Structuring online collaboration through 3TS: Task, Time and Teams

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STRUCTURING ONLINE COLLABORATION THROUGH *3TS*: TASK, TIME AND TEAMS

Workshop no. 4 at the STELLAR ARV 2011

WHITE PAPER

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1. INTRODUCTION AND MOTIVATION

The workshop entitled "**Structuring online collaboration through *3Ts*: Task, Time and Teams**" took place during the first part of the ARV 2011, from March 28th to March 29th in La Clusaz. It was organized by Pozzi F. and Persico D., both from CNR-ITD (Institute for Educational Technology, National Council for Research - Italy).

The workshop intended to bring together researchers who had been working on the general issue of "structuring online collaboration" with different approaches, be they collaboration techniques, strategies, scripts, content schemes, or any other type of structuring technique.

The need for this workshop had emerged from the current intense debate, in the literature, around how it is possible to support students' online collaboration. As a matter of fact, such debate has been focusing on whether, to what extent and under what circumstances structuring the interactions among students enhances the effectiveness of collaborative processes (Demetriadis et al., 2009). While some studies support the claim that an excess of freedom in the way collaborative tasks are proposed may fail to engage all team members in productive interactions (Hewitt, 2005; Bell 2004; Liu & Tsai, 2008; Demetriadis et al., 2009), others maintain that there is a danger in over-scripting collaborative learning activities (Dillenbourg, 2002), in that too much guidance, due to an excess of structure of the task, may hinder learners creativity, flexibility and ability to self-regulate, therefore jeopardizing the co-construction of knowledge and ultimately causing a loss of effectiveness of the learning process.

Kanuka & Anderson (1999) discuss some frequently used techniques for fostering collaborative learning processes. These techniques are procedures and behaviours to be enacted by students in order to carry out a given task, during a learning activity. Collaborative strategies and techniques, which are usually selected by the instructional designer and managed by the tutor during the educational experience, allow the organization and scaffolding of activities (that is, structure them), so to help students to collaborate effectively in order to reach the learning objectives. Examples of these strategies are: Discussion, Jigsaw, Role Play, Case Study, Peer Review, Pyramid, etc. The CSCL literature is quite rich of contributions reporting on experiences where one or more techniques have been adopted (Pozzi & Persico, 2011).

Other researchers (Dillenbourg & Hong, 2008; Dillenbourg & Jerman, 2007; Kollar, Fischer & Hesse, 2006; Weinberger et al., 2004) have oriented the issue of providing a structure to online

collaboration towards the definition and use of "scripts", that is a set of direct instructions (often provided through interaction prompts) guiding learners in the online activity.
Finally, another research thread has been explored (Ertl, Kopp & Mandl, 2007), focusing on the concept of "content schemes", seen as tools to scaffold the structure of the output of a collaborative learning process. Overall, collaborative strategies, techniques, collaboration scripts and content schemes are all complementary ways to support students while they carry out a collaborative learning activity: they can be combined with one another, at different levels, to improve both the design and the execution of the collaborative learning process.
Building on such debate and more broadly on the literature in the CSCL field, the workshop organizers had identified and proposed to adopt 3 Ts, namely ***Task***, ***Team(s)*** and ***Time***, as the main dimensions along which one may look at the structure of an online learning activity. The idea behind the workshop was thus to look at the 3 Ts as ***unifying and common backbones*** around which to build up a joint discussion even among people who had traditionally oriented their research efforts towards different design approaches.
Summing up, main goals of the workshop were:

- To bring together researchers who have tackled the problem of sustaining collaboration in CSCL activities with different structuring approaches
- To share a common framework to analyze these approaches and to critically engage with the usefulness of this framework
- To identify research questions that deserve attention and would profit from an international research approach/ team
- Possibly to plan concrete actions (i.e. "cross-experiments") to investigate them.

As to the overall organization, the main idea around which the workshop was conceived, was to make it as much interactive as possible, and to share roles and responsibilities among the participants, so to actively involve all of them in each phase of the workshop.
As a consequence of this, the workshop took the form of a blended event, composed of a preliminary virtual session and a main face-to-face session at the ARV.
In particular before the ARV, in February and March 2011 a virtual activity was proposed by using a TELeurope Group. Through this facility, the workshop participants shared their abstracts and were asked to introduce themselves. Then they were proposed an activity aimed at promoting reflection around the workshop theme. Such activity consisted of completing an online questionnaire, where they were asked to test the 3 Ts model to describe a collaborative learning activity they had delivered/proposed in their experience. The questionnaire aimed to help them familiarize with the 3Ts, as well as to test its usability in the various research contexts of the participants; besides the participants were also asked to provide an initial feedback to the model and in particular these latter data were then used by the organizers as a starting point for the discussion during the face-to-face sessions.
The face-to-face part of the workshop (subdivided in 4 main phases) was articulated as an alternation of presentations and working groups. More specifically the workshop was organized as follows:

virtual session through TELeurope group	• Each participant was required to share the abstract submitted to the workshop organizers and to introduce him/herself • Each participant was asked to fill in an initial questionnaire (developed by the workshop organizers) aimed to capture participants' preliminary concepts and ideas about how the 3Ts affect collaboration structuring
F2F first half-day	• Welcome and opening of the workshop by the organizers • Short introduction of all participants • Presentation by the workshop organizers of a re-elaboration of participants' inputs (provided online) in the light of the 3Ts • First round of participants' presentations

	• Questions and answers
F2F second half-day	• First session of group work • Second round of participants' presentations • Questions and answers
F2F third half-day	• Second session of group work • Presentations of the results of the working groups
F2F fourth half-day	• General discussion and definition of next steps and of future research directions • End of session and workshop.

