Computer-Supported Collaborative Learning (2008) 3:165–192
DOI 10.1007/s11412-008-9038-4

Appropriation of a shared workspace: Organizing principles and their application

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Received: 8 April 2006 / Accepted: 11 February 2008 /
Published online: 19 March 2008

Abstract The use and effects of a CSCL-tool are not always predictable from the properties of the tool alone, but depend on how that tool is appropriated. This paper presents the findings from a case study about the appropriation of a graphical shared workspace. When students are presented with a new tool they may encounter competing constraints and multiple possibilities for interacting with it. We argue that during critical events the students make choices, and in order to collaborate, coordinate these choices as a group. We study appropriation by looking into the ways in which small groups organize their contributions during a computer-mediated argumentative discussion. The results of our study illustrate how certain principles for organization emerge from an implicit negotiation of conventions, with mutual influence between the students and the tool.

Keywords Tool appropriation · Shared workplaces · Social construction

Introduction

The design of collaborative technologies is based on theory and hypotheses about how collaboration within a group proceeds, and how it could be enhanced. To some extent, collaborative technologies reflect what they are capable of and how they should be used. This information is perceived through 'affordances' that are made available by the tool (Suthers 2006). Intentions about its use and effect are often also explicated through a script that accompanies the tool. A script defines a sequence of activities, creates roles and constrains the mode of interaction within a group (Jermann and Dillenbourg 2003). The script and the technology influence the behaviour of a group by making certain structures available. These structures may specify possible communicative acts, a modality of representation, the organization of participation and the availability of information. Interacting with these structures shapes the actions of the group members, and gives rise

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to specific patterns of interaction between them. However, the enactment of a script is to some extent unpredictable (Dillenbourg and Tchounikine, 2007) and the affordances of artefacts are sometimes appropriated in unexpected ways (Dwyer and Suthers 2006). A technological artefact has a degree of 'interpretative flexibility' (Pinch and Bijker 1987), meaning that there is not just one possible or best way of using it. The use and effect of a tool are not always predictable from the properties of the tool, but depend on how the tool is appropriated.

The goal of this paper is to examine the appropriation of a graphical, shared workspace. We study the deployment of this tool during an argumentative discussion within a small group of students. The students had to construct and share arguments, and organize the most substantial arguments into a diagram. We study the appropriation of the tool by looking at the different ways in which the groups organized their contributions in a shared drawing space. The results of our study illustrate how certain principles for organization emerge from an implicit negotiation of conventions, with a mutual influence between the students and the tool.

The social shaping of technology

Although there has been an increased effort within the CSCL community to advance understanding of the dynamic relation between students and technology (Stahl 2006; Jones et al. 2006) and the foundations of artefact-mediated collaboration (Dwyer and Suthers 2006), collaborative technology is often treated as an 'independent' variable that stimulates particular forms of group interaction by exercising a stable influence on the cognition and behaviour of the students. This treatment reflects a technological determinism: the technology influences the behaviour of the students, but this influence is itself treated as stable and independent from the students' actions. Technological determinism has been questioned by several theorists. Studies within the Social Science of Technology (MacKenzie and Wajcman 1985; Bijker et al. 1987) have pointed out that technologies are social constructions instead of inventions. A technology gets its form and meaning in interaction, and its influence on human behaviour is not fixed or stable: form and meaning arise during social interaction, from a mutual influence between the technology and its users. Hutchby (2001) paraphrases as follows: "Technological artefacts, in both their form and their meaning, are socially shaped, as opposed to being the clearly defined products of particular inventors or innovators" (Hutchby 2001).

Social shaping of technology has been described at different levels of explanation. Within the Social Science of Technology, social shaping, or construction, of technology is explained from a sociological perspective. Pinch and Bijker (1987) describe technological development as "a nondetermined, multidirectional flux that involves constant negotiation and renegotiation among and between groups shaping the technology" (Bijker et al. 1987). The 'relevant social groups' that shape a technology comprise designers, producers and users of the technology. Social shaping of technology is also studied within the organizational sciences (e.g. DeSanctis and Poole 1994; Orlikowski 1992). DeSanctis and Poole (1994) describe how groups in organizations bring technology into action through appropriation of rules and resources that are provided by the technology. "New social structures emerge in group interaction as the rules and resources of the technology are appropriated in a given context and reproduced in group interaction over time" (DeSanctis and Poole 1994). DeSanctis and Poole conduct an institutional analysis, and define appropriation at the level of organizations. Finally, with a focus on desire and needs, Carroll

et al. (2002) explain appropriation at the level of the individual user. They view appropriation of mobile technologies as an interplay between what people desire, the capabilities and implications of the technology, and the situation of use. Carroll et al. (2002) define appropriation as a process in which a technology is explored, evaluated and adopted or rejected by users. According to them, young people use certain capabilities of a technology and reject others in order to satisfy their needs (Carroll et al. 2002).

The level of description that is required to explain the social shaping of a technology depends on the particularities of the situation and on the goals of the research. At the sociological level the aim is to describe how technology gets its shape within society. In this case, analysis may take a rather broad perspective and long-term scope. The sociological perspective is not necessarily limited to end-users in a specific institution or organization. It may take into account social networks that span a broad range of actors in various settings. Our study is situated in an educational setting. We examine the social shaping of technology in the classroom, at the level of the small group. We focus on group dynamics in the collaboration between students while taking into account the existing learning practice, the task and specific instructions. We examine how students appropriate a collaborative technology over a relatively short period of time. We address this issue through an exploratory concept of tool appropriation that we present below. After that, we introduce the learning task under study and the tool that was deployed to support this task: a graphical, shared workspace. We inspect the features of the tool, and explore the potential they make available to carry out the task. Based on this we formulate our problem statement.

What is tool appropriation?

When a group of students is presented with a new or unknown collaborative technology, they have to appropriate it. The students will try to appropriate the tool within their existing practice by 'adapting' it in a goal-directed activity. Hence the students have to make sense of the properties of the tool, and find 'a way of doing' to carry out their task. In order to achieve this, they have to explore the possibilities of the tool and monitor the consequences of their actions. In the case of collaboration, group members have to coordinate this effort. The group has to arrive at some kind of agreement on how to interact with the tool. For example, they have to attain a shared understanding of the symbols that are displayed in the user-interface, or they have to find a common strategy to manipulate the tool to achieve an outcome.

Tool appropriation does not simply refer to the acquisition of knowledge about an object, or to 'learning how to' do something with the aid of a technology. A tool-in-use is not a stable artefact with fixed characteristics that are independent from practice. Learners construct essential characteristics of the tool when they work with it. The students make choices in their usage of the tool, and these choices influence the mediating effect of the tool. Mutual shaping is central to the notion of appropriation: the actions of the learner are shaped through interaction with the tool, while at the same time the effects of the tool are shaped through the learner's actions. Appropriation of a tool simultaneously transforms the learner and the tool. Over the course of the appropriation process, the use and effects of a tool may change.

The mechanism that underlies tool appropriation becomes manifest during certain critical events, for example, when learners lack directions for use, when a certain need arises, or when a certain use has an unexpected effect.

A graphical shared workspace

Our study focuses on the collaborative learning practice of computer-supported argumentative discussion (Andriessen et al. 2003). Ideally, a participant in an argumentative discussion constructs and brings forward an argument, another participant interprets and criticizes the argument, and the first participant responds to that (Hitchcock 2002). We address a specific type of discussion support: a graphical, shared workspace. Basically, this tool consists of a shared drawing area and a graphical notation system that supports specific kinds of communicative acts see (Fig. 1). The user interface 'prompts' a specific set of contribution cards and makes certain types of contributions salient to the students. Students can choose a contribution card from the notation system, and add it to the drawing area. They can subsequently add a textual message to the contribution card. Students can use a comment window to give a more detailed account of their ideas or thoughts. The text that they type in the comment window is not directly observable in the drawing area. The card has to be 'opened' to read the text 'behind' it. Once a contribution is placed in the drawing area, it can be related to other contributions through the use of links. The spatial position of a contribution is not fixed. Students can move contributions—their own as well as those of others—through the drawing area.

