain time frame, sets by the moderator.

A summary of the main functionalities (proposed January 2018) of the DIALLS online platform is shown in Figure 15. The diagram below is simplified in that annotation tools can of course also be used by teachers, for example in focusing the discussion. Similarly, teachers may use the activity analysis tools, for example for evaluating students' work.

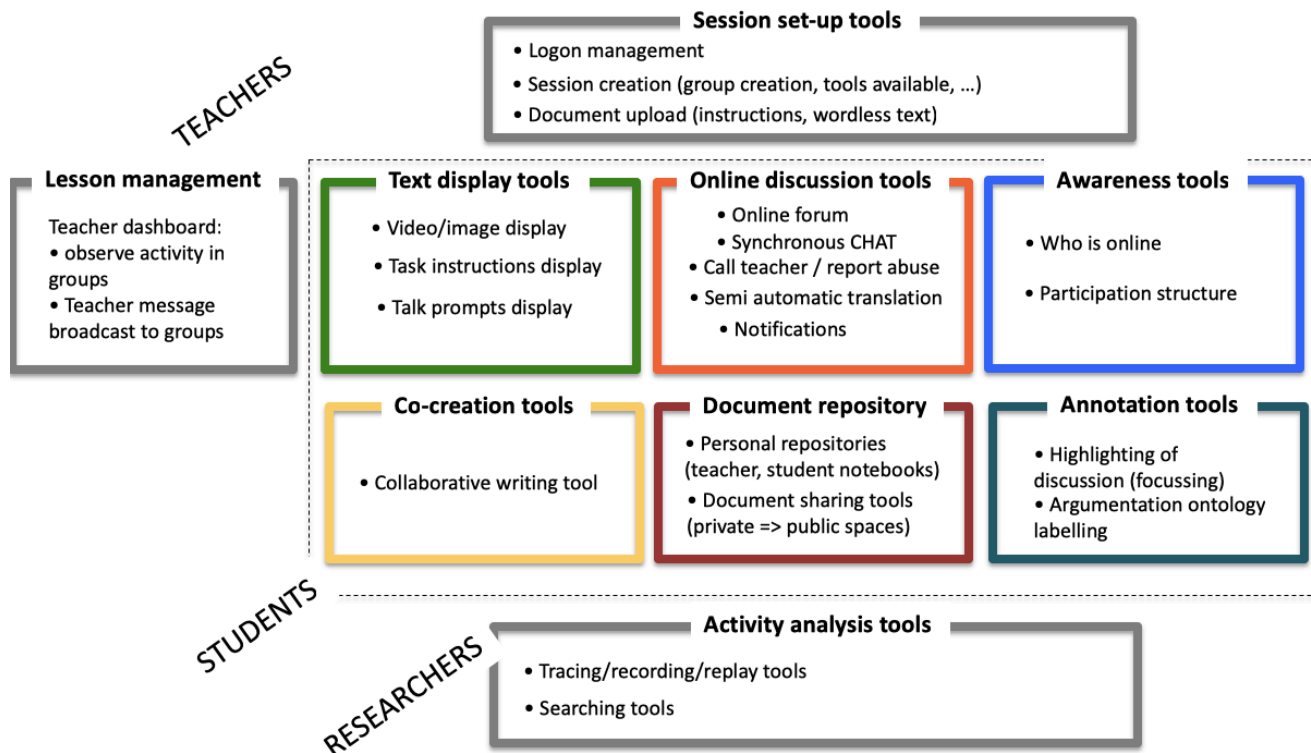


Figure 15: Summary of main functionalities of DIALLS online platform (v. January 2019).

The full list of functionalities is shown below. **Note that the illustrations of tools are hypothetical mockups.** Professional user-adapted interface design will be carried out over the ensuing months of the project.

4.2 Teacher tools: Lesson organisation, session setup, monitoring

Logon management

Logon management tools will be used to give identifiers for participants' roles (teacher, student, etc.). The registration process will include providing username and a chosen password. The DIALLS Platform will provide a recovery mechanism in cases of forgotten user names and/or passwords. Login through a designated address for each institution, for example:
<http://www.DIALLS Suite.com/school12.il>.

Tool for building rooms and discussion (for teachers)

These are tools that will be used to provide different layouts to support different forms of discussions (brainstorming, inquiry, convergence and decision making, debate). Tools for building rooms and discussions (Figure 16) will be employed to support the following activities : i) choosing between discussion or reflection; ii) if reflection, choose between discussion based or storage based; iii) If discussion based, select discussion number or title (auto fill); iv) If storage based, select from storage; vi) selection of layout; vii) choosing participants and roles; viii) attribute name tiles; ix) provide assignments; x) select resource and uploading and including links; xi) selection of

artefacts if needed from selected resources; upload; link to YouTube, Vimeo; xii) set time frame; and xiii) set number of copies for quick building of multiple rooms.



Figure 16: Room building (for moderators)

Assignment box (space for instructions)

Basic tool for teachers to input instructions. Instructions are presented in summarized form as teachers will explain them further.

Awareness tools (notifications of who's online)

Tool that enables teachers in a classroom to visualize who is participating in the proposed activities.

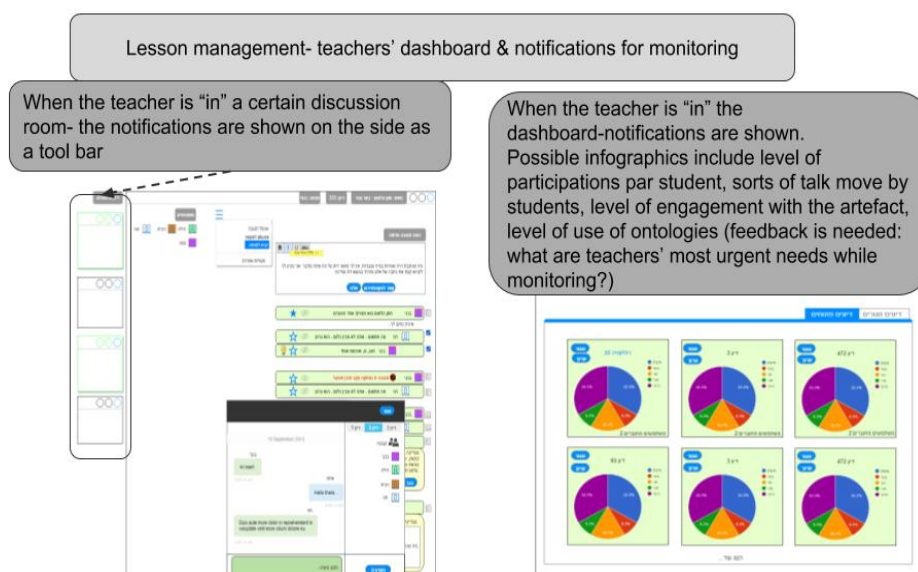


Figure 17: Moderator's awareness tools as seen on the dashboard (right) and in a discussion room (left).

Tools for uploading wordless texts

These include the possibility of uploading different types of files including i) JPEG files; ii) PDF files; iii) audio files (e.g., Mp3) and iv) video files (e.g., Mp4).

Teacher's dashboard

Crucial for teachers in classrooms with several groups, when orchestrating several discussions. Allows observing activity of each small group (in separate chat-rooms)

Graphical tools for teachers' analyses of students' structure of participation

Moderators have all the previously mentioned functions in the dashboard, as well as tools for opening discussion rooms and moderation toolbar. Moderators will have infographics for Social Network Analysis, structure of participation (words and utterances counting) and activity rates with the artifact (highlights, comments per student, group). Moderator can switch information between her own discussions. All functionalities have expand/collapse functionality and is available for the moderator on every discussion room (not only from dashboard).