2. WORKSHOP DESCRIPTION

Overall, there were 11 presentations (subdivided into three sessions) and 6 working groups (subdivided into other two sessions).
In the following both the presentation and group work sessions are described. In particular, section 2.1 briefly syntheses all the presentations; section 2.2 reports on the group work sessions and on the main results achieved by the groups.
Lastly, section 2.3 summarizes the main outcomes of the workshop and illustrates the main ideas brought forth by the workshop participants.

2.1 Report of the presentation sessions

The workshop was introduced by Pozzi F., who explained the main ideas behind the workshop, its goals and schedule, as well as the expected outcomes [Pozzi F. (*Istituto Tecnologie Didattiche, CNR, Italy*) – "Introduction to the workshop"].
After that, Joubert M., who was the workshop provocateur appointed by STELLAR; briefly illustrated the Network of Excellence and provided an explanation of the Grand Challenges, which should serve as a framework for the workshop [Joubert M. (*University of Bristol, UK*) - "The STELLAR Network of Excellence"].
Then Pozzi F. took the floor again and summarized the main inputs derived from the analysis of the online questionnaire filled in by the participants before the workshop. The results of this were taken and further elaborated by Persico who, in the presentation that followed, explained the 3Ts model and described the main principles behind it [Persico D. (*Istituto Tecnologie Didattiche, CNR, Italy*) – "Structuring online collaboration through 3Ts: Task, Time and Teams"].

This was considered as a sort of introductory session, which was followed by the first presentation session by the participants. This was chaired by A. Weinberger (*Saarland University, Germany*) and elaborated 4 interventions: Dimitriadis presented the concepts of learning and assessment design patterns and showed how in principle these can be both described in terms of the 3Ts. Despite this, Dimitriadis also explained a number of aspects of the model that could be improved in his view: in particular he pointed out that the model doesn't encompass technology, nor resources (documents, tool, etc.) as main dimensions along which to describe an online collaborative activity. He then claimed that the 3Ts – as they are - don't grasp the relationships between activities [Dimitriadis Y., Villasclaras E. (*University of Valladolid, Spain*) - "Pattern-oriented orchestration of learning and assessment activities in CSCL classrooms"].
His intervention was followed by that by Avouris, whose contribution focused on the use of tablets in collaborative learning activities in classrooms and in particular on the issue of how to assess activities of this kind. He reflected on whether and how the 3Ts, which had originated in 'pure' CSCL contexts, could serve to describe the structure of collaborative activities in face-to-face learning environments [Chounta I.A, Avouris N. (*University of Patras, Greece*) - "A case study: Tablet computers in orchestrated, collaborative activities"].
Suthers, then, elaborated on the concept of 'representational guidance' and claimed that shared representations may support the collaborative learning process at different levels (negotiation potentials, referential resource, reflector of subjectivity, etc.). In particular, different

representations, he claimed, may have different impacts in terms of expressiveness, salience, prompting [Suthers D. (*University of Hawai'i, HI*) – "Unstructured 'Structuring' with Representational Affordances"].
Lastly for this session, Timmis discussed the interactions occurred within groups of students, who, while required to carry out a collaborative research project within a formal course, were also encouraged to interact freely in their choice of informal environments. This was done to support affect and sustainable forms of collaboration. She suggested that a fourth T, namely Tool, would enrich the 3Ts model, in that the use of informal communication tools makes collaboration sustainable and supports motivation and affect. At the end of her presentation Timmis put forward the following research problem: "Need strategies for empowering students to sustain their own supportive and collaborative endeavors, alongside more scaffolded approaches" and formulated a number of research questions related to the impact of friendship on collaboration, how to encourage sustainable collaboration, what is the role of the teacher in that, etc. [Timmis S. (*University of Bristol, UK*) - "Longitudinal instant messaging conversations amongst undergraduates: From orchestration to sustainability and empowerment"].