Shared workspaces similar to the one we used in our study have been studied across diverse domains, tasks and settings. The graphical shared workspace has been widely used to support diagrammatical representation of reasoning and argumentation, in both dyads and small-groups. It can facilitate the construction of an argument structure (Buckingham Shum et al. 1997), or serve as a referential object during a discussion (Suthers and Hundhausen 2003). The interpretative flexibility of an artefact refers to how users think of

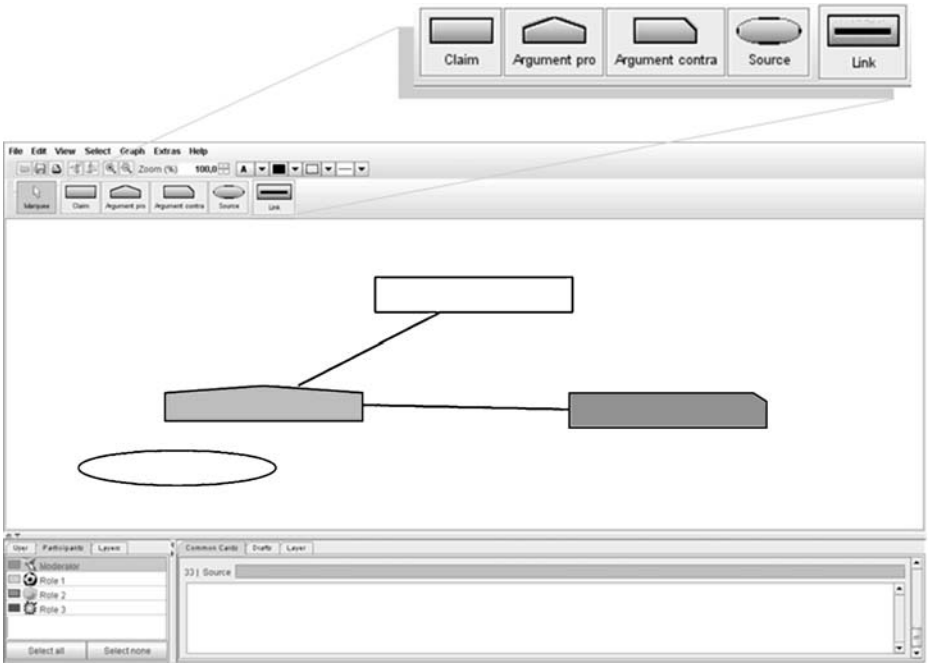

Fig. 1 The graphical shared workspace

artefacts, as well as to how they are designed (Pinch and Bijker 1987). Researchers who are involved in the design and evaluation of collaborative technologies do not always hold strong a priori thoughts about the capabilities of the tool, or about its ideal situation of use. Throughout his work with the graphical tool Belvedere, Suthers' orientation towards the tool has shifted from perceiving it as a medium for arguing with the computer to a medium that initiates and is the object of people arguing with each other (Suthers et al. 2001). From there on, Suthers has studied the effect of 'representational guidance' on face-to-face collaboration (Suthers and Hundhausen 2003) and the role of the graphical tool as a synchronous medium for communication (Suthers et al. 2003). In a similar vein, Baker et al. (2003) have questioned whether argument diagrams are better used as a focus for discussion, as tools for analyzing discussion, or as media for discussion (Baker et al. 2003). From now on when we refer to the shared workspace tool, we refer to the specific tool that we used in our study.

Interactive potential of the tool

We study the shared workspace as a synchronous medium for communication in a face-to-face classroom setting. The students were invited to discuss a particular claim through the use of arguments. They were asked to construct and share arguments, and to organize the most substantial arguments into a diagram. The members of the groups were all located in the same classroom, but did not sit next to each other. It was therefore hard for them to communicate orally. It could be argued that it does not make sense to compare such a 'discussion' with an 'ordinary' face-to-face discussion. After all, to construct a representation from a graphical notation without being able to talk to the other members of the group is quite different from what the students normally do when they discuss. However, elements from regular practice, like the rules and conventions of ordinary talk and experiences with classroom discussions, are likely to contribute to the students' expectations about the use and effect of the tool. Ordinary talk is an important reference during appropriation of the tool.

Several phenomena are responsible for organizing ordinary talk within a small-group. The conversational space is managed by turn-taking (Sacks et al. 1974). The position of utterances, i.e., their place in a sequence, is critical to their interpretation (Garfinkel 1967). This is illustrated by the formation of adjacency pairs: the coupling between an initiation and a response following that initiation. Furthermore, oral communication shows a high degree of turn adjacency: relevant responses occur temporally adjacent to initiations (Schegloff 1984). Finally, simultaneous feedback and interruptions are essential to fine-tune participation and grounding in oral communication.

The organization of interaction in a graphical shared workspace differs from that of ordinary discussion. The shared workspace is a persistent medium. Contributions remain in the drawing area and can be manipulated over the course of the discussion. They can be deleted only by the person who contributed them. The spatial location of a contribution and its relation to other contributions is flexible. The diagram is a dynamic representation: over the course of the discussion its content and structure can be changed. Participation in the drawing area is not restricted to taking turns. The participants are able to contribute simultaneously. Contributions can be produced in parallel in both modalities of representation, that is, participants can type all at the same time and they can manipulate the diagram simultaneously. The two modalities differ in terms of synchronicity. The graphical modality is synchronous, i.e. every time someone places a new card in the

workspace or moves a shape, this is immediately visible for the other participants. The textual modality is 'quasi-synchronous'; the textual part of a contribution card becomes inspectable for the others when the contribution is submitted to the workspace. Hence, a participant can not be interrupted when he formulates a textual contribution. As a consequence, he receives no immediate feedback. We may expect that some of the organizing mechanisms that are normally responsible for fine-tuning participation and grounding are lost.

Problem statement

Scholars within the CSCL community have argued that a tool reflects information about its use and its effect in the way that tool interfaces with students. In our study we adopt a relational approach to the connection between the students and the tool. We hold the following assumptions about the tool-mediated interaction process. First, a tool may provide multiple opportunities to a single student. This student can and sometimes has to make choices. A certain potential of the tool is hereby enacted. This enactment is not arbitrary, but purposeful. Secondly, the same tool may provide different opportunities for action to different students. This means that in case of collaboration, students may have to negotiate their actions in order to arrive at a shared convention of use. Thirdly, there is mutual influence between student(s) and tool. The opportunities for action that a tool provides are not fixed, new opportunities may arise as a consequence of the actions of the student(s).

To unravel the mechanism of tool appropriation we have to examine how interaction with the features of the tool shapes the students' actions, and how these actions give rise to specific patterns of interaction between them. We distinguish a personal dimension of actions in the tool from a collective dimension of interaction via the tool. To separate a personal dimension and a collective dimension we apply an analytical distinction between interactions *with* the tool and interactions *via* the tool. The mechanism is then described as a result of interdependent tool-shaped actions and tool-mediated interactions.

We study the appropriation of the tool by looking at (1) the students' actions in the tool, (2) the coordination and fine-tuning of these actions by the group of students, and (3) the consequences of these collective actions on the use and effect of the tool.

The shared workspace tool was deployed as medium for communication, as well as a means to construct an argument diagram. This dual focus was a challenge to the students, and lead to competing constraints on their behaviour. Moreover, the requirements on their behaviour changed during the activity. The students were asked to construct and share arguments during a first phase of the discussion, and organize the most substantial arguments into a diagram during a second phase. The students had to arrive at some form of organization of their contributions that enabled them to meet the requirements of the task. For example, students could spatially group all arguments in favour of a particular claim in contrast to the arguments against it, so that the drawing space would represent the contrapositions. We hypothesized that the students would have to arrive at a shared principle to organize their contributions in the drawing space, and furthermore, that the two phases of the discussion would require different principles for organization. We expected that the students would change their representational format halfway through the discussion. Because they did not have the possibility of oral discussion, the organization of the contributions had to take place by means of actions within the tool.

Method

The study was conducted over two lessons within the curriculum of a fourth grade secondary school geography course. The subject of the lessons was 'critical evaluation of the public image of a specific geographical region.' The goal of the lessons was to stimulate existing knowledge about a geographical region, and to critically reflect on the sources of this knowledge. The geographical region was Spanish Salou, a popular holiday destination among Dutch youth. The students were invited to discuss in small groups the public image of Salou. A class of 21 students participated in the study, divided into seven groups of three. During the lessons two researchers were present alongside the teacher.

The groups were composed by the teacher prior to the lessons. During the first lesson the teacher introduced the researchers to the class and explained their presence. The researchers introduced the tool by means of a slide show. The slides contained an overview of the basic tool properties and actions: submitting a contribution card to the workspace, typing text in a card, the ability to use links between cards, the ability to type text in the comment window, and the ability to contribute to the workspace simultaneously. After that, the groups were invited to an exploratory session with the tool. The instructions about the tool were limited so that the researchers would not impose their intentions of how the tool should be used.

Prior to the second lesson three roles were defined. Each role corresponded to a target group that viewed Salou as a suitable destination for their holiday. The three roles were *young person*, *parent with small children* and *elderly person*. The students were asked to adopt the perspective of one of these roles, so that three different perspectives were represented in each group. Each student received a source text that contained tourist information about Salou. This information was specifically aimed at the target group that was represented by the student. The students were asked to read the source text as homework for the second lesson.

During the second lesson the students were asked to perform the role-play discussion in their group. The discussion was stimulated with a central claim: 'Salou is suitable as a holiday destination only for young people.' The researchers informed the students that the discussion would proceed in two phases. During the first phase the students were asked to bring forward arguments around the central claim. The second phase was initiated by the researchers, instructing the students to work toward a diagram with the most substantial arguments that were brought forward during the first phase.