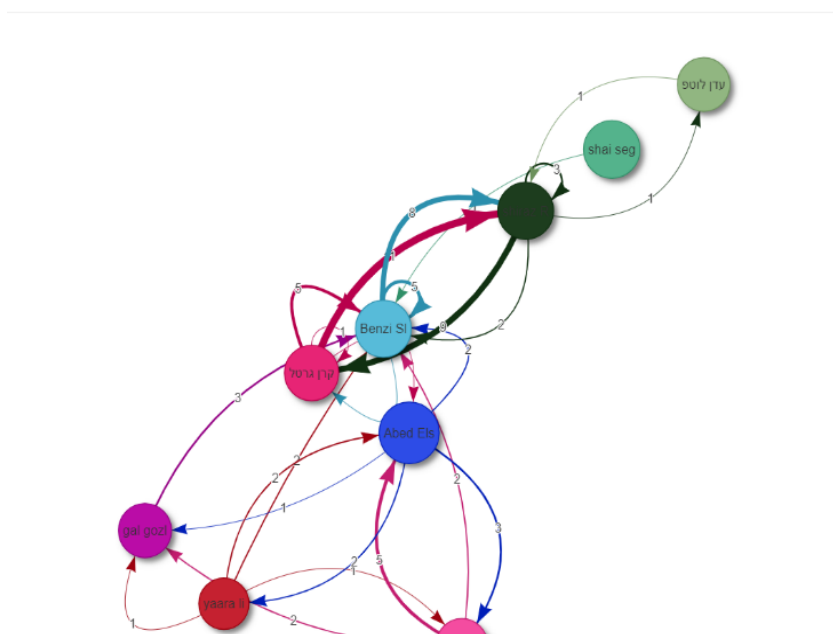


Figure 18: Social network analysis awareness tool

Graphical tools for teachers (level of engagement and dialogue analysis)

Graphical tools are important to visualize students' level and type of engagement with the uploaded shared objects (image, movie, text). Graphical tools for dialogue analysis will enable teachers to examine different ways to answer the same question and the co-elaboration of different approaches to designing a specific task on the same issue, etc. Graphical tools will help teachers to moderate group-work in DIALLS educational activities.

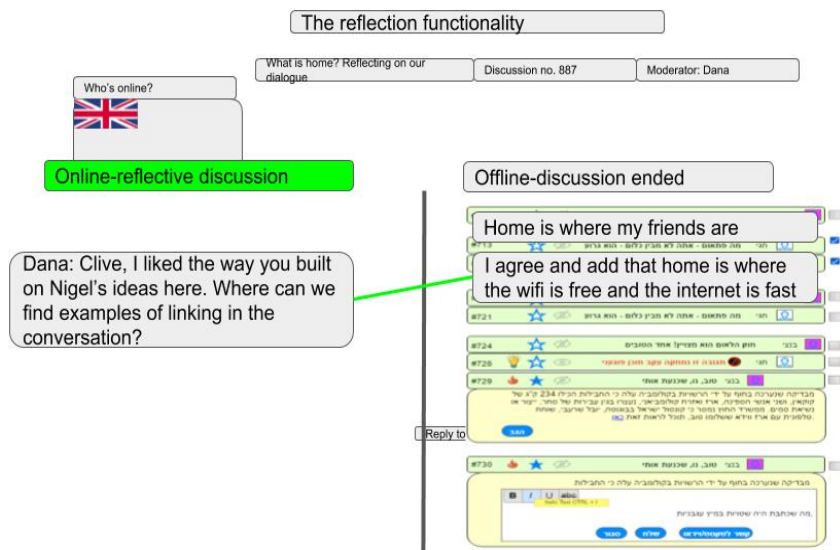


Figure 19: Graphical tools for dialogue analysis

Tool for the teacher to create joint attention of the participants with respect to a specific line/episode

Teachers can add and remove tags to specific lines in the thread, for example: "worth exploring" and "highly interesting" icon to specific utterances. The teacher has the option to create its own set of tags. They can also star utterances, but they can also apply a copy paste on the starred utterance and turn it into a parent comment, so the utterance will turn into a beginning of a new thread. Teachers can 'hide' selected utterances from view. In such case, the system will signal that the utterance was omitted.

4.3 Private and public 'spaces': personal repositories

Personal repository (student's/teacher's notebook)

These tools allow users (teachers and students) to store and share text and image files. Users can decide whether to keep these files private or make them public. Such tool will enable DIALLS Platform users to store and share cultural artefacts.

Tool for sharing items from repository with other participants

This tool is important for presenting oneself to the others, and for creating an atmosphere of empathy. When working on the artefact, participants have private and public working modes. In both they can highlight the text, link it to the thread and annotate it (pdf only). Participants can work privately and later choose what to publish in the public mode. When a pdf/thread reference is created, the utterance will contain a designated signal. Pressing it will spring the highlighted part of the pdf to the same level of the reference, so the reader will be able to read the source and the comment at a glance. Participants can create reference to a specific moment in videos. Pushing the reference will play the video from the chosen moment.

Tool for copy & paste of utterances/episodes from a room to the repository

This tool enables activities of reflection on previous discussions, a central way for learning from discussions. Teacher can select interesting arguments and dialogic patterns for later use with students. Participants can store selected utterances or episodes in a personal storage for later use. Moderators can use them later as resources for creating reflection rooms. When starting an utterance, moderator will be asked to provide a name or title for the saved utterance (to ease later remembrance).

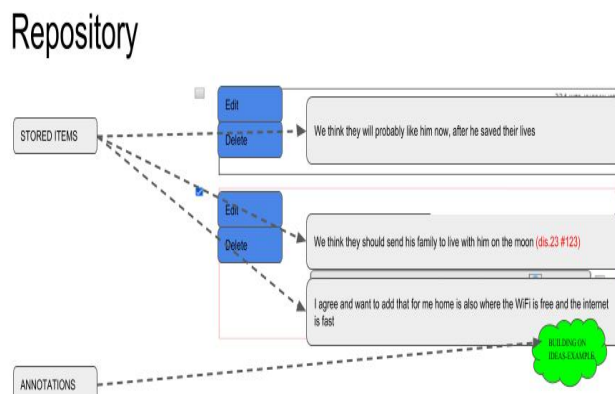


Figure 20: Repository of episodes for later use.

4.4 Observing/interpreting the wordless text

Image/video/audio file display and annotation tools

These include tools for i) displaying and annotating JPEG files, ii) PDF files, iii) audio (e.g., Mp3) and video (e.g., Mp4) files, and iv) sharing annotations. Such tools serve the very basic activities of the projects at all age-groups considered in the DIALLS project (5-6 years old, 8-9 years old and 14-15 years old). For younger children, the annotations may be with kinds of emoji.

Video display and annotation

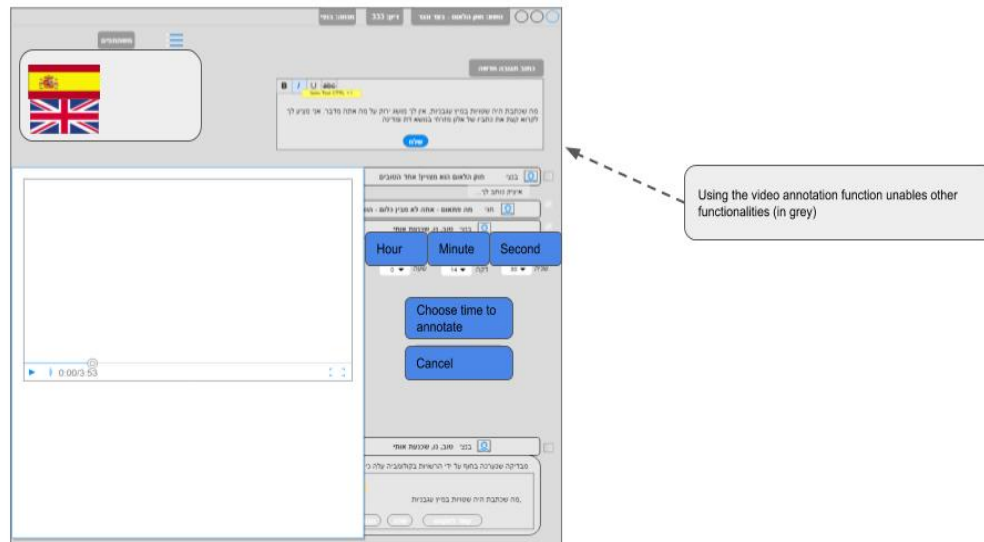


Figure 21: Video annotation

Talk Prompt box

Shows the talk prompts during discussion, for the students.

Personal user dashboard

Students see discussions they are assigned to, their repositories, history of participation. Each participant is provided a dashboard. The dashboard contains the participants assigned and past discussions. Dashboard is the entrance to the discussion rooms. It also contains an indication of who is online.

4.5 Online discussion tools

Forum-like discussion space - in the classroom, between classrooms

Utterances in the screen view zone will slowly appear only when the participant is in reading mode. When writing, no utterance will appear. They will appear upon completion of the writing.

Synchronous CHAT

Each room has an additional chat channel for collective off-line and assignment management. The room chat is active when the room is active. The chat resembles the WhatsApp™ web interface. Teachers can initiate discussions not only with groups but also with individuals. The messaging system is pinned for moderators and so it is available for use wherever they are located. Utterance will slowly appear, both structure and content wise (typing). It will have a flickering effect for several seconds. After that it will be accompanied by a glowing effect for another several seconds. Participants will be able to shorten the laboring effects by hovering over the utterance. In such case it will appear timelessly. "Typing" by participants will be indicated to others.