The second presentation session, chaired by Y. Dimitriadis (*University of Valladolid, Spain*), and comprised another 4 talks. Voigt mainly reflected on two issues: the former concerned the difficulty of assessing effective collaboration and, taking inspiration from Minsky, 1994, he proposed to refer to the concept of 'negative knowledge'. As a consequence of this, he reflected on the fact that Time, Task and Team, rather than saying what 'should happen' during a collaborative learning activity (prescriptive design knowledge), should indicate what 'shouldn't happen' (negative design knowledge). Talking about implementing design knowledge, he then came to his latter issue, i.e. how can technology enhance reflection. To tackle this issue, he showed some useful ways to visualize the flow of discourse [C. Voigt (*Centre for Social Innovation, Austria*) and P. Kraker (*Know-Center, Austria*) - "Empowerment as reflection on structures"].
Wise started her contribution by providing feedback on the 3Ts model, which she suggested she was rather comfortable with, even if she would encourage the inclusion of a fourth T, namely the Tool. Then she focused on the Time component and reflected on the relationships between this and the other components of the model in online discussion forums. First of all, she pointed out some key temporal concepts for asynchronous online discussions (freedom and time management, concurrency, periodicity & salience of time, persistence & continuity of interaction, resituating & memory decay); she then reflected with concrete examples on the fact that often the kind of Task or the roles within the Team may affect the Timeliness of students' contributions and thus the overall quality of the process [Wise A. (*Simon Fraser University, Canada*) -"As Time Goes By: Using Task and Team Design to Support Conversation Flow in Asynchronous Discussions"].
In the following presentation Rummel focused on online collaboration carried out by dyads working through audio and video conferencing. After discussing some examples, she reflected on two concepts of 'scripted collaboration' (where the focus is on structuring students' collaborative activities/interactions) and 'productive failure' (where the focus is on delaying content related support). She then provided some feedback to the 3 Ts model, mainly by pointing out that Task and Team should be better differentiated and that Timing may be interpreted as 'timing of the support', as well as 'timing as part of the scripting'. She then presented a framework (developed by herself and a group of colleagues) describing the main dimensions to supporting collaboration and raised the question of how it would be possible to map this on the 3 Ts model [Rummel N. (*Ruhr-Universität Bochum, Germany*), Diziol D. (*University Freiburg, Germany*), Westermann K. (*Ruhr-Universität Bochum, Germany*) – "How to design support for CSCL: Of Models, Scripts, Adaptive Support and Productive Failure"].
The last intervention was by Ronen, who pointed out the importance of the Teacher in online collaborative learning activities, suggesting that this was not enough recognized in the 3T model and presented CeLS, an approach and environment for the design and enactment of structured

collaborative activities. Ronen discussed the approach behind CeLS and reflected on how it could be used to design and control the 3Ts. During her speech Ronen put forth the notion of collaborative 'TECHNOGOGY', whose role is "to promote and expand the educational potential of new technologies through sound pedagogical exploitation"[1]. This notion was later on discussed by all the participants [Ronen M, Kohen-Vacs D. (*Holon Institute of Technology, Israel*) - "Controlling the 3T's with CeLS for practice and research"].

Each presentation was followed by a time slot dedicated to questions and answers; during these slots some important ideas were raised and discussed. Since many of them were then further discussed within the group work sessions, they are reported in the following.

2.2 Report of the group work sessions

As to the group work sessions, the first session encompassed 3 working groups, organized and led by the two workshop organizers and one participant, while the second session encompassed other 3 groups, this time organized and led by 3 volunteering participants.

In particular, the group discussions of the first session all aimed to discuss the 3 Ts model and gain feedback on it. The three groups were asked to carry out the same task, i.e. to elaborate a small set of research questions deemed relevant around the 3Ts, and possibly to identify plans to address these questions.
Each group chose a rapporteur in charge of taking notes during the discussion and then reporting the main ideas emerged to the rest of the workshop participants within the final plenary session.
In the following the notes produced by the 3 rapporteurs are provided.

- *Right hand side group*

Participants: Francesca Pozzi, Yannis Dimitriadis, Anastasios Karakostas, Sue Timmis, Maria Perifanou, Bernhard Ertl
Coordinator: Francesca Pozzi
Rapporteur: Yannis Dimitriadis.

The work in groups took place after the introduction of the workshop and the associated 3T model, as well as the first session of presentations. It focused on a deeper analysis of the 3T model and it was characterized by several diverging positions on the main elements to be included in the model.
In a chronological order the following items were discussed:

- The distinction between **collaboration and cooperation**, as reported in the literature.
- There were several assertions stating that **Task** is much more important than the other two Ts (Time and Teams), although it is clear that the other Ts are still necessary and important.
- With respect to **Teams**, a classification was proposed as "individuals, pairs, small group, big groups" and it was noted that particular group structures seem to encourage particular types of interactions.
- One of the major issues dealt with the **objective of the 3T** model, which could be used to organize, optimize, describe, understand, etc. Depending on this objective, the model could be appropriately assessed. The same holds with the **actors that are involved in the 3T model**, i.e. instructional designer, teacher, researcher, tutor, learner, etc. The combination of actors and objectives could be used to assess the validity of the model more systematically.
- With respect to **Time**, there was some discussion on its role and whether it should be controlled or not. The elements of deadlines, milestones, and the need for synchronization or description of phases could be essential for this dimension.
- An important aspect has to do with the **quality of collaboration** and its characteristics. On the one hand, the learning objectives in a knowledge domain or with respect to collaboration skills could be considered; on the other hand the efficiency of the process could be taken into account. Should the process be adapted and personalized and what is the unit of analysis? Globally, a model of the quality of collaboration, such as the one proposed by N. Avouris could be useful. Having a model of the quality of collaboration and the way to assess it might also be useful for the analysis of the 3T model and it could also help in enhancing the model.

