DEVELOPING THE ROLE CONCEPT FOR COMPUTER-SUPPORTED COLLABORATIVE LEARNING: AN EXPLORATIVE SYNTHESIS

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Developing the role concept for computer-supported collaborative learning: An explorative synthesis

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Abstract

The role concept has attracted a lot of attention as a construct for facilitating and analysing interactions in the context of Computer-Supported Collaborative Learning (CSCL). So far much of this research has been carried out in isolation and the focus on roles lacks cohesion. In this article we present a conceptual framework to synthesise the contemporary conceptualisation of roles, by discerning three levels of the role concept: micro (role as task), meso (role as pattern) and macro (role as stance). As a first step to further conceptualise 'role as a stance', we present a framework of eight participative stances defined along three dimensions: group size, orientation and effort. The participative stances – Captain, Over-rider, Free-rider, Ghost, Pillar, Generator, Hanger-on and Lurker – were scrutinised on two data sets using qualitative analysis. The stances aim to facilitate meaningful description of student behaviour, stimulate both teacher and student awareness of roles at the macro-level in terms of participative stances, and evaluate or possibly change the participation to collaborative learning on all levels.

Keywords: roles, collaborative learning, CSCL, scripting, narratives, higher education

Developing the role concept for computer-supported collaborative learning: An explorative synthesis

In recent years the role concept has become a promising construct for facilitating and evaluating Computer-Supported Collaborative Learning (CSCL). Although role-play research is an established tradition in the domains of psychology and sociology (Forsyth, 1999), it is still an emerging topic in CSCL research. In this article we will describe what is meant by roles and how the concept of roles is currently utilised in (computer-supported) collaborative learning research. The use of roles in CSCL contexts is aimed at facilitating group learning. Current roles in CSCL are often designed with the learning task in mind and have therefore limited generalisability. In this article we review roles featured in CSCL literature with the aim to find commonalities across roles based on which a conceptual framework can be built.

Roles in collaborative learning

Roles can be defined as more or less stated functions and/or responsibilities that guide individual behaviour and regulate group interaction (Hare, 1994). Roles can promote group cohesion and individual responsibility (Mudrack & Farrell, 1995), and specify what each group member is accountable for. The degree of cohesion and group members' individual responsibility are central to the functioning of any group (Forsyth, 1999). A greater sense of responsibility can increase an individual group members' commitment – "we-ness" – to the group's goal and subsequently increase group functioning.

Individual responsibility and group cohesion correspond with two concepts that are central in collaborative learning: 'individual accountability' (Slavin, 1980) and 'positive interdependence' (Johnson, 1981). Individual accountability refers to the degree to which group members are held individually accountable for jobs, tasks or duties central to a groups' functioning. In other words,

a higher level of individual accountability can enhance group members' individual responsibility for the group. Positive interdependence is the degree to which the performance of a single group member depends on the performance of other members. In other words, a higher level of positive interdependence can enhance cohesiveness. Cohesiveness can increase stability, satisfaction and efficient communication, as well as result in negative effects like social pressure, inter- and intra group aggression or conflict, and polarisation (Forsyth, 1999). Roles strengthen interdependence as contributions of all member are required for the task (Brush, 1998), and stimulate group members' awareness of overall group functioning and of other group member's contribution (De Laat, 2006; Mudrack & Farrell, 1995; Strijbos, Martens, Jochems, & Broers, 2004, 2007).

Roles in CSCL research

Two perspectives on roles are apparent in the CSCL literature: scripted roles and emergent roles. *Scripted roles* are assigned by a teacher to structure the collaborative learning process (De Wever, Van Keer, Schellens, & Valcke, this issue; Kagan, 1994; Kollar, Fischer, & Hesse, 2006; Weinberger, Stegmann, & Fischer, this issue). Each student is assigned a specific role – or responsibility – during the group assignment. Scripted roles often comprise a single job, task or duty, as they were originally developed for collaborative learning in primary education (Johnson, Johnson, & Johnson-Holubec, 1992; Kagan, 1994) and applied in Jigsaw (Aronson, Blaney, Stephan, Sikes, & Snapp, 1978) or scripted cooperation (O'Donnell & Dansereau, 1992). *Emergent roles* are roles that emerge spontaneously or are negotiated spontaneously by group members without interference by the teacher or researcher. In other words, individual students' contribution and interaction patterns emerge during interaction with their fellow group members without any role instruction being provided in advance (De Laat, 2006; Pilkington & Walker, 2003; Waters & Grasson, 2007). During collaborative activities the task and individual

orientation towards this task affects how students structure their collaboration, and develop a personal participative style (emergent roles) during online learning activities and interplay with fellow group members (De Laat, 2006; Jahnke, this issue; Sarmiento & Shumar, this issue).

Both perspectives provide a broad conceptualisation of how the concept of role is applied to CSCL. In the next section we will discuss recent CSCL literature featuring the actual use of roles in various contexts. Furthermore, based on this literature we will attempt to build a conceptual framework of the role concept in CSCL research.

Reviewing roles

Our first step towards building a more generalisable framework of the role concept concerned the reconceptualisation of two well-known participative behaviours in collaborative learning and CSCL research: the Free-rider and Lurker. Both are usually regarded as an unwanted side-effect of collaborative learning, and most instructional support (often through scripts) is implemented to decrease free-riding and lurking. Nevertheless, lurking is not necessarily detrimental as "(…) there are many reasons why people lurk in online communities (…) and most important, lurkers are not selfish free-riders." (see Preece, Nonnecke, & Andrews, 2004, p. 201).