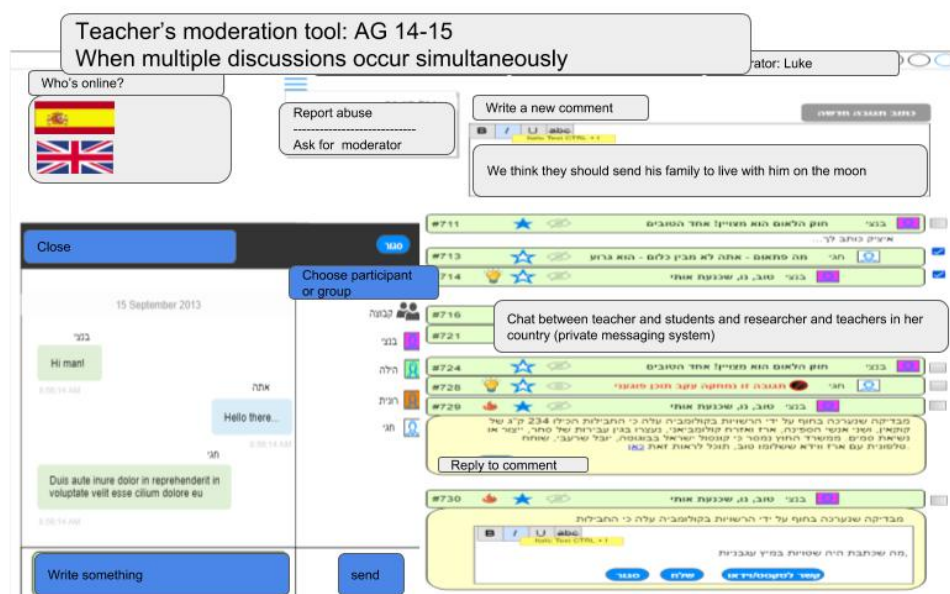


Figure 22: Chat (expanded, lower left) operates alongside the main discussion thread (right)

Semi-automatic translation tools

The DIALLS SUITE will include the possibility to semi-automatically translate text from different languages. This will be a function external to the platform and the combination of languages that it will support depends on technology advances independent of the development of the platform.

Hyperlinks to external media

Users can hyper-link their comments. They may attach numerous resources as depository for the discussions. The resources will be open in new windows (external to DIALLS SUITE at the moment). One of the selected resources will serve as the artifact and will be viewed in a fixed pop up window next to the discussion thread. The pop-up window has an expand/collapse feature embedded, so the students can work solely on it, solely on the thread or with both zones opened. This tool will support video and PDF files. Word and copy pasted excerpts will be converted into PDF files.

Support for dialogic/argumentative activity

This tool will allow users to tag and label utterances according to argumentative functions.

Instant messaging system

The DIALLS platform will include an instant messaging system to facilitate interactions between teacher and students, among students themselves, among members of the research team, and between teacher and student. Such tool provides a public and private messaging channels enabling for important separations. Users separate the discussion from acts that are around the discussion (humor, informal interactions, appraisals, etc.); the teacher can separate between students of a group and provide help or any suggestion to one/some of them only.

Report abuse button (calls the teacher, signals the problematic utterance)

Participants may anonymously report on a problematic utterance, episode. The teacher will receive the alert wherever she is 'located' in the system. Once entering the room, the reported utterances will be signaled out. The teacher will be able to chat privately with the student who issued the complaint.

Call the teacher button

Student can ask for teachers' online presence when they are facing problems or needs guidance. Each room has a button for inviting the moderator to join the discussion. The moderator will receive the alert wherever he is 'located' in the system.

Tools for notifying participants on new contributions made while there were logged-off/ offline

When the user is offline or logged out, new utterances in the screen view zone will appear upon entering the room and notifications will alert users regarding the hidden zones.

4.6 Co-creation of artefacts

Collaborative writing

This a necessary tool for the co-creation of cultural products. Although the DIALLS project will focus on dialogues, an important foreseen activity is to produce a collaborative "text" (in the broad sense of text) after dialogue, as a further expression of agreement/shared beliefs. Upon teachers' selection, rooms can contain a tool for collaborative writing. The purpose is to afford students with in-house production tools, accustomed to users' desired pedagogical design. Like other parts of the system, can be used for monitoring, evaluation, reflection and research.

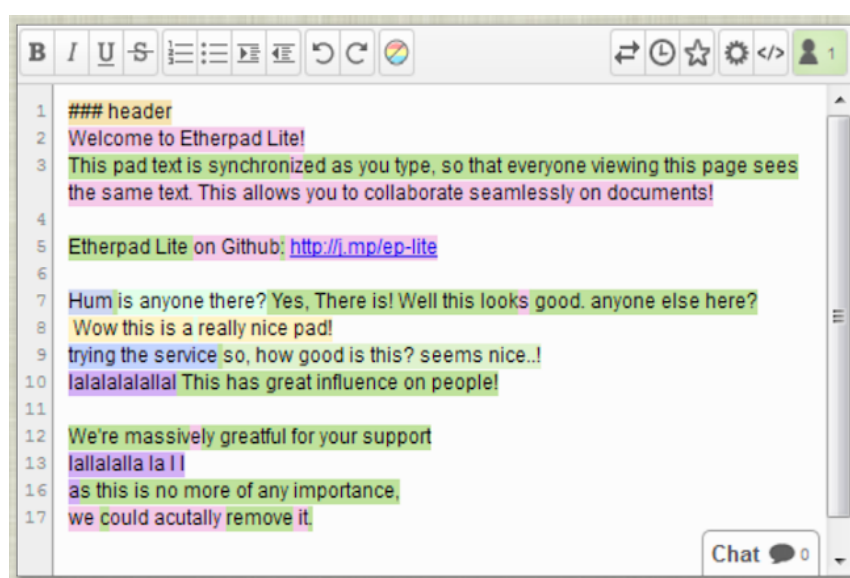


Figure 23: Collaborative writing tool (similar to Google Docs TM, Ether pad [presented]).

4.7 Researcher-teacher tools

Researchers' dashboard

This tool enables researchers to navigate within the country's discussions and graphical representations of activity patterns.

Search engine

This tool is important for offline evaluation of discussions by the teacher or the researchers. Words, users and room numbers can be used to initiate searches.

Search discussions

By user:

By discussion:

By keywords:

חפש

Figure 24: Search engine

Tool for video recording ongoing discussions

Teachers and researchers will be able to go back to the discussions and analyze them in a dynamic manner, and therefore, complementing the analyses that could be carried out looking at the transcriptions only.

Documentation of the activities on the systems' log (documentation of progress, for future analysis)

This represents a crucial tool for further analyses. It will be of great relevance due to the comparative nature of the DIALLS project.

4.8 Adaption to age-groups

The three target age-groups of the DIALLS project are shown in the Table below (Table 4), together with suggested tools (functional components) to be used. In all cases, the teacher set-up and monitoring tools are assumed to be relevant in all cases:

Table 4: Tools for different student age groups

| | | | 5-6 years | Class level (controlled by teacher) | Student age group | | |
|--------------------|--|-------------------------------------|-----------|---|-------------------|---|----------------|
| | | | | | 8-9 years | Class level (controlled by teacher) | 14-15 years |
| Tools available | Session set-up | • logon managment | | ✓ | | ✓ | ✓ |
| | | • session creation | | ✓ | | ✓ | ✓ |
| | | • doc upload | | ✓ | | ✓ | ✓ |
| | Lesson management (teacher dashboard): | • observe group activity | | | | | ✓ |
| | | • message broadcast | | ✓ | | ✓ | ✓ |
| | Text display tools: | • video/image display | | ✓ | | ✓ | ✓ |
| | | • task instructions | | ✓ | | ✓ | ✓ |
| | | • talk prompts | | ✓ | | ✓ | ✓ |
| | Online discussion tools: | | | | | | |
| | | • online forum | | ✓ | | ✓ | ✓ |
| | | • synchronous CHAT | | ✓ | | ✓ | ✓ |
| | | • semi- automatic translation | | ✓ | | ✓ | ✓ |
| | | • call teacher | | ✓ | | ✓ | ✓ |
| | | • notifications | | ✓ | | ✓ | ✓ |
| | Awareness tools: | • who's online | | ✓ | | ✓ | ✓ |
| | | • participation structure | | | | | ✓ |
| | Co-creation tools: | • collaborative writing | | ✓ | | ✓ | ✓ |
| | | • personal repository | | ✓ | | ✓ | ✓ |
| | Document repository: | • doc sharing | | ✓ | ✓ | | ✓ |
| | | • discussion highlighting | | ✓ | | ✓ | ✓ |
| | Annotation tools: | • recording, tracing | | ✓ | | ✓ | ✓ |
| | Activity analysis (researcher/teacher): | • searching | | ✓ | | ✓ | ✓ |
| | | | | | | | |

In the concluding section of the document we i) briefly summarize sections 2, 3 and 4; ii) refer to the limitations of this current functional recommendation; iii) describe our current work and describe our future plans.