[1] Quotation from http://www.technogogy.org.uk/

- With respect to the model, an **analysis of the usefulness and robustness** of each dimension should be undertaken. Is simplicity the major characteristic to be achieved? Also, it will be necessary to "**include" the tensions** on structuring that were discussed thoroughly throughout the workshop.
- The **role of Tools/Technology** was also discussed. In this case, the majority considers Tools as elements that help the realization of the learning tasks. However, for Yannis and Anastasios at least, technology could also be used to support the design process, or the evaluation, i.e. before or after the learning process. The affordances of the technological tools should be taken clearly into account
- Some discussion was carried out on the importance of considering the **role of learners and learning** more; besides teachers/designers, etc; who structure the collaboration process. Also, the distinction of formal and informal settings should be considered.
- The **personal and emotional aspects** should be taken into account, either on an individual level or in a group level through the social interactions. These aspects are under-researched and should be included in the model.
- With respect to **concrete actions**, the following were considered:
    - ✓ Provide immediate feedback on the model through its analysis.
    - ✓ Understand how the tensions regarding structuring are described in the model.
    - ✓ Include and consider the tools for design, enactment and evaluation.
    - ✓ Formulate the most appropriate research questions and consider whether they are new or persistent through time.
    - ✓ The quest for the "best" structure that meets all tensions is still an open issue.
    - ✓ The influences between dimensions should be studied in all levels, e.g. what happens when one dimension changes?

- *Left hand side group*

Participants: Eloy Fernandez, Dan Kohen-Vacs, Donatella Persico, Miki Ronen, Dimitra Tsovaltzi, Armin Weinberger, Mike Tissenbaum
Coordinator: Donatella Persico
Rapporteur: Mike Tissenbaum.

The work from the left hand side began with the central notion that we, as researchers, cannot be everywhere – that is to say we cannot be there to watch all the instances of a particular design or technology's implementation – how then do we encourage and support teachers to use these techniques, especially over time. The following is a summary of the main ideas and points that were raised.

- One of the main points that arose from our discussions was the need to find ways to encourage teachers to **employ collaboration strategies in their daily practices**.
- In addition to the notion of collaboration two other main themes were prominent throughout our discussions: **technological affordances** and **scripting.**
- In our discussions collaboration focused mainly on collaboration among teachers. In particular we talked about how, in relation to encouraging teachers to adopt and continue using particular educational designs over time, a community of teachers could be established that would support both novices and experts alike in using these designs.
    - ✓ In connection to this we put forth the notion of **teacher scripts**, which are similar to student scripts in that they scaffold novices in the adoption and integration of particular activities until they feel confident enough to use them on their own.
    - ✓ From this we developed a central question of our group: How do we support teachers in designing, sharing, and enacting these kinds of curriculum/activity – what kinds of scripts can be provided for educators, and how can these scripts be faded to give the teacher ownership of the curriculum?
    - In support of the above notion was the role that technology played in the successful implementation of these designs. In particular we asked how technology could provide teachers with **dynamic representations and aggregations of student;** work that could not be done with traditional (non-digital) means, and how can this information help teachers **adapt their scripting** of the 3Ts in **real-time** to address student needs?
        - ✓ We also noted that it wasn't enough to simply provide *all* the collectable student information, but it was also important to ask what information is required by the teacher to make decisions for the particular activity at hand?
    - Furthermore, we discussed the issue of how **culture** affects the successful implementation of a particular curricular design – we noted that the same design might be enacted quite differently, and with very different results, depending on where and with whom it was employed.

- ✓ In an attempt to better understand this we asked ourselves: How do **external** (**given scripts**) and **internal** (**culturally shared**) scripts interact in the execution of the curriculum?

– Finally we discussed the idea of student agency and motivation in taking part in the activities. We noted that over time, much like with the teacher, it is important to give the student a **sense of ownership** in the learning activity, and as such asked two questions:
  - ✓ How can these curricular designs provide students with the ability to construct (externalize) their own scripts within the context of the learning activity?
  - ✓ How does the ownership of the scripts affect student motivation?
– **Measurement** was also a key part of our discussions, and so we developed three measurements that we would look at to determine the success of our designs in regards to the questions posted above:
  - ✓ **Sustainability of the curriculum**: Is the teacher employing the curriculum over time?
    - This would be done with periodical check-in with the teachers to improve both adoption and retention of the designs.
  - ✓ **Re-application of scripts**: Students' ability to describe and (re)-apply the scripts developed during the curriculum.
    - Done either through post-tests or observing students in other settings outside of the intervention.
  - ✓ **Collaborative Practices**: Does the self-construction of scripts result in good collaborative practice?
  - ✓ In an attempt to tie teacher support to student motivation we also asked:
    - Which forms of teacher support result in more self-regulation by the students?

- *Window side group*

Participants: Nikolaus Avouris, Peter Kraker, Pantelis Papadopoulos, Nikol Rummel, Dan Suthers, Christian Voigt, Alyssa Wise
Coordinator: Christian Voigt
Rapporteur: Alyssa Wise

The discussion began with the question of "why do we structure online collaboration?" and quickly moved to the notions of self-sustaining collaborative practices and learner agency, how to support these via structuring and how to assess when they have been achieved. The following is a summary of the main ideas and points that were raised.