Configuration of the tool

The students worked with a specific configuration of the tool. The notation of the tool was based on a simple model of argumentative action. It contained three contribution cards that were labeled 'argument pro.' 'argument contra' and 'source,' and it included the ability to link the cards. The argument cards had a specific colour: the 'argument pro' had a green fill and the 'argument contra' had a red fill. The central claim was typed in a card and placed in the upper left corner of the drawing area.

The setting

The lessons took place in a computer room at the school. The students were used to working with the computers in this room, individually as well as in groups. During the lessons the students were distributed over the room so that the members of the groups did

not sit next to each other. It was therefore difficult for them to communicate orally. Their communication had to take place via the tool.

Data collection

Two sources of data were used in the analysis: the final diagrams and the replay of the tool. The content and structure of the drawing space changed continuously over the course of the discussion. The replay function of the tool allowed us to reconstruct these changes. It captured all 'basic' actions that took place in the tool, resulting in a frame-by-frame representation of the course of action. All manipulations of the diagram—like changing the location of a card, or adding a link—were taken into account. The information from the replay was transcribed into a spreadsheet that included the timeline, all basic actions in the tool, the students responsible for the action, and the textual content of the contribution.

Analysis

A principle for organization reflects a rule or convention that concerns the organization of contributions in the drawing space. Such a principle can be applied through interactions with the tool, in one or in both modalities of representation. The members of a group may apply different principles for organization. In order to collaborate the group has to arrive at a shared principle. An organization principle becomes a shared principle when it is applied consistently by all members of the group.

We have seen three basic orientations towards the tool: (1) an orientation towards establishing and maintaining a direct and ongoing interaction between the members of the group; (2) an orientation towards the construction of a personal line of reasoning without direct interaction with the other members of the group; and (3) an orientation towards submitting contributions without expressing a relation between these contributions. These orientations lead to different principles for organization. In our analysis section we present the appropriation process of four of the seven groups that participated in the study. We have selected these four groups because each of them arrived at different principles for organization, based on one of the three orientations.

The first two groups that we present were primarily oriented towards establishing and maintaining a direct and ongoing interaction. These two groups applied different principles for organization. The students in the first group participated in multiple discussion lines that developed in parallel, whereas the students in the second group constructed one single discussion line. A discussion line is a string of three or more cards that have been connected with a link or through spatial adjacency. A discussion line may include interaction between two or more students in the form of initiation–response, and it may include the connected contributions of a single student: a personal line of reasoning. The students in the third group were orientated towards constructing a personal line of reasoning. During the first phase of the discussion they did not respond to each other's contributions. During the second phase they interacted with each other in one discussion line. Finally, the students in group four were orientated towards submitting contributions without expressing relations between these contributions. However, this group did arrive at a strong principle for spatial organization during the second phase of the discussion.

We have selected episodes from the discussions that reflect critical events in the appropriation of the tool. An episode corresponds to a duration of coherent activity demarcated by the students' behaviour (Roschelle 1992). We start each episode with a

presentation of the data. We describe the actions that were performed in both modalities, and we support this description with pictures of corresponding states of the drawing area (a transcript of the actions in the textual modality and the transcription conventions can be found in Appendix). After that, we zoom in on the critical events that occurred during the episode. We describe the principles for organization that the group members applied, and we describe how the group arrived at a shared principle. Finally, we discuss the consequences of the principles for the group discussion.

Group 1. Maintaining an ongoing interaction: Participation in multiple discussion lines

The students that participated in the first group are named Ayaan, Mark and Nicole (all names in this paper are pseudonyms). In the analysis we refer to the students by using these names. We use a transcript convention to refer to their contributions in the workspace. The notation 'M3' refers to the card with number three placed by Mark. Ayaan is A, Mark is M and Nicole is N. The numbers of the cards correspond to the order of their appearance in the workspace.

Episode 1: Actions in the tool

The students were asked to bring forward their arguments in the shared workspace. At the start of the discussion they all selected a card, and placed it in the workspace at about the same time. The cards were positioned in the upper left corner of the drawing area, near to the claim. Each of the students typed a text in the title space of the card, respectively [M3: 'inconvenience'], [N4: 'we go on a holiday to rest'] and [A2: 'cozy'] (Fig. 2). After that, Ayaan submitted Response A5 to N4 and connected the two cards with a link [then you shouldn't come to Salou]. Mark put forward response M6 to the central claim [we are annoyed by all the flirting because it is a bad example to our young children]. He connected his response right under the claim, without using a link. Thereafter, all three acted simultaneously. Nicole submitted response N7 to A5, and placed her card near the initiation [hey, the elderly deserve some respect]. Ayaan placed card A8 under M6, typed in a response, and connected the two cards with a link [they'll do that eventually anyway]. Finally, Mark placed card M9 right above M3 [there are beautiful beaches where our kids can play safely]. The appearance of the drawing area at the end of the episode is depicted in Fig. 2.

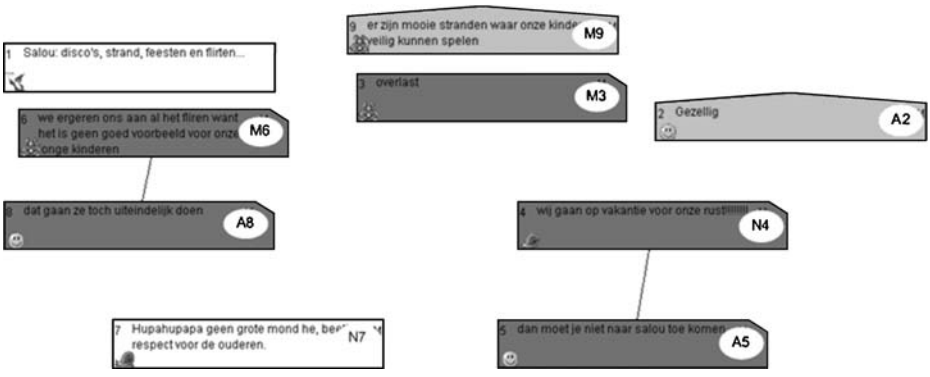

Fig. 2 Drawing area at the end of the first episode

Episode 1: Appropriation

From the start of the discussion, both Ayaan and Nicole displayed an orientation towards a direct interaction with the other members of the group. Both students responded directly to something that was brought forward by another student. They visualized the sequence of initiation and response through the use of a link and/or spatial grouping. Mark displayed a different orientation. During the first episode he did not respond to any contribution that was brought forward by another member of the group. Instead, Mark constructed a cluster of contributions that reflected his personal line of reasoning, and he grouped these contributions around the claim.

During the episode, all three students placed adjacent cards underneath each other, in a vertical position. Ayaan's contribution A5 was positioned near the border of the drawing area. When Nicole responded to A5, there was no space to place her card underneath the initiation. Instead, she placed her card (N7) in a horizontal position (Fig. 2). She could have maintained the principle of placing adjacent cards in the vertical position if she would have enlarged the drawing area downwards. The drawing area can be enlarged by moving a contribution down or to the right, outside the default frame. When this is done, the drawing area no longer fits the screen, and navigation bars appear to scroll it.

Episode 2: Actions in the tool

At the start of the next episode two students acted simultaneously (Table 1 lists the codes and contributions from this episode in alphabetical order). Nicole responded with N13 to M9 [the beaches are crowded and all but safe! Not for parents, elderly or children!!]. She moved M3 out of its adjacency with M9 into the periphery of the drawing area. Then she placed N13 directly underneath M9. At the same time, Ayaan responded with A11 to N7 [I agree but if you choose to spend your holiday in Salou then you know that many young people will be there to go out and party]. These two cards that were not spatially adjacent were connected with a link. Subsequently, Mark responded to A8 with M10 [but not at that age]. The card was placed directly below A8, and also connected with a link. After that, four more contributions were submitted: A16, M15, M17 and N14 (Fig. 3). This episode ends when Nicole neatly arranged the cards to vertically align the lines of argument.

Table 1 The contributions from group one, episode two

Episode 2
[A8] they'll do that eventually anyway
[A11] I agree but if you choose to spend your holiday in Salou then you know that many young people will be there to go out and party
[M3] inconvenience
[M9] there are beautiful beaches where our kids can play safely
[M10] but not at that age
[N7] hey, the elderly deserve some respect
[N13] the beaches are crowded and all but safe! Not for parents, elderly or children!!