Highlights

- Functional recommendations for the DIALLS Platform were defined following an analysis of DIALLS project educational concept; the critical review of existing CSCL systems; and co-design workshops with future users.
- We organized functional recommendations into 9 main categories: 1) Session set-up tools; 2) Lesson management; 3) Text display tools; 4) Online discussion tools; 5) Awareness tools; 6) Co-creation tools; 7) Document repository; 8) Annotation tools; and 9) Activity analysis tools..
- We proposed adaptations to the tool in relation to each of the specific age-groups included in the DIALLS project.

5. Discussion and concluding remarks

5.1 Discussion

The aim of D6.1 has been **to present the work conducted within WP6 during the first 9 months of the DIALLS project**. Such work included the following tasks:

1. Writing a critical and systematic review of the existing (currently available or not) CSCL systems supporting dialogue, dialogic learning and thinking and collaborative argumentation
2. The co-organization of two co-design workshops with future users (researchers and teachers) of the DIALLS Platform
3. The outline of the functional recommendation document for the DIALLS Platform based on 1 and 2

These were necessary steps for the **design and development of the DIALLS Platform**. The work done in the preparation of D6.1 constitutes **the basis for the actual development and launch of the DIALLS online SUITE**. The online platform must be successfully launched and ready for teacher to use by M17 (September 2019). In what follows we discuss the results and implications of each task. Subsequently, we refer to the limitations of the work carried out so far and give details about our current and future work.

5.1.1 Summary results #1: critical review

Our critical review of existing CSCL systems supporting dialogue collaborative argumentation was based on the functional analysis of the user requirement inherent in the DIALLS project. The functional analysis document presented an array of functionalities for the DIALLS Platform to support (Section 1). Those functionalities were proposed in accordance to the CLLP (WP3, currently under development) and relevant features of available computer tools used for collaborative argumentation-based learning. The functional requirement document was conceived as a living document (not as a deliverable) and has been circulating among DIALLS partners since M6. We expect the document to be updated regularly with feedback from teachers, students and researchers.

These are main results and implications of our critical review of the CSCL systems:

- Most of CSCL systems included in the review were not available for downloading and installation. A majority of them were developed for research purposes and funded by public resources (e.g., European Commission). The maintenance of software platforms is costly, therefore, as soon as projects come to an end (as well as funding), research leaders involved in the development of the systems stop updating the online platforms whereas other project members (with temporary contracts) start working as post-docs in other projects or find permanent positions in academia or the industry. This situation is reflected on the fact that only four **out the 26 CSCL systems included in the critical review** are currently available for downloading, installation, and use in the classroom.

- Our critical review of empirical studies that have tested users' experiences with the 26 CSCL systems has shown that the presence of a **strong written language bias and age-related bias towards the development of tools supporting collaborative argumentation-based learning**. We did not find a single CSCL system (currently available or not) that has been developed (or adapted) for testing with pre-primary (5-6 years old) and primary (8-9 years old) school children. These are two of three age-groups represented in the DIALLS project.
- Besides that most CSCL systems have been tested with children in the US, Western Europe (Germany, The Netherlands, UK and Finland) and Israel almost exclusively, we observed a lack of comparative cross-cultural studies reporting user experiences with same CSCL system. **We could not find a single study comparing and analyzing how children from classrooms located in different countries and who speak different languages use the same platform**. This is of special relevance for the DIALLS Platform. The CSCL system will be used to collect data from European countries (Cyprus, Germany, Lithuania, Portugal, Spain, and the UK) and Israel within pedagogical activities involving computer-supported dialogues between classrooms located in distant countries.

The above-mentioned results of the CSCL systems reviewed did not allow us to identify an existing and currently available CSCL system to be adapted for the requirements of the CLLP (currently under development). As mentioned in Introduction the DIALLS Platform will be based modifying and extending software tools available at HUJI, on the basis of the critical review and co-design workshops. This led to the definition of **a specific list of tools (See Table 1) for further refinement and co-elaboration** among future users of the DIALLS Platform. **Those refinements and co-elaborations took place in two co-design workshops** we co-organized in Paris and Cambridge, in September and November 2018, respectively.

5.1.2 Summary results #2: co-design workshops

We conducted two co-design workshops with future users of the DIALLS Platform in September and November 2018. Co-design workshops were organized following the DIALLS core educational activities as described in the Description of Work. The aim of both workshops was to further specify **the functionalities retained from the existing CSCL systems** included in the systematic and critical review. In order to do so, workshop participants were asked to collaboratively design educational activities for the classroom.

Here are the main results and implications of both co-design workshops with future users of the DIALLS Platform:

- The DIALLS Platform should come with a user-friendly interface. Users would prefer to interact with a relatively easy to learn and use interface that would not require them to participate in an excessively long training program.

- For pre-primary (5-6 years old) and primary school (8-9 years old) children the DIALLS Platform was used as a tool to connect classrooms in different countries and display cultural artefacts produced by students in order to promote collective reflection and dialogue. However, teachers played a key role in the collaborative activities between classrooms. Thus, most of the tools retained from existing CSCL systems (e.g. synchronous CHAT) must consider teachers and not students as main users. This leads to a further specification of the functionalities that the DIALLS Platform should support as well as tools that the software needs to include for 5-6 and 8-9 years old.
- For secondary school students (14-15 years old) the DIALLS Platform had to support similar functions as described in the Description of Work but resembled more some of the existing CSCL systems supporting dialogue and collaborative argumentation-based learning designed for older students. Teachers played a limited role in the individual and collaborative activities, in the classroom and in between classrooms.
- Future users of the DIALLS Platform addressed the issue of how to design a computer tool that would support the semi-automatic translation of text when classrooms from different countries were participating in online discussions. Semi-automatic translation tools were not part of the CSCL systems we included in our critical review and we did not find any currently available CSCL system supporting this function. However, workshop participants proposed that the DIALLS Platform could include a link to an external semi-automatic translation option (e.g., Google Translate™). Human translators should be required for non-existent or less reliable combination of languages offered by semi-automatic translation tools.

Co-design workshops provided a **detailed contextualization of the CSCL system functionalities** analyzed in the critical review and how they could be adapted and refined for the DIALLS Platform. Co-design workshops led to our functional recommendations of the list computer tools that the DIALLS Platform should contain.

5.1.3 Summary results #3: functional recommendation

Functional recommendations were based on the results reported in the critical review (Section 2) and the co-design workshops (Section 3). These findings were complemented by the DIALLS educational concept (according to the Description of Work and related research literature, e.g. Maine, 2015; Maine & Hofmann, 2016).

These are main features of the functional recommendation:

- We organized functional recommendations tools into 9 complementary categories: 1) Teacher tools (Lesson organisation, session setup, monitoring); 2) Private and public 'spaces': personal repositories (teacher and/or students); 3) Observing/interpreting the wordless text; 4) Online discussion tools; 5) Co-creation of artefacts (outcome of discussion); and 6) Researcher-teacher tools
- Categories were expanded into fine-grained tools supporting specific functions in relation to the pedagogical activities described in the Description of Work
- We proposed adaptations to the tools in relation to each of the specific age-groups included in the DIALLS project

5.2 Limitations of functional recommendations

The process of development of the functional recommendations involved, in a first phase, researchers and teachers. In a second phase, once the system is operational, feedback from learners' use of the DIALLS Platform, under the scaffolding of their teachers, will be used to further refine the software.

The issue of **the 'scale' of units of analysis** is important here: functional recommendations need to be based on a more fine-grained definition of activities (bundles of action, behaviours, oriented towards micro-level communicative-pedagogical goals) than the specification of general teaching programmes (cf. WP3 of DIALLS). Since the platform is intended to support user needs, to support specific educational activities of the DIALLS project, it cannot be developed in a vacuum: *platform definition must be based on a model of DIALLS pedagogical activities to be supported*. The criterion of validation of the platform is: *to what extent does it support the target pedagogical activities and to what extent does it support them effectively?*

The DIALLS Platform will be adapted to native languages in all partner countries. We reiterate our general remark concerning the fact that the **functionalities of the envisioned system are maximal, and partners of the project will choose parts of the system that fit their educational needs**. To carry out country-level specific adaptations main elements of the functional recommendation will be transformed into a questionnaire that will also request basic information on technology readiness, availability, in participating schools. Still, feedback from learners and more in-depth information about the specificities of each of the schools participating in the DIALLS project have not been taken into consideration for the adaptation of list tools included in the functional recommendations.