– One of the driving purposes of structuring online collaboration is to make effective collaborative practices a natural part of learner interactions. In other words to create a **self-sustaining system**.
– What might the progression towards such a system look like? There are multiple trajectories towards productive collaboration. One scheme of **incremental development** is:
  - ✓ **Exploration**: Learners focus on understanding the structuring resource as tool
  - ✓ **Reliance**: Learners use the tool as a means to focus on the domain problem (can vary in fluency)
  - ✓ **Appropriation**: Learners "own" the resource, possibly using it in ways not designed for or anticipated
  - ✓ **Internalization**: Learners internalize the functional support of the structuring device, so they no longer need the external artifact that embodied that structuring
  - ✓ **Carry-On**: Learners "own" the structuring device by continuing to use it beyond the mandated setting (next project, next class, life in general)
– How can the creation of such a system be supported?
  - ✓ By using the "**endemic"** tools and practices of a domain (ones that are authentic rather than contrived)
  - ✓ It is critical that learners can **see the value** in using the structuring devices if they are to continue using them on their own
  - ✓ There needs to be a balance between providing too much or too little structure to let learners develop agency but also support them in the process; and this **balance of how much structure is just enough will change over time** (structuring fades as learners appropriate/internalize)
– The idea of ownership and sustainability led to a discussion of learner agency and the question that rather than seeing structuring and agency as two opposing forces in online collaboration, how can structuring be used to enable agency? What factors in structuring could be varied to affect this?
  - ✓ Is structuring provided on an **opt-in or opt-out** (only when need identified vs. faded over time) basis?
  - ✓ **Who has the control** of how much structuring is provided? (Teacher, students, peers, shared or distributed control)
  - ✓ **How long** should structure be provided (need to first experience success)
  - ✓ Other questions can be derived from an examination of specific collaborative scenarios (see notes from the follow-on session)

- It is important to take into account the **context of learners today and the technological milieu** in which they operate; for many, the notion of agency in online interactions is implicit. As designers we need to take what students do as a starting place and respect the ecology of current tools.
- There is a need for **long-term studies** to examine these questions; short experiments won't do.

As already mentioned, the groups of the latter session, instead, had different aims and tasks, as each of them was organized by one of the workshop participants who has chosen the focus of the activity. In particular: one group (right hand side) was organized by S. Timmis and aimed to analyse some interactions occurring among students within an informal online environment within one of her courses (see the short synthesis of Timmis' presentation); the idea behind this activity was to reflect on the relationship between the 3 Ts and learning in informal settings.
Another group (left hand side), organized by M. Ronen, aimed to present myCeLS (an online environment to design online collaborative activities); the idea behind this was to reflect on how CeLS may support the design and control of the 3 Ts (see the short synthesis of Ronen's presentation).
The third group (window side) was launched and coordinated by A. Wise and was around the notion of Time and how this is affected by the other components of the model (see the short synthesis of Wise's presentation).
In the following the notes provided by the 3 rapporteurs are provided.

- *Right hand side group*

Participants: Francesca Pozzi, Anastasios Karakostas, Sue Timmis, Maria Perifanou, Bernhard Ertl, Dimitra Tsovaltzi
Coordinator: Sue Timmis
Rapporteur: Dimitra Tsovaltzi and Francesca Pozzi

At the beginning the discussion was oriented towards informal learning, but then the group agreed that the examples provided by Sue can be considered examples of 'informal communication' (rather than informal learning), which can be used to support both formal and informal learning. In particular this discussion led the group to formulate the following questions:

- What is the relation between informal communication and learning to formal communication and learning? How can we leverage the advantages of informal communication to advance formal learning?

Another issue raised by Sue and then discussed by the group was related to the sustainability of collaboration, which can be influenced by elements such as trust, cohesion, affect, etc. This led the group to elaborate another small set of questions:

- What is the role and contribution of emotional support to the sustainability of the groups/collaboration as possibly one of the main contributions of CSCL (tool affordances, e.g time extension)?
- What is the role of structure to foster emotional engagement and common learning interests/goals as the preconditions of sustainability? How do these mediate learning outcomes?
- How can we effectively research affect?

- *Left hand side group*

Participants: Dan Kohen-Vacs, Donatella Persico, Miki Ronen, Mike Tissenbaum
Coordinator: Miki Ronen
Rapporteur: Mike Tissenbaum.

The work from the left hand continued primarily from the work developed from the previous session. In this session we spent time looking at Ronen's project and then discussed what kinds of insights it provided, and what questions arose in relation to similar technology-based learning platforms in general.