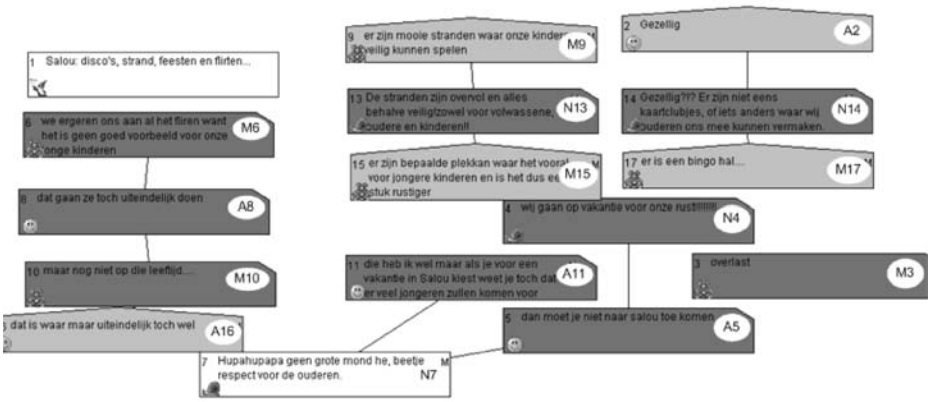

Fig. 3 Four separate discussion lines in the drawing area

Episode 2: Appropriation

During this episode all group members came to use the same principle for organization. All three students responded to contributions that were brought forward by another student, and all three used spatial grouping and linking to pair initiations and responses. Four separate discussion lines have developed. Three of these developed vertically, from the top to the bottom of the drawing area. The fourth line bends sideways to the left, and then upwards. Here the students reached the border of the drawing area.

In the first episode Mark had applied a different principle for organization than the others. What made him to start using the same? Nicole had moved Mark's contribution to the periphery of the drawing area, and replaced it with one of her own. In doing so, she overruled Mark's principle of 'collecting' arguments and work on a personal line of reasoning. From that point onwards Mark adapted his behaviour to that of the others. Near the end of the episode Nicole neatly arranged the cards to vertically align lines of argument. Herewith she emphasized the organizing principle, and made it more visible. As a consequence, the four discussion lines can be clearly distinguished.

Episode 3: Actions in the tool

The third episode starts when Mark and Ayaan simultaneously responded to Nicole (Table 2 lists the contributions from this episode). Both M19 [there are also many restaurants and bars] and A20 [just go somewhere else] were placed below N18, overlapping each other. Mark linked M19 with N18, and then moved M19 away from A20, following the principle of placing responses underneath initiations (Fig. 4). Ayaan also submitted her response to Nicole. As a consequence, the line split in two branches. Each of these branches was further developed.

Table 2 The contributions from group one, episode three

Episode 3
[A20] just go somewhere else
[M17] there is a bingo hall
[M19] there are also many restaurants and bars
[N18] one in the whole of Salou?

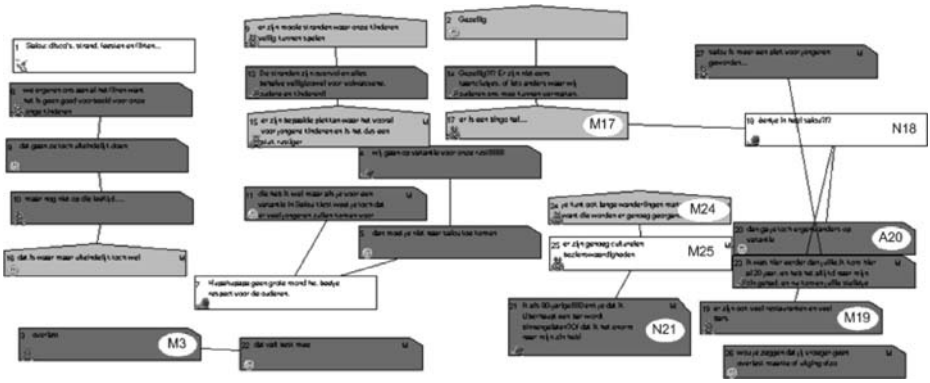

Fig. 4 Principle in the graphical modality is abandoned

Episode 3: Appropriation

At this point, the contributions had filled the available space in the drawing area. Nicole had enlarged the drawing area with response N18 to M17. She linked her response to M17, but there was no space to place the card directly under it. As a consequence, the drawing area was enlarged to the right side. The downward verticality of adjacency pairs was disrupted again. From there on, the graphical organizing principle was further abandoned. This had a side effect: links were now drawn across contribution cards. Figure 4 shows the state of the drawing area. The graphical organizing principle was no longer maintained.

Discussion

After a first orientation (episode 1) the students interacted with each other on the basis of initiation and response. They used only the title spaces of the cards to bring forward their contributions. The initiation–response sequence was reflected in the graphical modality: adjacent cards were connected vertically through spatial grouping and linking. All members of the group submitted an opening statement at the beginning of the discussion, and each of these statements evolved into a discussion line. The students participated in these lines, sometimes in parallel. Application of the initiation-response principle put some constraints on the interaction process. Students had to keep track of all initiations that were placed, while other students may have had to wait for a response. As a consequence, the time between a response and an initiation had to be short. This lead to a high-paced exchange of relatively short messages. Figure 5 shows the development of four discussion lines over the timeline of the discussion. The discussion lines are depicted horizontally in the rows: the straight horizontal lines represent a demarcation of two separate discussion lines. The connecting lines between a particular student's cards indicate that student's participation in the discussion lines. The figure shows that the students participated in multiple discussion lines, and that they interacted at a high pace. Their participation shows a complex pattern of spatial behaviour. In order to keep up with all contributions, the students 'followed' each other through the drawing space (Fig. 5).

It can be difficult to maintain the initiation-response principle. When two students respond to the same initiation, a branch splits off from the line and the single history of the initial line gets lost. The principle had another consequence. The discussion lines contain no responses to contributions that were made before the immediate prior one. No links were

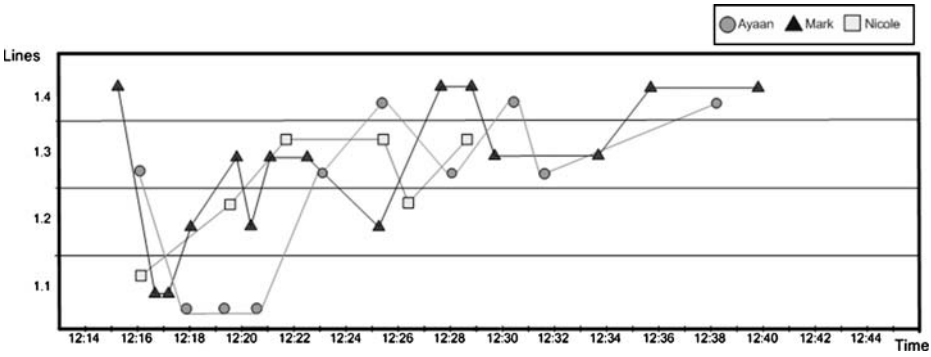

Fig. 5 Participation in separate discussion lines

placed in retrospect, and no links were placed between cards from different lines. The principle of initiation and response lead to a linear organization.

The group had difficulties maintaining organization in the graphical modality. After some time, vertical grouping and linking of contributions was abandoned. What was the cause of this? Placement of contributions in an early phase of the discussion had an effect on subsequent organization. When the group came across a discussion line that was in the way of another, they were unable to reorganize the workspace. The group did not use the ability to expand the drawing area downwards. When they reached the bottom of the drawing area the downward vertical organization became disrupted.

The three episodes that were presented are from the first phase of the discussion. Halfway through the discussion the researchers gave the instruction to move into the second phase (around 12:29). The group was asked to organize the most substantial arguments into a diagram. All three students made an effort to change the structure of the diagram. They moved the cards over the available space so that they were better distributed and the links between them were more visible. Because the students had used a lot of links, the attempts to change the structure of the diagram were not successful. More contributions were submitted, in the same way as during the first phase of the discussion. One of the students—Nicole—made an attempt to apply a different organizing principle. She made several cross-connections between cards from different lines near the end of the second phase. Because this selection of cards wasn't spatially grouped, it did not stand out clearly from the other contributions in the drawing area.

Group 2. Maintaining the ongoing interaction: Participation in one single discussion line

Participating in this discussion were Lara (L), Etienne (E) and Patrick (P).

Episode 1: Actions in the tool

Table 3 lists the codes and contributions from this episode in alphabetical order. Patrick started the discussion by placing card P2 in the centre of the drawing area. He subsequently added text in the title space of the card [on my holiday I want some peace and quiet]. When Patrick had submitted his contribution, Etienne added card E3, placed it near P2, and typed a response in the title space [as an elderly person you shouldn't go to Salou if you want

Table 3 The contributions from group two, episode one

Episode 1
[E3] as an elderly person you shouldn't go to Salou if you want peace and quiet.
[E6] in Salou they have beautiful beaches where you can go as parent with small children and have a great time.
[L5] they have those.
[P2] on my holiday I want some peace and quiet.
[P4] Salou is simply a beautiful place, as an elderly person I think discos are allowed, but there should also be areas for the elderly.
[P9] maybe there are areas especially for the elderly, but in those areas there is also a lot of inconvenience caused by young people.

peace and quiet]. Subsequently, Patrick moved E3 precisely below P2. Almost directly after that, Patrick moved both contributions to the upper left corner of the drawing area (Fig. 6).