Another ongoing issue for WP6 that has not been fully addressed in the functional recommendation is **the how the link to an external semi-automatic translation tool will be operationalized by the DIALLS Platform, and how its users will respond to such feature**. Some language combinations are more frequent than others, and therefore, it is expected that semi- automatic translation tools will be more reliable in the former. Hence, **human translators may be required for less reliable language combinations**. Additionally, even reliable semi-automatic translators could interfere with the dynamics of collaborative dialogue while students (e.g., in 14-15 years old) were using the synchronous CHAT system.

The tools of the DIALLS Platform should enable its users to analyze the dynamic development of cultural values (e.g., tolerance and inclusion) in dialogue. Thus, the structures provided by the platform **need to support such fluid dialogue movements that allow building on other students' responses, elaborating and justifying ideas and synthesizing group thinking processes**. Additionally, the language for teachers will need careful consideration, based on their experiences and the cultures of classrooms in different (e.g., in a UK secondary class, setting up discussions to have, for example, proposals and rebuttals would not be met well by teachers who operate sophisticated dialogic structures in their classes). **Our challenge in WP6 is to make sure that tools and structures provided by the DIALLS Platform will on one hand support and yet not limit the pedagogical diversity expected to be observed in the DIALLS project.**

All the limitations presented in this section will be successfully addressed in the upcoming months before the launch of the DIALLS Platform before M17.

5.3 Ongoing and future work

5.3.1 Development of DIALLS Platform

The DIALLS Platform needs to fit users whose age ranges from 5 to 15. Also, it must fit very different settings (whole class teacher mediated interaction; dialogue between teachers, guided or unguided dialogue between students around different types of texts) in different languages. This diversity demands a highly structured design to provide a flexible tool. In order to take into consideration these demands, the HUJI team quickly developed a simplified version of the platform with which a list of prerequisites could be agreed upon by all members of WP6. The existence of the simplified version enabled the HUJI team to undertake small pilot studies in which the usability of specific functionalities was on focus.

Having analyzed the prerequisite list, HUJI estimated that the bulk of the development could be achieved within several months, meaning that a reasonable version of the platform should be available during the coming spring to enable the implementation of pilot studies in four countries. The general strategy in the development is to take into consideration all possible settings at three different ages. The efforts in development are then currently structural. The HUJI team meets to review progress on a weekly basis. The development of the envelope of the DIALLS Platform will take several weeks, after which the heart of the development will begin – collective work around a text (video, [series of ordered] pictures, written text), the work consisting of oral discussions, written discussions, annotations on the text, or reflection on the discussion.

The unit for data protection at HUJI requested Baruch Schwarz and his team to comply with very strict demands about the storage of data and issues of privacy. The unit will accompany the development of the platform to check this compliance on an on-going process.

5.3.2 Work to be carried out over the coming period

Over the coming twelve months, the work to be carried out within WP6 is as follows:

Task 6.2. Online platform development and launch

- HUJI will pursue development of the DIALLS Platform, following the system specification and the feedback received from researchers and teachers
- Different options for semi-automatic translation will be explored. These are to be used by teachers, following asynchronous discussions between different countries in the DIALLS Consortium
- CNRS will design unobtrusive methodological tools (e.g., questionnaires) for collecting information on users' experiences with the interface design. This will be done in collaboration with DIALLS partners and teachers involved in the project
- WP6 (CNRS and HUJI) will incorporate the feedback collected and sent by DIALLS pedagogical partners. This information will be essential for the improvement of the platform interface design
- WP6 will define and implement procedure for managing feedback from pedagogical partners on platform usability
- WP6 will launch of DIALLS Platform (prototype). HUJI will develop guidelines for installation in line with the specificities of each country and languages
- WP6 will redefine the platform prototype as result of empirical work that will be conducted by pedagogical partners in multiple countries
- HUJI will conduct small scale usability studies in order to test platform modifications before being sent to other pedagogical partners

Task 6.3. Scenario created for online use

- WP6 will develop online scenarios for the CLLP tasks created in WP3 Task 3.2. These will include synchronous and asynchronous scenarios
- Alternative versions of the online scenarios, with their attendant teaching materials, will be tested in limited experiments (pre/post tests, with scenarios/scripts as independent, and constructive argumentative interaction characteristics as dependent variables)
- Pedagogical adaptation will also include producing versions of the scenarios and tools in local languages for schools involved in the research project

Task 6.4. Teacher guide for online tool use

- HUJI will create a training document for teachers (available online) that explains how to download, install and use the suite of online tools that has been selected and tested within the project. The training document will be produced in a first version from month 18 onwards (i.e. the platform launch)

- The training document will be updated, in the light of teachers' feedback, every six months up to the end of the project. This will be translated into the local languages of schools involved

Once the DIALLS platform is launched, in month 17 (September 2019), CNRS and HUJI will collaborate with other pedagogical partners to monitor platform usability, using the methodological tools that will already have been designed.

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7. Appendices


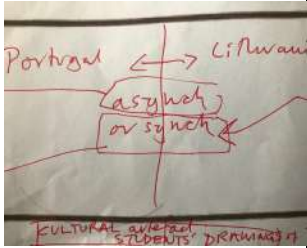
7.1 Appendix 1: User-centered scenarios produced in Paris co-design workshop

Description of user-centered scenarios

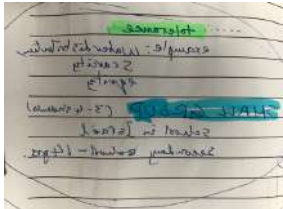
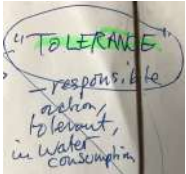
Lucas Bietti, Stéphane Safin, Michael Baker
& Françoise Détienne

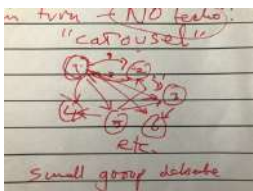
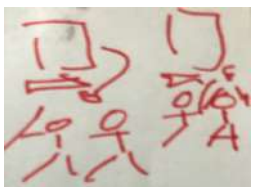
CNRS Paris DIALLS mini-workshop:
“From pedagogical situations and tool design to dialogues and their analysis”

September 27-28, 2018
Télécom ParisTech

| Project: CNRS DIALLS meeting_scenario#1.1 Name: The mouse and the fox Producers: Chrysi, Michael, Benzi & Irene Date: 27/09/2018 | | | | | | |
|---|--|---|--|--|--|---|
| Narrative: There is a mouse who is also a dentist and has to face the dilemma of accepting a fox as patient while being afraid of being eaten. Activity based on a text and picture book (not wordless text). It is activity taking place in the classroom, orchestrated by the teachers and bringing together pre-primary school students in Lisbon and Vilnius. The cultural value discussed is empathy. | | | | | | |
| Constrains: (1) pre-primary students (age 5); (2) collaboration with another country; (3) two classes in different schools; (4) empathy | | | | | | |
| Sequence | | | | | | |
| No | Steps | Activities | Setting | Actors | Artefacts | Objectives |
| 1 | | | Classroom | Teacher Pre- primary student s | Picture book  | |
| 2 | Greeting | Say hello to student and introduce the task | Classrooms in Lisbon and Vilnius  | Teacher Pre- primary student s | | |
| 3 | Introduction | Introduc tion of main problem | Classrooms in Lisbon and Vilnius | Teacher Small group student s | Copies of picture books distributed among groups | Develop empathy |
| 4 | Explanation of procedure set ground rules and allow individual questions | Teachers allow students to come up with their questions based on the picture book | Classrooms in Lisbon and Vilnius | Teacher Small group student s | Copies of picture books distributed among groups | Motivate students' participation/engagement with the task |
| 5 | Group discussion | Whole class discussion based on questions | Classrooms in Lisbon and Vilnius | Small group student s | Question | Make sense of previous individual questions in relation to the general objective |
| 6 | Preparation for intercultural communication | Teacher introduces the topic of the cultural text more related to empathy | Classrooms in Lisbon and Vilnius | Teacher Small group student s | | Discussion about whether the mouse should accept the fox as patient |
| 7 | Develop of an artefact | Students should design the last page | Classrooms in Lisbon and Vilnius | Student s | Creative drawings - papers, pencils, markers, etc. | Co-creation of multiple endings of the story (i.e. fox eating the mouse, mouse eating |