- Looking at myCeLS – the environment developed by Dan and Miki, we highlighted several interesting affordances of the technology that would be important for other similar platforms:
  - ✓ An easy-to-use **authoring environment** that is also **flexible**, so that teachers do not need high-level programming experience to use it, configure, and author their own curriculums within in.
    - Feature such as "drag & drop" and other GUI features were mentioned as being highly "teacher friendly".
  - ✓ The ability to integrate the platform with other technologies was also noted as being an important feature – from grade systems, to content creation systems (such as Google Docs)

- A central feature that came up in our discussion was the need to make the environment **social**.
  - ✓ How can the environment give access to the collective experiences and expertise of the wider community of teachers, students, developers, and researchers by others?
  - ✓ Also how can such an environment provide these different stakeholders with information about the activities taking place within the environment?
    - Including, who is online? Who has accessed specific areas? What are their individual contributions?
  - ✓ We also noted the need to construct different **levels** of "**social structures**", including classes, groups, sub-groups, and individuals within the learning environment to allow for different types of interactions depending on the learning goals of a particular activity.
- Ultimately we noted that **Technology Solutions** are out there but how do you promote the practice of technology use for wider dissemination?
  - ✓ It's not just getting the technology in the teachers' hands but encouraging (and working with them) to use it over time.
    - To this end we asked: What **supports** (teacher training, etc.) and **scripts** can best result in **teacher adoption** of new pedagogical technologies?
  - ✓ Furthermore, given the many different pedagogical technology designs out there, what are the **affordances** and **opportunities** presented by the different technology platforms?
    - What different teachers' needs are addressed by each of these platforms?
      - And since there is no panacea (nor should there be) platform – what **concessions** are made by each platform to address particular needs?
  - ✓ We also asked in what ways are the **community** of teachers supported by the technology?
    - To what extent does this kind of system allow for the sharing of experiences and resources among teachers?
- We closed with a rather broad idea of our own Grand Challenge problem:
  - ✓ Developing a **Ontology (or Taxonomy) of Collaborative Activities**
    - To this end we would like to think about, and potentially, develop an understanding of the different configurations of collaborative activities – which work well in consort, result in powerful and effective learning outcomes, support particular pedagogical aims – and what technologies are most effective in their implementation?

- *Window side group*

Participants: Yannis Dimitriadis, Nikolaus Avouris, Peter Kraker, Pantelis Papadopoulos, Christian Voigt, Alyssa Wise
Coordinator: Alyssa Wise
Rapporteur: Christian Voigt

Realising the wide range of possible directions to progress starting from the discussion of the previous day, the group decided to focus on the temporal dimension of the 3T framework. The following notes capture the questions addressed and points of view presented during the group discussion. Roughly, the session can be split into a first, common ground creating phase (points 1 & 2), discussing more general issues and a second, more applied discussion, taking 'pyramid structures' as example.

- **Should models go for simplicity or coverage?**
  - ✓ Continuing the debate on whether 3Ts were enough or whether a 4th or 5th should be added, a more general question about the nature of instructional guidelines and models was raised: Should models go for simplicity or coverage?
  - ✓ It was perceived that simple models had an important advantage in being useful and inspiring to a wider range of teachers ...
  - ✓ Complex models were deemed less usable as they often required a steep learning curve
- **What is the audience?**
  - ✓ Next we discussed whether the 3T model would be more useful for specific user groups (e.g. Designers, Teachers, Researchers)
  - ✓ Although the framework was perceived to favour designers of learning processes – it was suggested that one framework should be able to cater for all three audiences ... however in light of the previous comment, a more simple version should be for users and a more complex one for researchers.
- **Are we aware of new tools and tasks emerging out of the provided initial question?**
  - ✓ To avoid the group spending too much time with high level speculations, there was a call to look for more applied scenarios of using the 3T Framework. So the initial idea was that, as discussed in the previous session, groups are more likely to be self-sustained if they can use the tools and structures that are "endemic" to their community. Hence our first question was, where and how

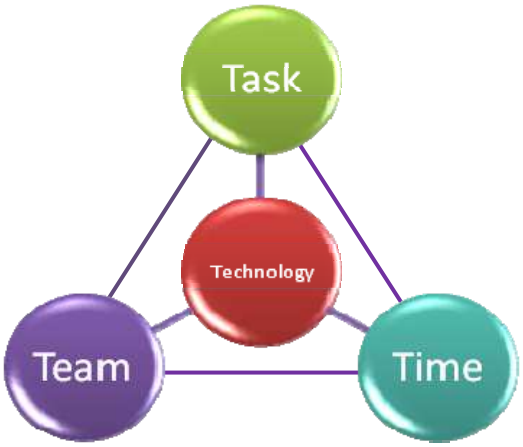
do we consider the emergence of tools over time? ... rather than prescribing what structures to use.
    - ✓ Are we aware of new tools emerging out of tasks as well as new tasks, that are discovered while exploring the tools?
    - ✓ Eventually, the 3 Ts framework was perceived as a helpful structure for looking at existing teaching strategies to shed light on the role of learner agency.
- **Can we go to an example?**
    - ✓ The previous point was then contextualised, taking the 'Pyramid structure' as an example. (Note: A Pyramid structures the transfer of learning outcomes, combining the outcomes from various small groups)
    - ✓ We quickly came to the conclusion, that emergence of new tools requires a different level of observation. Whereas the 3T framework is supporting a Macro view on learning process, emergence of new tools etc. is likely to be discovered by looking at the interactions on a micro level.
- **Pyramid structures demonstrate how much power teachers have over the learning process?**
    - ✓ It was then argued that providing structure is also a matter of exercising control over what's happening in the classrooms. Control is often a precondition to get comparable results in formal education. Hence, drawing agency into the picture would also require us to reconsider ways of evaluating learning outcomes.
    - ✓ The challenge here would be to use structures in ways that wouldn't stifle learners' creativity / agency because learners could feel that they had to comply with a given template for the task.
- **Recap, how many abstract support means do we need?**
    - ✓ At some stage we compared the 3T framework with other approaches we knew such as alternative models or design patterns. However, the aim was not to endorse or refute the 3Ts framework, but to use it to discuss ways of enabling agencies.