This move was almost immediately followed by placement of P4, precisely below E3. Patrick typed a lengthy statement in the title space and resized his card so that all the text was visible [Salou is simply a beautiful place, as an elderly person I think discos are allowed, but there should also be areas for the elderly]. Now Lara started to participate in the discussion. She placed card L5 in the centre of the drawing area as a response to P4 [they have those] When she finished typing her contribution she moved the card directly below P4 (Fig. 7).

During the time that Lara typed her response, the other two students intended to respond to the same initiation. Etienne placed card E6 in the centre of the drawing area, and typed a response to P4 [in Salou they have beautiful beaches where you can go as parent with small children and have a great time]. Before he had a chance to place his contribution into adjacency, Patrick had inserted P9 below L5 [maybe there are areas especially for the elderly, but in those areas there is also a lot of inconvenience caused by young people]. Finally, Etienne placed E6 below P9.

Episode 1: Appropriation

Within the first five minutes the group had arrived at a strong principle for organization. The principle was initiated by one group member, and subsequently followed by the others. The students interacted with each other by means of spatial grouping of initiation and response. They developed one discussion line, and placed subsequent contributions in vertical position, starting from the upper left corner of the drawing area. The students participated in the discussion line and tried to refute each other's arguments. In this episode we have already seen a negative consequence of the principle. Adjacency between initiation and response was disrupted. Etienne submitted a response to Patrick but didn't get the

Fig. 6 The first two contributions in the upper left corner of the drawing area

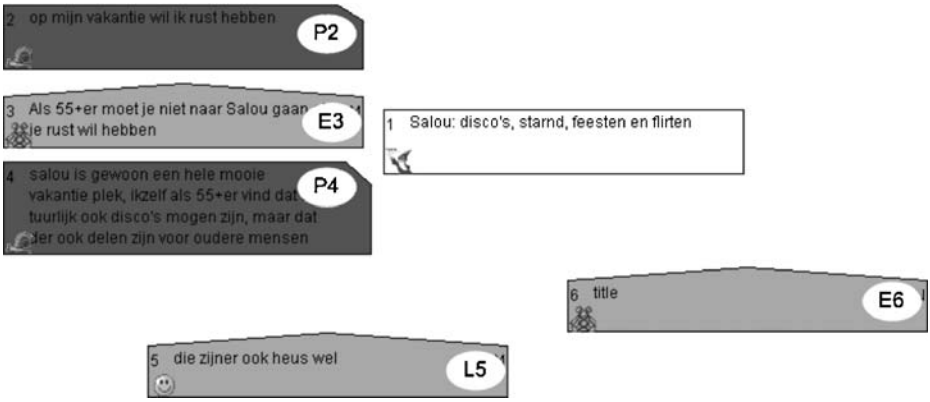

Fig. 7 A strong principle in the graphical modality

chance to place it into adjacency because Patrick was quicker with his response to the same initiation. Regardless of this negative consequence the principle was maintained as shared principle, and it was consistently applied over the course of the discussion by all members of the group. Figure 8 depicts the final diagram.

Discussion

The group interacted on basis of initiation and response. Only the title spaces of the cards were used to type in contributions. The students organized their contributions into one single discussion line. Responses were placed in line, keeping with the order of their appearance in the drawing area. Subsequent cards were spatially grouped. The discussion line developed vertically downwards, and when it reached the border of the drawing area, it continued on the right side and downwards again. The interaction between the group members was linear: they made no responses to contributions prior to the previous one. The organization principle in the graphical modality turned out to be very strong. The group kept strictly to the order of appearance of the contributions. Organization in the textual modality turned out to be weaker: at several time responses were interjected. No deviation from the graphical principle occurred, even when the principle resulted in disrupted adjacency. Figure 9 shows the students' participation in the single discussion line.

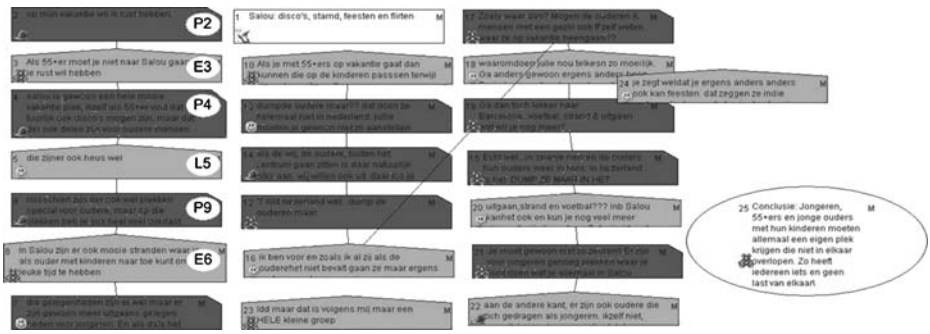

Fig. 8 The final diagram

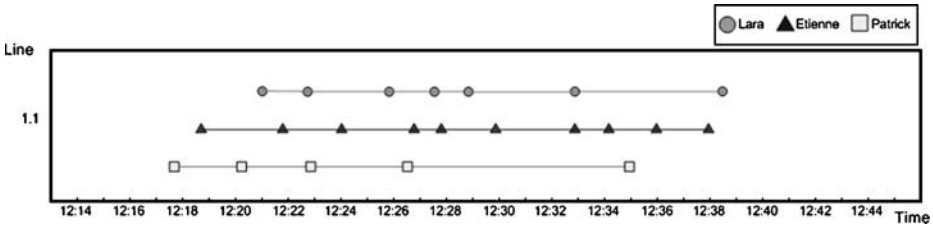

Fig. 9 Participation in one single discussion line

The graphical principle of grouping contributions underneath each other on the basis of the order of their appearance in the drawing area was initiated early in the discussion by one of the students. The principle became reified in the drawing area, and was strengthened with each application. At an early stage it had evolved into a strong principle from which it was difficult to deviate. When the group was asked to enter the second phase of the discussion they proceeded to interact as they did during the first phase. Except where they had tried to refute each other's arguments during the first phase, they now tried to reach a resolution of the different perspectives on the claim. Near the end of the second phase Patrick added links between successive contributions. Herewith he reinforced the organization principle and emphasized the direction in which the contributions should be read. The last card comprised a conclusion that was formulated by Etienne. The group did not arrive at a different principle for organization.

Group 3. Constructing a personal line of reasoning

The students that participated in this discussion are Anne (A), Lisa (L) and Charley (C).

Episode 1: Actions in the tool

At the start of the discussion the members of the group simultaneously placed a card in the workspace. Anne was the first to complete her contribution [A2: 'lots of young people go to salou to party and drink. The source also makes this clear: it says: 'there is a variety of disco's, bars and amusement halls']. She typed in a relatively large amount of text in the title space, and she enlarged the card to make all text visible. In the meantime Charley had completed his contribution [C3: 'the surroundings of Salou are very interesting to hike or make a day trip + the country is slightly sloping and there are vineyards, pine trees, hills etc.']. Subsequently, Anne placed A5 below A2 and connected her cards with a link [because a lot of young people go to Salou it is inevitable that there will be a lot of drinking and partying]. Again, her card contained a lot of text and she resized it to make all the text visible. At the same time Lisa placed L4 [Salou is a fine holiday resort for families, they have recently built new family hotels and there are several activities for families, so nowadays it is not only meant for young people]. She also enlarged her card. Finally, Charley moved his card away from Lisa's card, towards the upper left part of the drawing area. Then he placed card C6, and added it to C3 [D-travel]. He moved Lisa's card downwards in order to place the source card directly below his argument. He then connected the two cards with a link (Fig. 10).