| | | | | | | |
|---|--------------------------------|--|---|----------|------------------|--|
| | | of the picture book | | | | the mouse, or both characters holding hands) |
| 8 | Intercultural group discussion | Sharing each group perspective on the dilemma faced by the mouse | Classrooms in Lisbon and Vilnius (joint activity) | Teachers | Skype or similar | Exchange of perspectives – intercultural empathy |

| Project: CNRS DIALLS meeting_scenario#2.1 Name: Water management in the Israeli context Producers: Chrysi, Michael, Benzi & Irene Date: 27/09/2018 | | | | | | |
|--|-----------------------------|--|-------------------|--|--|--|
| Narrative: Classroom discussion about the use of water and water management in the Israeli context. A social scientific dilemma based on multiple texts that students had to discuss and bring on their own perspectives/experience with the topic. Multiple texts should prompt controversies and conflicts and may nicely complement wordless text for secondary school students. | | | | | | |
| Constraints: (1) secondary school; (2) small group; (3) tolerance; (4) waterfall | | | | | | |
| Sequence | | | | | | |
| No. | Steps | Activities | Setting | Actors | Artefacts | Objectives |
| 1 | Introduction | Two small group discussions based on scientific evidence | Israeli classroom | Students | Multiple texts and graphs | |
| 2 | Introductory discussion | First discussion on policy | Israeli classroom | Small student groups  | Multiple texts and graphs | Reach consensus on policy |
| 3 | Implementation of tolerance | Second discussion on policy implementation | Israeli classroom | Small student groups | Multiple texts and graphs  | Tolerance inspired policy |
| 4 | Post-discussion | Discussion across small groups | Israeli classroom | Students | Multiple texts and graphs | Reflection on other small groups tolerance inspired policies |

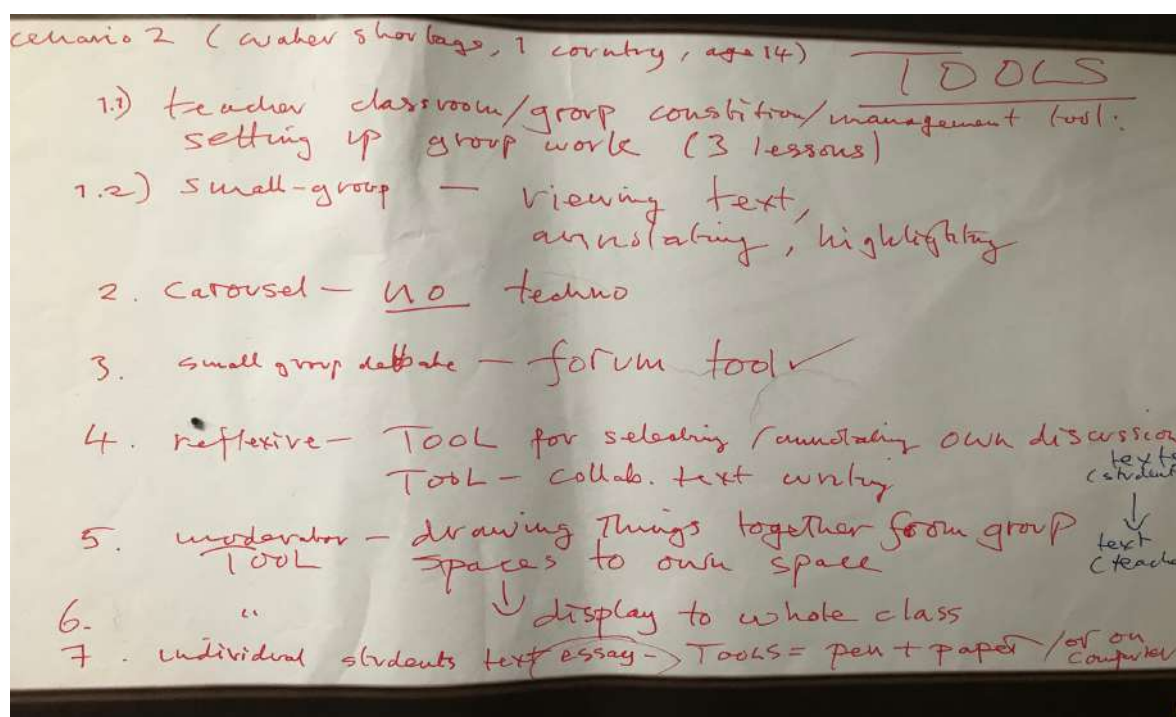
| Project: CNRS DIALLS meeting_scenario#2.2 Name: Water management in the Israeli context Producers: Vic, Michael, Benzi & Irene Zaleskiene Date: 28/09/2018 | | | | | | | |
|--|--|--|----------|-----------|---|---|---|
| Narrative: Classroom discussion about the use of water and water management in the Israeli context. A social scientific dilemma based on multiple texts that students had to discuss and bring on their own perspectives/experience with the topic. Multiple texts should prompt controversies and conflicts and may nicely complement wordless text for secondary school students. | | | | | | | |
| Constrains: (1) secondary school; (2) small group; (3) tolerance; (4) waterfall | | | | | | | |
| Sequence | | | | | | | |
| No. | Steps | Activities | Duration | Setting | Actors | Artefacts | Objectives |
| 1 | | Lesson #1 | 1.5 hour | | | | |
| 1.1. | Introduction | Teacher creates the groups via the group management tool provided by the software Teacher decides who will be in what group | 10' | Classroom | Teacher Class of 24 students divided into small groups of 3-4 participants | Software – teacher control tool | Create small groups |
| 1.2 | Presentation | Teacher presents the topic and task | | Classroom | Teacher Students in small groups | Software | Give basic information about the task |
| 2 | Preparation in small groups | Students study a set of texts Teacher distributes texts among groups ("jigsaw approach") | | Classroom | Teacher Small student groups of 3-4 participants | Set of texts including personal point of view; statistics on water shortage; and short documentary Each group has a different resource | Highlight and annotate what are the main points |
| 3 | Transmission of each group information | Each group goes around the different tables and explains what information they have - "carousel approach" | | Classroom | Small student groups of 3-4 participants | | All the information is shared among all groups |
| | |  | | | | | |
| 4 | Debates in small groups | Students will participate in debates in small groups. Debates will be motivated by the question "what changes to water distribution policies?" | 20' | Classroom | Small student groups of 3-4 participants | Software – chat | Generation of debates around the question: "what changes to water distribution policies?" Production of cultural texts |
| | |  | | | | | |
| 5 | Reflexive activity | Each group reflect upon the debate they already had – reread, select and annotate part of the previous debate in the light of a new question that will be used to make a link between the previous | 20' | Classroom | Small student groups of 3-4 participants | Software – chat | Production of cultural texts |

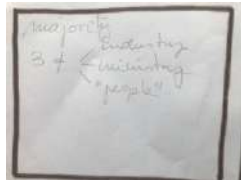
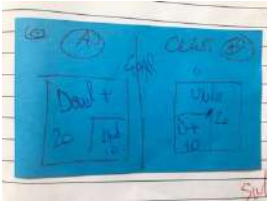
| | | | | | | | |
|----|--|---|--|-----------|---------------------|--|--|
| | | debate and the concept of tolerance | | | | | |
| 6 | Teacher's analysis and integration of cultural texts | Teacher will synthesize the 6 cultural texts produced by students | | Classroom | Teacher | | Preparation for lesson 2 Produce an unique text synthesizing the 6 student's cultural artifacts |
| 7 | | Lesson #2 | | | | | |
| 8 | Display of teacher's text to the whole class | Teacher led whole class discussion | | Classroom | Teacher Students | Teacher's text on the basis of the 6 artifacts produced by students previously | Create a common ground for next task |
| 9 | Discussion | Whole class discussion based on teacher's text | | Classroom | Teacher Students | Teacher's cultural artefact | Negotiation of ideas summarized by the teacher's text |
| 10 | Individual essays on policy issue | Students will have to write short essay on the policy issues discussed at the beginning of the activity | | Classroom | Students | Pen, pencil, paper or computer tool | Individual reflection and group evaluation |

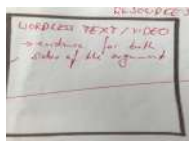

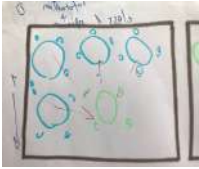
Additional information

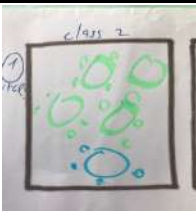
Summary of tools:

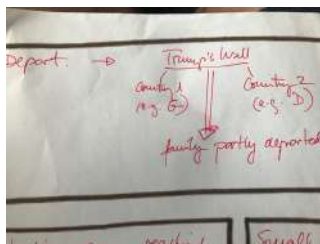
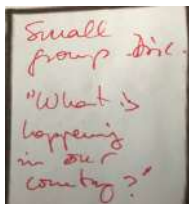
- i) teacher's tool for making up and managing the groups;
- ii) tools for small group viewing and annotating of the text;
- iii) forum tool for small groups debates;
- iv) reflexive tool on small groups for selecting and working on the texts;
- v) teacher' moderator tool to bring the six cultural texts produce by students and summarize main points;
- vi) tool for displaying the product of (v) to the whole class

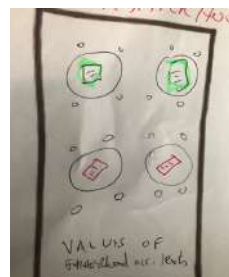
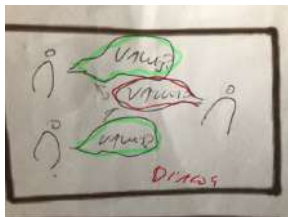
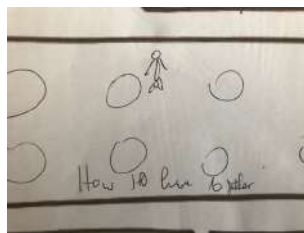


| Project: CNRS DIALLS meeting_scenario#3.1 Name: How power relations shape debates on energy consumption Producers: Fabrizio, Ana & Lucas Date: 27/09/2018 | | | | | | |
|--|--------------------|--|----------------------------------|--|---|---|
| Narrative: Debate on energy consumption in two classes considered each as individual cases. Students will be divided into two groups, one that represents a strong majority whereas the other a weak minority. Roles will be assigned to student within both groups (developed vs. developing countries or regions within the same country). In the first class, the strong majority group will represent developed countries whereas in the second classes the developing countries. Two scenarios will raise multiple and conflicting arguments about the same topic. Such arguments will depend on group size, and power asymmetrical relations. | | | | | | |
| Constraints: (1) adolescents; (2) two classes at the same school; (2) adolescents; (3) tolerance; (4) lightbulb | | | | | | |
| Sequence | | | | | | |
| No. | Steps | Activities | Setting | Actors | Artefacts | Objectives |
| 1 | | | Classroom | Students from two classes | | Debate on policies related to energy consumption within groups made of asymmetrical power relations |
| 2 | Group organization | Assignment of roles and definition of goal | 2 class-rooms at the same school | Teachers Students | [DIALLS group discussion on the nature of artefacts produced by students] | Define common policy in groups with opposing interests on the same topic |
| 3 | Debate 1 | Debate on best energy consumption policy for the whole | 1 class-room | Students divided into one majority group (developed) and weaker minority group (developing) | | Define common policy in groups with opposing interests on the same topic  |
| 4 | Debate 2 | Debate on best energy consumption policy for the whole | 2 class-rooms | Students divided into one majority group (developing) and weaker minority group (developed)  | | Define common policy in groups with opposing interests on the same topic |

| Project: CNRS DIALLS meeting_scenario#3.2 Name: How power relations shape debates on energy consumption Producers: Fabrizio, Benzi, Merce & Benjamin Date: 28/09/2018 | | | | | | | |
|--|--------------------------------|---|----------|-----------|---------------------|---|---|
| Narrative: Debate on energy consumption in two classes considered each as individual cases. Students will be divided into two groups, one that represents a strong majority whereas the other a weak minority. Roles will be assigned to student within both groups (developed vs. developing countries or regions within the same country). In the first class, the strong majority group will represent developed countries whereas in the second classes the developing countries. Two scenarios will raise multiple and conflicting arguments about the same topic. Such arguments will depend on group size, and power asymmetrical relations. | | | | | | | |
| Constraints: (1) adolescents; (2) two classes at the same school; (2) adolescents; (3) tolerance; (4) lightbulb | | | | | | | |
| Sequence | | | | | | | |
| No. | Steps | Activities | Duration | Setting | Actors | Artefacts | Objectives |
| 1 | Organization | Divide students into 2 groups – majority (25) vs. minority (5) in class 1 and the other way around in class 2 | | Classroom | Teacher Students | | Create the organizational conditions for the debate |
| 2 | Provide background information | Teachers presents evidence to students about the costs and benefits of green energy development/ consumption | | Classroom | Teacher Students |  | Set the ground for the debate by presenting basic evidence |
| 3 | Write an essay | Students will have to write an essay based on their own opinions | | Classroom | Teacher Students |  | Prepare students for group discussion |
| 4 | Group discussions 1 | Students will have to share and discuss their opinions in groups (see step 1) | | Classroom | Students | Technology-mediated | |
| 5 | Whole class discussion 1 | Students representing each of the opposing groups will participate in a whole class discussion  | | Classroom | Students | Text on policies | Students will write policies regarding clean energies (e.g. letter to ministry of energy) |
| 6 | Group discussions 2 | Students will have to share and discuss their opinions in groups (see step 1) | | Classroom | Students | Technology-mediated | |
| 7 | Whole class discussion 2 | Students representing each of the opposing groups will participate in a whole class discussion | | Classroom | Students | Text on policies Technology will help to refer to specific moments in the previous sessions (forum platform) | Students will write policies regarding clean energies (e.g. letter to ministry of energy) |

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| 8 | Write individual essay | Students will have to write an individual essay at home | | Home | Students | Individual essay after previous group and whole discussion sessions | Negotiation of values and comparison between individual essay produced in 3. To what extent students were able to update their values on the topic after the debate and the role that were assigned |

| Project: CNRS DIALLS meeting_scenario#4.1 Name: Empathy in times of Trump's border wall Producers: Fabrizio, Ana & Lucas Date: 27/09/2018 | | | | | | |
|---|-----------------------|--|----------------------------------|----------|--|--|
| Narrative: Students in two countries will be shown a short video in which part of a Mexican family is deported back to Mexico from the US. These two countries will correspond to a) more empathetic societies and b) more rule/law conformed societies where the actions of law enforcements are rarely questioned. Students will have to individually reflect on the video, exchange ideas and discuss in small groups first and the whole class afterwards. Then, they will have to share their understanding of the video with another class from the other type of society. | | | | | | |
| Constrains: (1) older adults; (2) two classes from two different countries; (3) empathy; (4) cactus | | | | | | |
| Sequence | | | | | | |
| No. | Steps | Activities | Setting | Actors | Artefacts | Objectives |
| 0 | | | Classroom | Students | Video of Mexican family who has been divided due to Trump's wall. Several family members were deported to Mexico.  | |
| 1 | Individual reflection | Students will have to write individual essays based on the film | Classroom | Students | Individual essays | How the values are developed and how they empathized with the family individually around the moral values and legal issues |
| 2 | Discussion 1 | Discussion in small groups  | Classroom | Students | | Negotiation of values, etc. in small group discussions |
| 3 | Discussion 2 | Whole class discussion | Classroom | Students | | Negotiation of values, etc. in the whole class |
| 4 | Discussion 3 | Discussion between 2 countries | Classroom DIALLS online platform | Students | DIALLS online platform | Negotiation of values between two countries |

| Project: CNRS DIALLS meeting_scenario#5.1 Name: Diverse perspectives on parenthood Producers: Baruch, Benjamin & Vic Date: 27/09/2018 | | | | | | |
|--|---------------------------------------|--|-----------|-----------------------------------|---|--|
| Narrative: Debate on parenthood in different countries, comparing (a) societies where parenthood is commonly shared with (b) societies which roles are more established and there is little room for negotiation. Combination of individual and group activities, within small groups but also across groups and in both societies (a) and (b). Final individual reflection and production of cultural text. Important role of teachers as moderator of discussion and actor responsible for prompting further argument elaborations. | | | | | | |
| Constraints: (1) secondary school students; (2) two classes in the same school; (3) tolerance; (4) brain | | | | | | |
| Sequence | | | | | | |
| No. | Steps | Activities | Setting | Actors | Artefacts | Objectives |
| 1 | | Make several groups corresponding to each of the societies (a) and (b) | Classroom | Students | Cultural texts (e.g. animation, written text) | |
| 2 | Description and explanation of values | Students will have to describe and explain the values contained in the artefact | Classroom | Students | Cultural texts (e.g. animation, written text) | Express the values and norms that are represented in the artefact without giving personal considerations  |
| 3 | Discussion in small groups | Students will have to discuss the values and norms that are represented in the artefact in small groups  | Classroom | Students | Cultural texts (e.g. animation, written text) | Discussion, negotiation and mutual understanding of the values and norms contained in the cultural text |
| 4 | Discussion between groups | Students will have to discuss the values and norms that are represented in the artefact between small groups | Classroom | Students Teachers as moderator | Cultural texts (e.g. animation, written text Technology | Inter-group discussions about the topics that were previously discussed and negotiated in small groups |
| 5 | Discussion | Teacher will start a follow-up discussion on tolerance prompted by the question "how can we live together?" | Classroom | Teacher Student | Question: "how can we live together?"  | Negotiation of values and norms about parenthood in same society |