2.3 Report of the final plenary discussion: main outcomes of the workshop

During the final plenary session, the results of the group work sessions were reported and then an overall discussion took place, from which one may draw the main ideas brought forth by the workshop participants and the main outcomes of the workshop.

In particular, one of the main outcome of the workshop concerns the feedback received by the workshop organizers on the 3Ts model. As we have seen from the previous sections, the feedback were provided in different moments of the workshop and at different levels, but it is possible to summarize them as it follows:

- generally speaking the 3Ts model was appreciated by all the participants for its immediateness and flexibility;
- all the participants agreed that the Tool (or Technology) component should be added as a fourth T of the model; as to the Teacher, who certainly plays a crucial role within the process, this can be considered part of the Team component;
- according to the workshop participants, further attention should be devoted to the relationships among the Ts, and the way one influences the other;
- the following representation has been suggested to capture the main dimensions of the model, as well as their connections:



– all in all, the 3Ts are considered a good vehicle to study some of the main underlying tensions of the field, but depending on the objectives of the use of the model (to design, to describe, to assess, etc.) and on the users involved (instructional designer, teacher, tutor, student, …), the model should be adapted and used differently; this calls for further research and testing. As to this latter point, at the moment there is a possibility to make some further joint work on the model is under consideration and may lead in the future to common scientific publications by sub-groups of the workshop participants.

Besides, as already mentioned, the model proved to be very effective in stimulating the discussion among the workshop participants, who, even if originally oriented towards different structuring approaches, during the workshop focused on the following, common issues:

– the notion of 'agency', which should not be seen as opposed to structuring, but rather the question should be: how can structuring be used to enable agency? In particular the discussion around this issue is still ongoing among some of the workshop participants, and it is likely that a sub-group of them will carry out some joint work on it;
– the attention towards a 'sustainable collaboration', which should be achieved thanks to a fading structure (as the collaborative mechanisms are internalized by students as time goes by, and then they do not need the structuring scaffold any more);
– the importance of the affective and emotional sphere within the collaboration learning process;
– the importance of providing structure to teachers as well, so to encourage and help them to use technology appropriately.

3. EMERGING RESEARCH QUESTIONS

Starting from the results of the group activities, it is possible to extract instances of research questions, which are – though - 'prototypical' and require further refinement through a more extensive and extended consultation process than what was possible during a 2 day workshop. Many of these are 'concerns' rather than 'questions', some are very long term questions, some will never lead to a "final" answer (since it doesn't exists), most of them have already been addressed but more work is needed.

The glue that joins these questions is that 3 Ts have been considered as a good vehicle to answer them.

1. How and how much should the 3Ts (or 4Ts) model be developed in further detail in order to serve the purpose of helping instructional designers, teachers and students in their tasks? Should the possible Tasks be exemplified/listed? Should the possible group structures be described (including different levels of them) and

investigated individually? How should the influence of timing be studied? Should a taxonomy of tools be built?

2. How do teachers manage the tension between structured activities and the need for fostering student agency? How do they, or could they, manage to maintain the balance particularly as it shifts over time?
3. How can we support individual students and student communities in achieving effective collaboration while recognizing the importance of their own agency in this process? How do we assess the effectiveness of collaboration?
4. How could learners and learning communities be helped in getting ownership in their collaborative learning process? Should they be monitored or facilitated in exploring/relying/appropriating/Internalizing/carrying-on with the use of structuring techniques? To what extent should they be in control of the amount of structure they are provided with? How could collaborative learning activities be designed and orchestrated to promote the learners' and learning communities' sense of ownership? What is the role of structuring techniques in exploring/relying/appropriating/internalizing/carrying-on activities? How do learners and teachers respond to varying levels of monitoring and control provided by the structures which determine the activities within collaborative learning processes?
5. How do personal/emotional aspects integrate/meddle with the 3Ts/4Ts framework? Can we leverage the advantages of informal communication to advance formal learning? How can emotional support sustain collaboration? How could the 3Ts/4Ts framework be adapted to take into account the personal/emotional aspects of learning and collaboration?
6. Are there cultural differences that should be taken into account while using the 3T framework with students/learners? How do cultural differences influence the way learners collaborate within given structures framed by the 3T model?
7. To what extent is the 3Ts (or 4Ts) framework compliant with conceptual and technological tools currently used to design and manage CSCL processes? What features are needed for a tool to lend itself to be used in conjunction with the 3Ts (or 4Ts) framework?

4. GRAND CHALLENGE PROBLEM: EMPOWERING TEACHERS AND LEARNERS TO TAKE ADVANTAGE OF ONLINE COLLABORATION

At the end of the workshop a problem was tentatively elaborated by the workshop provocateur and organizers, based on the workshop discussions and outcomes,. Again this should be considered as prototypical and would require further refinements.