The contributions from this episode are listed in Table 4. When Charley added C9, an elaboration of C3, there was not enough space available to place the cards into adjacency [there are a lot of cultural sites you can visit besides the many discos]. The card overlapped

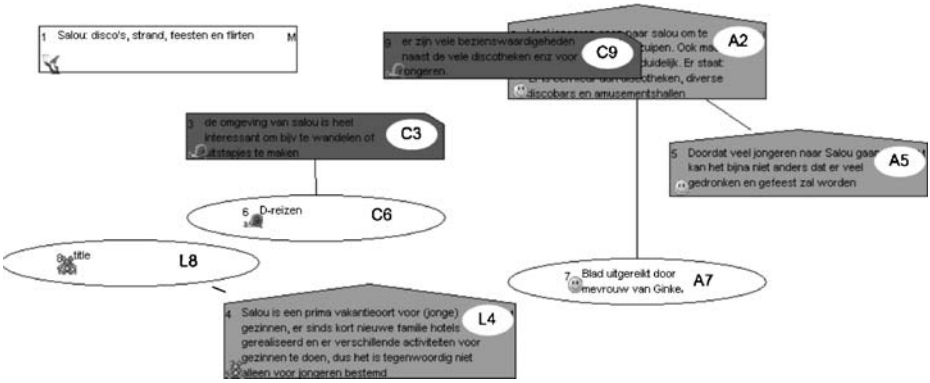

Fig. 10 Crowding in the drawing area

with Anne's contribution (Fig. 10). Charley moved Anne's contributions to the right, in order to be able to spatially group his cards. Anne reacted to this by reorganizing the whole drawing area. She moved Charley's cards upwards and to the left of the space, and closer towards each other. She did the same with Lisa's cards. To create more space for the contributions she had moved the claim from his original position into the centre of the drawing space. While Anne was reorganizing the space, Lisa added another contribution [L10: 'there's much more to do for young people than for families. The Spanish have really learned that they can earn a lot of many from the young people, therefore other target groups are forgotten'] (Fig. 11).

Episode 1: Appropriation

From the start of the discussion, each of the students worked on a personal line of reasoning. The students spatially grouped their personal contributions and connected them with links. Many of the cards contained a lot of text in the title space. The students enlarged the cards to make the text directly visible. The group members all used the oval-shaped source card from the notation system to indicate the origin of their arguments. It took some effort to maintain the graphical principle for organization. The enlarged cards took up much

Table 4 The contributions from group three, episode one

Episode 1
[A2] lots of young people go to Salou to party and drink. The source also makes this clear: it says: 'there is a variety of discos, bars and amusement halls'
[A5] because a lot of young people go to Salou it is inevitable that there will be a lot of drinking and partying
[C3] the surroundings of Salou are very interesting to hike or make a day trip + the country is slightly sloping and there are vineyards, pine trees, hills etc.
[C6] D-travel
[C9] there are a lot of cultural sites you can visit besides the many discos
[L4] Salou is a fine holiday resort for families, they have recently built new family hotels and there are several activities for families, so nowadays it is not only meant for young people
[L10] there's much more to do for young people than for families. The Spanish have really learned that they can earn a lot of many from the young people, therefore other target groups are forgotten

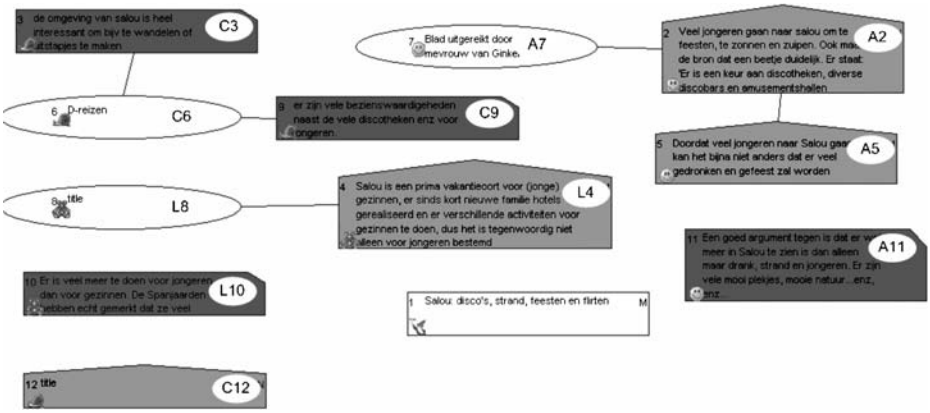

Fig. 11 The reorganized drawing area

space, and the drawing area soon grew crowded. Anne reorganized the drawing area in order to maintain the spatial grouping of personal contributions.

The group arrived at a shared principle at an early stage of the discussion. How did they do this? It appears that students followed each other in certain choices. First Charley and then Lisa followed Anne's example of grouping one's own contributions. Charley and Lisa also followed Anne's example of typing a lot of text in one card and then enlarging the card. Lisa and Anne followed Charley's initiative of using the source card from the notation system to mention the source of the arguments. All these choices were made only in this particular group.

Episode 2: Actions in the tool

When the second phase of the discussion was initiated, the students started to interact directly with each other. Charley placed C12 directly under L10, and typed a response [the elderly also like cozy bars and hanging at the beach for a day]. Lisa connected L10 and L4 with a link. Anne added A13, placed the card besides C12, and connected the two with a link [but young people hang at the beach every day, the elderly will not only do that, they will visit cultural activities as well]. Anne typed A11 and connected it to L4 with a link [a good argument against is that there's more to see in Salou than just liquor, beaches and young people. There are many beautiful spots in nature] (Fig. 12).

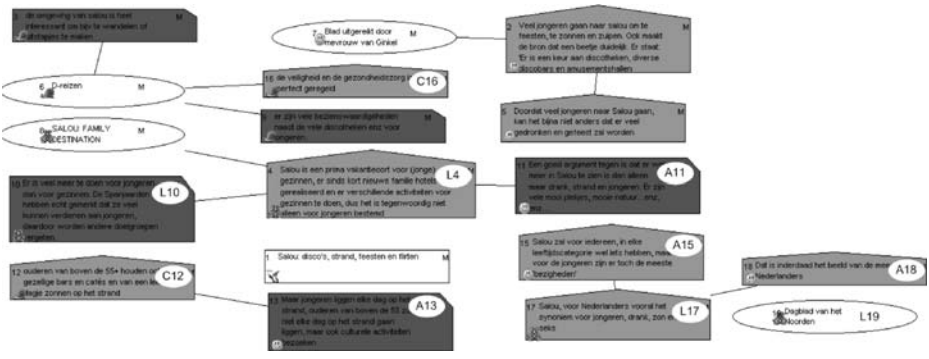

Fig. 12 The final diagram

Episode 2: Appropriation

With the initiation of the second phase, the students started to interact directly with each other by means of initiation and response. They also connected some contributions that were already placed during the first phase. The drawing area was reorganized again, this time by Charley, to maintain organization in the graphical modality. As with the first group, the drawing area is enlarged near the end of the discussion, and again, oriented to the right side.

Discussion

During the first phase of the discussion each of the students constructed a personal line of reasoning, and did not respond to contributions that were made by the other members of the group. The students used spatial grouping and linking to connect adjacent cards. Cards were spatially grouped in horizontal and vertical positions. The organization of contributions was non-linear: it did not reflect the temporal order of the contributions. Organization in the graphical modality turned out to be weak.

In the transition from the first to the second phase the group arrived at a different shared principle. From the moment that the second phase was initiated, the students started to interact directly with each other. Organization in the textual modality had changed from expanding a sequence without participant change to pairing of initiation and response. A fourth discussion line developed. Just as during the first phase, the group applied a weak graphical principle. Participation in the discussion lines is depicted in Fig. 13.

Group 4: Submitting contributions without expressing relations

Vera (V), Margot (M) and Aldert (A) participated in the discussion.

Episode 1: Actions in the tool

At the start of the discussion Aldert placed two cards, A2 and A3, and typed a contribution in the first [a right to healthcare and homecare]. Margot contributed M4 [not just young people, but mostly], and placed card M5. Vera contributed card V6, and used the comment window to elaborate her statement [the young people + disco's, beach, partying, and flirting surely is for the young people]. Subsequently, all three acted in parallel. Vera placed V8, and Aldert A7. Margot typed M5, and used the comment window to elaborate her statement as well [possibilities for families + the image that is given in Costa is not entirely true. The

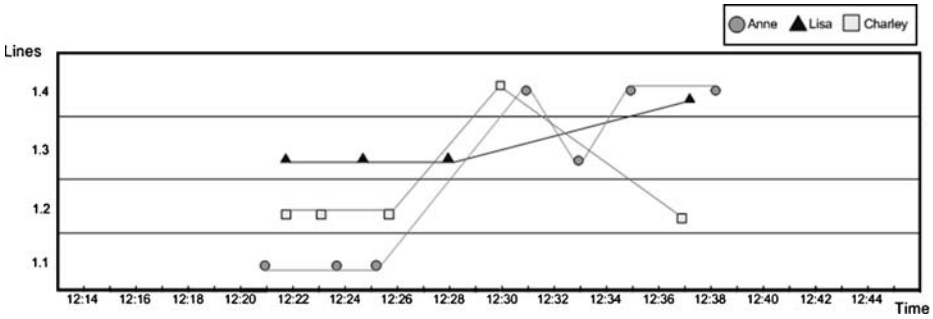

Fig. 13 Participation in discussion lines over the course of the discussion

source ‘Salou: family destination’ indicates that the first family holiday resort of Catalonia was build in Salou] (Fig. 14).