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| 6 | Personal reflection | Students will have to write an argumentative essay on how to live together | Classroom and via the online platform | Students | Cultural texts by students | Students' reflection on previous activities and opinions on parenthood, especially in societies where both models co-exist |
|---|---------------------|--|---------------------------------------|----------|----------------------------|--|

Project: CNRS DIALLS meeting_scenario#6.1

Name: Create, justify and understand own and other endings for a moral dilemma

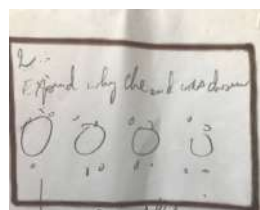

Producers: Baruch, Benjamin & Vic


Date: 27/09/2018


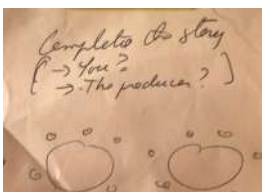
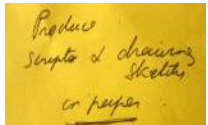

Narrative: Students working in groups in two classrooms will be given specifically-designed cultural texts about an unspecified moral dilemma. Such texts do not have endings (resolution), so students' task will be to come up with an ending to the story that then will have to justify to members of other groups. Such justified endings will be shared with other classes via the online platform. Each class will have to try to understand other class' reasons behind the design of their respective specific ending.

Constraints: (1) primary school children (8-9 years of age) ; (2) two classes in the same school; (3) empathy; (4) sponge bob

Sequence

| No. | Steps | Activities | Setting | Actors | Artefacts | Objectives |
|-----|---|--|---------------------------------------|----------------------|---|--|
| 1 | | | Classroom | Students | Specifically designed cultural text about a moral dilemma without ending (cartoon, video, etc.) | Design their own ending to that particular text  |
| 2 | Introduction | Explanation of the activity | Classroom | Teachers Students | Specifically designed cultural text without ending (cartoon, video, etc.) | |
| 3 | Collaborative design | Students will have to design their own endings to the stories in groups  | Classroom | Students | New cultural artefacts (endings) | Create a new cultural artefact for different possible endings |
| 4 | Explanation | Students in group will have to give reasons to other class-mates | Classroom | Students | New cultural artefacts (endings) | Explain endings to other class-mates and justify decisions |
| 5 | Sharing endings | Each class will have to share their justified endings to other class | Between classrooms | Students | New cultural artifacts (endings) | Sharing of cultural artifacts between classes |
| 6 | Evaluation of other class cultural artefact | Each other class will have to assess the other class' endings | Classroom and via the online platform | Students | New cultural artifacts (endings) Technology | Assessment of other class' endings |
| 7 | Reflection on other class cultural texts | Each class will have to reflect on the endings provided by the other class | Classroom | Students | New cultural artifacts | Attempt to understand the reasons for those specific endings |

| Project: CNRS DIALLS meeting_scenario#6.2 Name: Create, justify and understand own and other endings for a moral dilemma Producers: Baruch, Francoise & Lucas Date: 28/09/2018 | | | | | | | |
|--|----------------------------|--|----------|-----------|----------------------|--------------|--|
| Narrative: Students working in groups in two classrooms will be given specifically-designed cultural texts about an unspecified moral dilemma. Such texts do not have endings (resolution), so students' task will be to come up with an ending to the story that then will have to justify to members of other groups. Such justified endings will be shared with other classes via the online platform. Each class will have to try to understand other class' reasons behind the design of their respective specific ending. | | | | | | | |
| Constraints: 1) primary school children (8-9 years of age); (2) two classes in the same school; (3) empathy; (4) sponge bob | | | | | | | |
| Sequence | | | | | | | |
| No. | Steps | Activities | Duration | Setting | Actors | Artefacts | Objectives |
| 1 | Watch video | Students will have to watch fragments of the BRIDGE video  | 5' | Classroom | Teachers Students | BRIDGE video | Complete the story |
| 2 | Watch first part of video | Students watch the 1/3 part of the video up to part where the big animals hit the little ones | 3' | Classroom | Students | BRIDGE video | |
| 3 | Collective reflection 1 | Students will have to reflect on the first part of the video | | Classroom | Students | BRIDGE video | Debate on values, moral issues, etc. |
| 4 | Watch second part of video | Students watch the 2/3 part of the video up to part where the little animals cut the ropes holding the bridge | 3' | Classroom | Students | BRIDGE video | |
| 5 | Collective reflection 2 | Students will have to reflect on the second part of the video | | Classroom | Students | BRIDGE video | Debate on values, moral issues, etc. |
| 6 | Collective reflection 3 | Students will have to reflect on the video in the whole class | | Classroom | Students | BRIDGE video | Negotiation of different values/ understandings of the video |

| | | | | | | | |
|----|--------------------------|--|--|--------------------|-------------------|--|--|
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| 7 | Complete the story | Students in small groups will have to complete the story  | | Classroom | Students | Cultural texts – drawings, etc. | Produce an ending to the story and express that ending in drawings on paper  |
| 8 | Upload cultural texts | Teachers will upload the cultural texts produced by students | | Classroom Lab | Teachers | Cultural texts – drawings, etc. Online platform – software | Share cultural texts Give access to all cultural texts produced in small groups |
| 9 | Access to cultural texts | Students have access to the cultural texts produced by other students/groups | | Classroom Lab | Students | Cultural texts – drawings, etc. Online platform – software | Inform everyone about the cultural texts produced by students |
| 10 | Explanation | Students/groups will have to explain to other groups the reasons behind selecting a particular ending  | | Classroom | Students Teacher | Prompt: “why did you choose this end? ” | Justify the reasons behind their choice for an ending |
| 11 | Collective reflection 3 | Collective reflection on previous step | | Between classrooms | Students Teachers | | |

Date: 27/09/2018

Narrative: How people think about animals and how this change across cultures. Such differences affect they several ways in which animals are treated by humans, by for example assigning them distinct roles within the social organization (pets, working animals, or just considered as source of food). Contrast may also depend on whether people come from urban/rich or rural/poor contexts, and whether student might be asked to take the perspective of the animal.

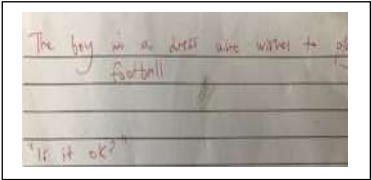
Constraints: (1) primary school (8-9 years of age) (2) small groups in one class in the same school; (3) empathy; (4) cat and dogs

| No. | Steps | Activities | Setting | Actors | Artefacts | Objectives |
|-----|-------|------------|---------|--------|-----------|------------|
| | | | | | | |
| | | | | | | |

PETS
being
abandoned

- Possible differences
 - Urban - Rural
 - Nat: Rich - Poor
 - Animal - Human
 - Pet - Working animal - Food
 - Nature - Breeding

| Project: CNRS DIALLS meeting_scenario#8.1 Name: Gender stereotypes Producers: Benjamin, Francoise, & Rikka Date: 27/09/2018 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------|------------|---------|--------|-----------|------------|-----|-------|------------|---------|--------|-----------|------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Narrative: What does gender mean? Discussion of an imagine that shows a boy wearing a dress who wants to play football. Such prompt will be used to start a discussion with students about male vs female ways of behaving (Are there specific-gendered activities?) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Constrains: (1) pre-primary school (5-6 years of age) (2) whole class in the same school; (3) tolerance; (4) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sequence <table border="1"> <thead> <tr> <th>No.</th> <th>Steps</th> <th>Activities</th> <th>Setting</th> <th>Actors</th> <th>Artefacts</th> <th>Objectives</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> | | | | | | | No. | Steps | Activities | Setting | Actors | Artefacts | Objectives | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No. | Steps | Activities | Setting | Actors | Artefacts | Objectives | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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7.2 Appendix 2: Materials used and developed for the Paris co-design workshop

Primary school

**Secondary school -
young students**

Pre-primary school

**Secondary school -
old students**

**Small-size group
3-4 students**

Class

**2 classes in the
same school**

**2 classes in different
schools with
different languages**

Tolerance

Empathy

Inclusion



Tolerance

Empathy

Inclusion