As it is, the problem is the result of an abstraction effort to find a problem umbrella comprising the workshop assumptions and also encompassing the various research questions emerged. This is stated in the following.

4.1 Problem formulation

It is generally recognized that, although online collaboration between learners has the potential to contribute to learning, teachers and learners do not fully appropriate the potential of this sort of activity. Many innovations within this area have been developed and used in a variety of situations, but the online collaboration is not often sustained and learners frequently engage in the collaborative activity only to the extent that is required by the task or activity they are set. Take up is lower than hoped for. At the same time, there is evidence that many learners use social networking tools in their everyday lives, and there is a question within this research area related to ways in which formal education can draw on the power of social networking in order to optimise online collaborative activity for learning.

The European education system values collaboration between learners. However, face to face collaboration limits learners to collaborating when they are co-located and collaborating only with other people within the location. Online collaboration has the potential to connect learners any time and any place, and to connect them with people they do not already know. However, it seems that teachers frequently need support in organising and structuring online collaborative activities for learning.

The Grand Challenge problem is ***to develop and validate approaches to empowering teachers and learners to take advantage of the potential of online tools for sustained and engaged collaborative activity aimed at improving or transforming learning***.

Addressing this challenge would benefit society by a) developing the collaborative skills of learners and b) exposing learners to a wider range of perspectives.

4.3 Main activities needed to address this Grand Challenge Problem

The programme of research addressing this Grand Challenge Problem should include, but is not limited to, a comprehensive set of projects including innovations related to developing the approaches described above (which could include structuring or scripting the collaborative activities), quantitative and qualitative evaluations of these innovations, ethnographic studies to investigate the use of online collaborative tools in the everyday life of learners; evaluations and ethnographic studies should contribute to the iterative development of the innovations.

Those studies concerned with the structuring of online collaboration should address a tension between over-structuring, which tends to leave students unmotivated, and under-structuring, which tends to leave students overwhelmed. It may be helpful to focus some studies on how structured activities are used by exploring how the structuring devices used are assimilated into student activity systems and are transformed from 'add-ons' to a way of doing things. Some studies might draw on the emerging '4T' model, which structures online collaborative learning activity within four strands.

- The requirements of the learning **task**, including the activity type (e.g. jigsaw), the intended learning, formative and summative assessment, social and cognitive scaffolding, drawing on a repository of previously 'proven' building blocks
- The **timings** involved in the activity at all phases (before, during and after the activity), including adaptive teacher and computer interventions (feedback/support)
- The organisation of '**teams'**, which includes the teacher (if applicable) and the learners in dyads, small groups or larger groups flexibly adapting to unfolding situations
- The **technology** used, including hardware and software as well as other mediating artefacts such as visualisations/diagrams, particularly recognising the importance of learner agency in choosing (or not choosing) to use a particular technology

4.4 Timeframe for the Grand Challenge Problem

The work for this Grand Challenge Problem would take up to five years, comprising two main phases. The first phase would study current practice, draw on lessons learnt and identification of 'what works' to devise and implement approaches to supporting teachers and learners, and evaluate interventions. The second phase would draw on the evaluations of the first phase to modify the designed approaches, re-implement and re-evaluate.

4.5 Measurable progress and success indicators

Progress and success indicators will be related to individual initiatives within the programme. These will include a) evaluation of the actual support provided to teachers and learners, from their perspectives, b) the nature and extent of the online collaboration and c) the level to which this collaboration is sustained. For example, within studies concerned with scripting/structuring online collaboration, measures of motivation and confusion could be used for "steering" short term adjustments, and measures of reliance, appropriation, carry-on, and internalisation could be used for the major evaluation of success.

4.6 Funding attraction

European Funding sources would include the European Research Council or organizations such as Marie Curie. A concerted effort would also be made to encourage funding from respective National Research Councils. Exemplar bodies in the UK would be the Economic Research Council. There would also be funding possibilities from different stakeholders such as the Department for Education.

5. RESEARCHERS AND COMMUNITIES

As already mentioned, in order to tackle the GC Problem, i.e. to (develop and) validate a framework able to describe the way an online collaborative learning process is structured, it would be necessary to gather a community of people (not only researchers, but also designers, tutors, teachers, etc.) who traditionally use different structuring approaches, and plan (cross-)experiments to verify its validity. The well-established CSCL research community could certainly be a pertinent arena for this, but also teachers' communities, as well as more in general practitioners in this field, including learners, could be involved in the validation process.

More specifically, educational technology researchers are needed to better design and define the research questions, to plan the research experiments, to draw conclusions from the data collected. Psychologists are needed for their competence in self-regulated learning, the affective component of learning, but they could also contribute to the above. Technology could contribute by developing ad hoc software components of the learning environments, but also authoring tools for the teachers and monitoring tools for the management of learning processes. Linguists and statistic experts would be useful to elaborate new ways to analyse the interactions among the members of a learning community based on content analysis of messages and statistical investigation of the results. It is envisaged that all of these competences should join the same research team and work in close contact. Learners should also be involved not only as Guiney pigs of the studies but in order to reflect with them on the possible interpretations of the results of the study.

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