Episode 1: Appropriation

At the end of the first episode there is no principle for organization, not in the graphical modality, nor in the textual modality. The contributions show no manifest relations: the students did not respond to each other’s contributions, they did not take up content from each other, and they did not construct a personal line of reasoning. The group did not use links or spatial grouping to connect contributions. Organization was weak in both modalities. The students did use the comment window several times to elaborate the text in the title space of the cards.

Episode 2: Actions in the tool

The contributions from this episode are listed in Table 5. Margot contributed M9, and used the comment window [child friendly’ + ‘there are even child friendly possibilities in the resort like menus for children and long chairs. That’s only the restaurant. There are also playgrounds for children]. Vera contributed V8 [partying, and going out’ + ‘most of the young people come for the discos and the parties]. When she finished typing, Vera moved her card to the outer left side of the drawing area, and started to reorganize the drawing area. She introduced a graphical principle based on card type: a clear separation of arguments in favour of the claim on the left, and arguments against the claim on the right side of the drawing area (Fig. 15).

During the same time that Vera reorganized the drawing area, Margot contributed [M9: ++ ‘there are also safety measures for children. They can get a sort of bracelet with their identity on it’] and Aldert contributed [A3: ‘doesn’t live in Spain but in the extension of Holland’ + ‘personal optician, dentist, physiotherapist, bakery, etc. Other stores you can order in Dutch!!’]. Immediately after the reorganization, the drawing area was reorganized again. Again it was Vera who initiated another graphical principle: organization based on contributor. When she had finished reorganizing, the students acted in parallel. They contributed M10, V11 and A12 respectively. Margot and Aldert took up Vera’s initiative, and placed their contributions in their ‘personal line’. The cards are now organized on basis of contributor (Fig. 16).

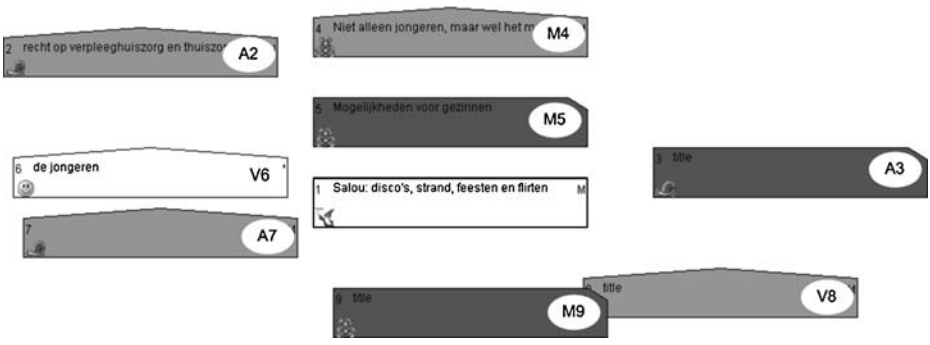

Fig. 14 No principle for organization

Table 5 The contributions from group four, episode two

Episode 2
[A3] doesn't live in Spain but in the extension of Holland + personal optician, dentist, physiotherapist, bakery, etc. Other stores you can order in Dutch!!
[A12] resident get healthcare and homecare + they have a right to that. Expenses are paid by Dutch insurance companies
[M9] child friendly + there are even child friendly possibilities in the resort like menus for children and long chairs. That's only the restaurant. There are also playgrounds for children
[M9] ++ there are also safety measures for children. They can get a sort of bracelet with their identity on it
[M10] beaches for children + there are special beaches for children where they are monitored by lifeguard
[V8] partying, and going out + most of the young people come for the discos and the parties
[V11] beach and sea + there is enough sea and beach to please all visitors, young people can drink on a terrace and swim in the sea all they like

Episode 2: Appropriation

In the second episode we see how the group shifted between bringing forward arguments and constructing a diagram. At one point they even did both at the same time. Organization in both modalities was still weak. This enabled Vera to experiment with different graphical principles for organization. It turned out that the principle based on contributor would be abandoned as well. When the second phase of the discussion was initiated, the graphical principle changed back to organization based on card type. The students contributed several more cards. The new principle was maintained until the end of the discussion (Fig. 17).

Discussion

During the first phase of the discussion organization was weak in both modalities. The students formulated lengthy statements, and made frequent use of the comment window. There were no manifest relations between the contributions. The students did not respond to other members of the group, and they did not take up content from each others' contributions. Initially, the group did not use spatial grouping or linking of contributions. No discussion lines developed. Near the end of the first phase one of the students started to experiment with spatial organization of the cards. Two different principles were introduced. However, the group did not arrive at a leading principle: no principle was consistently applied over another. Organization in the textual modality remained weak during the second

Fig. 15 Graphical principle based on card type

Fig. 16 Graphical principle based on contributor

phase of the discussion. However, the group did arrive at a strong graphical principle for organization. The group used spatial grouping and linking to organize the contributions based on card type. The cards were grouped vertically in two columns. Because the group applied a weak principle during the first phase of the discussion—notably, they used no links, they were able to freely move the cards through the workspace.

Organizing principles and their application

In order to collaborate the students had to arrive at a shared principle for organization. A principle becomes a shared principle when it is consistently applied by all members of the group. An organization principle may be applied through actions in one or in both modalities of representation (Table 6). Actions in the two modalities can be congruent—directed towards the same principle—or non-congruent—directed towards a different principle. For example, spatial grouping of contributions based on card type is a principle that is applied through actions in the graphical modality. Organization of the content of the cards in form of initiation and response is an example of a principle that is applied through actions in the textual modality. The principle of initiation and response can be supported

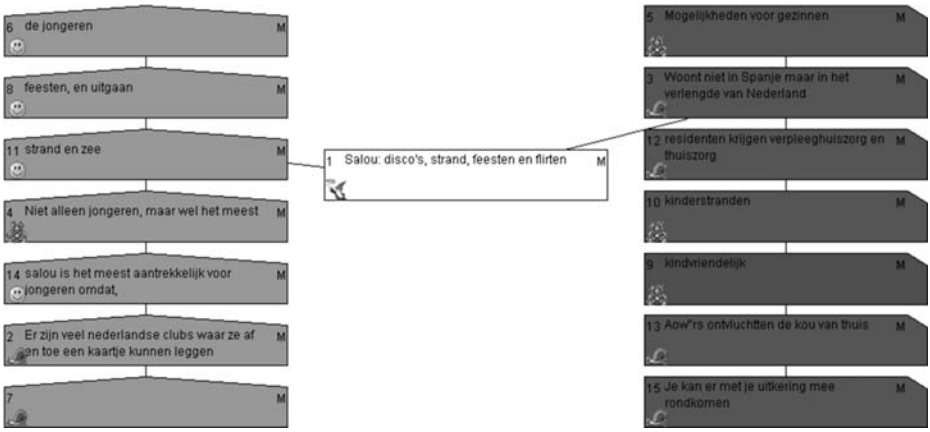

Fig. 17 The final diagram

Table 6 Overview of organizing actions in both modalities

Graphical modality	Textual modality
Spatial grouping and/or linking of initiation–response	Pairing of initiation and response within a sequence
Spatial grouping and/or linking of cards of one participant	Expansion and/or elaboration of a sequence without participant change
Spatial grouping and/or linking of cards of the same type	
Spatial grouping and/or linking based on temporal sequence of cards	

through spatial grouping and linking of the initiation-response pair. If this is the case, actions in both modalities are congruent: they are both directed toward the pairing of initiations and responses. However, this is not always the case. Sometimes the actions in the two modalities are aimed at application of different principles. For example, actions in the textual modality can be directed toward pairing initiations and responses while the actions in the graphical modality are directed toward positioning contributions in the order of their appearance. If organizing actions are non-congruent, they may compete with each other. Eventually, the stronger principle will be applied over the weaker principle. A principle for organization is strong when it is consistently applied over other principles. A principle for organization is weak when it is hard to maintain.

We have seen three basic orientations toward the tool: (1) an orientation toward establishing and maintaining a direct and ongoing interaction between the members of the group; (2) an orientation toward the construction of a personal line of reasoning without direct interaction with the other members of the group; and (3) an orientation toward submitting contributions without expressing a relation between these contributions. These orientations lead to different principles for organization. In the *first group*, actions in both modalities were congruent toward the same principle: pairing of initiation and response. Organization in the textual modality was strong, whereas organization in the graphical modality turned out to be weak. The group applied the same principle during both phases of the discussion. Organization in the graphical modality was abandoned during the second phase of the discussion. In the *second group*, the actions in the two modalities were non-congruent, that is, not directed towards the same principle. Actions in the textual modality were directed toward pairing of initiation and response, while actions in the graphical modality were directed toward spatial grouping based on the temporal sequence of the cards. Organization in the graphical modality was strong, whereas organization in the textual modality turned out to be weak. The group maintained the organization in the graphical modality throughout the discussion. Organization in the textual modality was abandoned at an early stage of the discussion. In the *third group*, actions in both modalities were congruent toward the same principle: construction of a personal line of reasoning during the first phase, and initiation and response during the second phase. During both phases organization in the textual modality was strong, whereas organization in the graphical modality turned out to be weak. Finally, in the *fourth group* the actions in both modalities were congruent during the first phase toward the same principle: no organizing actions were consistently performed. Organization in both modalities was weak. During the second phase a strong principle for organization emerged from actions in the graphical modality: organization based on card type. Organization in the textual modality remained weak throughout the discussion (Table 7).

Table 7 Application of strong and weak principles during the discussion

	Graphical modality		
Textual modality		Weak	Strong
	Strong	Group 1 (Whole discussion) Group 3 (Whole discussion)	
	Weak	Group 4 (Phase 1)	Group 4 (Phase 2) Group 2 (Whole discussion)

The application of strong and weak principles for organization had implications for the transition between the first and second phase of the discussion. At the start of the second phase the students were asked to construct a diagram of the most substantial arguments. We expected that the second phase would require a different principle for organization. It turned out that it was difficult to deviate from a strong graphical principle, whereas a weak graphical principle, in contrast, was more easily abandoned. A strong principle in the textual modality appeared to be less of a problem. However, when this principle was supported in the graphical modality—through the use of links—it was also difficult to abandon.

Appropriation: Implicit negotiation of conventions

We have examined the 'mechanism' of tool appropriation through a micro-analysis of tool-mediated interactions. Micro-analysis revealed phenomena that would have otherwise remained unnoticed. Basically, the distinction between interaction *with* and *via* the tool enabled us to reveal some of the interdependence between a personal and a collective dimension of interaction. Throughout the discussion the students displayed personal orientations in their interaction with the tool. These orientations were most prominent at the start of the discussion. Students' orientations, and the actions that followed from it, converged within the group context once the students started to interact with each other via the tool.

Our analysis has illustrated how groups arrived at a shared principle for organization. Group members mutually influence each other, and adapt their behaviour in the workspace to the behaviour of the other group members. One group member can have a profound impact on how the tool is appropriated. In several cases a principle for organization could be traced back to the initiative of one of the group members. It was introduced by one member, and subsequently adopted by the others. However, we have also seen some examples in which an initiative taken by one member of the group was not followed by the others. The chance that an initiative remains unnoticed or is hard to follow seems to be larger in a crowded drawing area. When this was the case, the principle did not last very long. The students had to explore possibilities and monitor the consequences of their actions. In doing so they could play a conscious role in adjusting their actions in favour of one consequence over the other. However, some principles were hard to deviate from. Choices that were made at an early stage had consequences throughout the discussion. Most groups made a substantial effort to arrive at a shared principle. This was a challenge, especially since verbal deliberation was not possible. Their appropriation of the tool was the result of an implicit negotiation of conventions.

Our analysis has illustrated some of the mutual influence between the students and the tool. The flexibility of the tool allowed multiple possibilities for interacting with it. There was not just one best way to utilize the tool in order to perform the task. In order to deal

with constraints and possibilities the students had to make choices, and these choices had to be coordinated. The choices that students made influenced subsequent choices that they could or had to make in order to maintain comprehensible communication. Their actions influenced the mediating effect of the tool. For example, typing a lot of text in the title space of the cards lead to enlarged cards. Enlarged cards lead to a crowded drawing space, and to a need to (re)organize the contributions. In another case, not using a strong principle for spatial grouping made the structure of the diagram difficult to perceive, and the ongoing interaction difficult to maintain. Using neither spatial grouping nor the linking principle made both difficult. A continued application of a principle recursively implicated the principle. Moreover, through the feature of persistency, the principle became reified in the drawing area. The principle was strengthened through reification and continued application. When a shared principle emerged, the use and effect of the tool stabilized.

We end our paper with a general conclusion. It is often assumed that students fluently incorporate a new technology into their existing practice. Our study shows that when students are presented with a new CSCL tool, there can be a lot of diversity in the way that tool is appropriated. One needs to carefully consider the introduction of a new tool in the classroom, taking into account both the requirements of the task and the learning goals.

Acknowledgements The authors would like to thank Dan Suthers, Michael Baker, Timothy Koschmann, and the anonymous reviewers for their comments on earlier drafts of this paper.

Appendix

Transcription conventions

Notation	Description
[A1]	Card number 1 contributed by Ayaan
[M2]	Contribution M2 splits off from the line
+	Text in comment window
++	Edited text in comment window

Transcripts

Final diagram of group one

Line 1

[N4] we go on a holiday to rest

[A5] then you shouldn't come to Salou

[N7] hey, the elderly deserve some respect

[A11] I agree but if you choose to spend your holiday in Salou then you know that many young people will be there to go out and party

Line 2

[M6] we are annoyed by all the flirting because it is a bad example to our young children

[A8] they'll do that eventually anyway

[M10] but not at that age

[A16] that's true but eventually they will

Line 3
[M3] inconvenience
[M9] there are beautiful beaches where our kids can play safely
[N13] the beaches are crowded and all but safe! Not for parents, elderly or children!!
[M15] there are certain places that are especially meant for young children and it is more quiet there
Line 4 (fragment)
[A2] cozy
[N14] cozy?!? There's not even a cart club, or something to entertain us elderly people
[M17] there is a bingo hall
[N18] one in the whole of salou?
− [M19] there are also many restaurants and bars
[N21] Me as an eighty-year old! Do you really think I will be allowed into a bar? Or even like it?
[M25] there are plenty of cultural sites
[M24] you can also go on a hiking tour, they organize them often
[A20] just go somewhere else
(…)

Final diagram of group two
Line 1 (fragment)
[P2] on my holiday I want some peace and quiet
[E3] as an elderly person you shouldn't go to Salou if you want peace and quiet
[P4] Salou is simply a beautiful place, as an elderly person I think discos are allowed, but there should also be areas for the elderly
[L5] they have those
[P9] maybe there are areas especially for the elderly, but in those areas there is also a lot of inconvenience caused by young people
[E6] in Salou they have beautiful beaches where you can go as parent with small children and have a great time
(…)

Final diagram of group three
Line 1
[A2] lots of young people go to salou to party and drink. The source also makes this clear: it says: 'there is a variety of disco's, bars and amusement halls'
[A7] sheet handed out by Miss van Ginkel
[A5] because a lot of young people go to salou it is inevitable that there will be a lot of drinking and partying
[A11] a good argument against is that there's more to see in salou than just liquor, beaches and young people. There are many beautiful spots in nature
[C12] the elderly also like cozy bars and hanging at the beach for a day
[A13] but young people hang at the beach every day, the elderly will not only do that, they will visit cultural activities as well
Line 2
[C3] the surroundings of salou are very interesting to hike or make a day trip
+ the country is slightly sloping and there are vineyards, pine trees, hills etc.
[C6] D-travel
[C9] there are a lot of cultural sites you can visit besides the many discos
Line 3
[L4] salou is a fine holiday resort for families, they have recently built new family hotels and there are several activities for families, so nowadays it is not only meant for young people.
[L8] Salou: family destination
[L10] there's much more to do for young people than for families. The Spanish have really learned that they can earn a lot of many from the young people, therefore other target groups are forgotten.
[A15] Salou has something for every age category, but most is for the young people
[B17] Salou, for the Dutch synonymous to young people, booze and sun
[B19] Northern Daily
[A18] indeed, that is the image most Dutch people have

[C16] safety and health care is perfectly arranged
+ there's a hospital, drug store, police, etc.
Final diagram of group four
Arguments in favour
[V6] the young people
+ disco's, beach, partying, and flirting surely is for the young people
[V8] partying, and going out
+ most of the young people come for the disco's and the parties
[V11] beach and sea
+ there is enough sea and beach to please all visitors young people can drink on a terrace and swim in the sea all they like
[M4] not just young people, but mostly
[V14] salou is the most attractive to young people because,
+ it offers the most activities to young people, skating, surfing
[A2] a right to healthcare and homecare
Arguments against
[M5] possibilities for families
+ the image that is given in Costa is not entirely true. The source 'Salou: family destination' indicates that the first family holiday resort of Catalonia was build in Salou
[A3] doesn't live in Spain but in the extension of Holland
+ personal optician, dentist, physiotherapist, bakery, etc. Other stores you can order in Dutch!!
[A12] resident get healthcare and homecare
+ they have a right to that. Expenses are paid by Dutch insurance companies
[M10] beaches for children + there are special beaches for children where they are monitored by lifeguard
[M9] child friendly
+ there are even child friendly possibilities in the resort like menus for children and long chairs. That's only the restaurant. There are also playgrounds for children
++ there are also safety measures for children. They can get a sort of bracelet with their identity on it
[A13] Retired people flee the cold
+ Spain has a lot of retired people
[A15] You can live there on your allowance
+ they mostly cook themselves and sometimes they go to a nice restaurant

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