Although lurking and free-riding reflect a particular stance towards the product and process of collaboration, and constitute a specific participative pattern, lurking and free-riding is usually not regarded as a role in CSCL research because they are not assigned. Eliminating the perspective that a role is by definition designed and/or assigned, provides new directions for conceptualising roles (see Herrmann, Jahnke, & Loser, 2004). Furthermore, the role of lurking and free-riding, carried out by some members of a group, is *not* directed at carrying out a specific task within the group, an orientation towards role-play that seemed to feature rather strongly in CSCL research (see for example Hara, Bonk, & Angeli, 2000). From the literature review it became apparent

that roles were played at different levels, each having a different impact on the collaborative process in the group. A close inspection of the roles in reviewed studies reveals a large variation in the conceptualisation of what constitutes a role. The granularity of roles appears to differ, i.e. some roles comprise a single task whereas other roles consist of a collection of tasks. In addition, a role can focus on the task at hand, maintenance of collaborative processes, or reflect individual goals that are not relevant for the task or collaborative process (Mudrack & Farrell, 1995). Based on this review we argue for a conceptual framework in which the role concept is categorised in three levels: the micro-, meso- and macro-level. At the micro-level a role consists of a task specifying an activity that is either focused on the collaborative product or process. At the meso-level the role consists of a pattern of multiple tasks focused on the product, process or a combination. At the macro-level the role consists of a stance comprised of an individuals' participative style based on their attitude towards the task and collaborative learning. Conceptualising emergent roles as participative stances at the macro-level, connects prior research on levels of participation to research on roles and signifies that such behaviour can also be the object of facilitation. For example, if we identify a Lurker at the macro-level, we can attempt to influence this participative pattern through specific role instructions at the micro- or meso-level. Table 1 presents an overview of recent CSCL studies that featured our review.

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Insert Table 1 about here

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In the following section we discuss an exemplar article of each role concept, for further reading we refer to articles presented in Table 1.

Role as a task (micro-level): specified activity focused on the collaborative product or process

According to the Merriam-Webster dictionary (2009) a task can be defined as “an assigned piece of work, often to be performed within a certain time”. The (CS)CL literature contains many examples where ‘roles’ are essentially made up of single tasks. This is mainly due to the fact that a) the roles were originally designed for primary education, and b) the popularity of scripting as an approach to structure group processes (Fischer, Kollar, Mandl, & Haake, 2007). A script provides more or less clear operational instructions for the participants on how to act. These activities can be product-oriented or process-oriented.

Hara, Bonk and Angeli (2000) used product-oriented roles by assigning two weekly tasks to students in an online discussion forum. The first task was the role of starter. A *starter* is responsible for initiating the weekly discussion by asking questions related to the provided literature. The second task was the role of *wrapper*. This is someone who summarised the discussion at the end of the week.

Pilkington and Kuminek (2004) used both process and product oriented roles to facilitate the process of student online argumentation. Two examples of their process-oriented roles are *task management* activities: aimed at keeping people focused on the issues discussed and to encourage them to move on; and *balance of participation*: aimed at encouraging and balancing out participation equally between all group members.

Role as a pattern (meso-level): multiple tasks focused on the product, process or a combination

According to the Merriam-Webster dictionary (2009) a pattern is “a reliable sample of traits, acts, tendencies or other observable characteristics of a person, group, or institution”. Role-play in CSCL is often used to structure the collaborative learning process by means of providing a set of instructions on how students can deal effectively with the group task at hand. Instructions can be aimed at facilitating group processes and/or products and consist of multiple activities that

form a pattern of acts exerted by a specific group member.

Arvaja and Häkkinen (2001) used role-play to study the extent to which the students (of two separate schools) were able to share and construct knowledge during a history project. The roles were based on occupational or social roles representing a British and Indian society during the 19th century. The aim of the role-play was for students to study (and experience) imperialism and social status by acting out several distinguished societal roles or occupations. The students chose an occupational or social role and learned about their function and social responsibility before acting them out in the discussion forum. The students composed messages while keeping the perspective of their own role character during that period in history in mind. For example, it was not feasible for a poor farmer to contact a British bishop. The roles played by the students were mostly based on intellectual or organisational positions ranging from a *bishop*, *Hindu priest*, *missionary*, *British officer*, *detective, lawyer*, *physician*, *doctor*, *businessman*, *tradesman*, *railway engineer*, *Indian craftsman* and *servant*.

Role as a stance (macro-level): an individuals' participative pattern based on their attitude towards the task and collaborative learning

According to the Merriam-Webster dictionary (2009) a stance is "an intellectual or emotional attitude". An individual's stance is concerned with the participant's orientation towards the group task, the value that this group task has for the person and the extent to which she/he wants to (or can) engage in this task. This macro-level provides a more contextual understanding of how tasks and patterns at the micro- and meso-level will be carried out by each participant.

Knowlton (2005) proposes a taxonomy of learning based on five levels of participation in asynchronous discussions. *Passive participants*, referred to as lurking, are students who read messages but do not actively participate in the collaborative process. They either do not value or

understand how to engage in collaborative processes. They do not view themselves as constructors of knowledge and adopt a product (not process) view of participation. *Developmental participants* are still actively learning to participate. On a surface level they behave similar to passive participants as they do not yet fully contribute to the collaborative construction process. They tend to focus on social group processes as team building and morale. Their contribution to knowledge building focuses on connections between theory and practice, often thinking in terms of examples rather than abstract constructs. *Generative participants* tend to view knowledge construction as a private and solitary act. Their effort is aimed at earning a grade and the fact that others read their contributions is secondary to this. Generative participants have a narrow understanding of collaboration and often believe that their perspective is superior to those of other participants. *Dialogical participants* become situated as a part of the community of learners. They understand that they can structure the environment to facilitate stronger collaboration resulting in more durable knowledge construction. Dialogical participants are thus not only concerned with generating an individual perspective. Instead they become engaged with seeing how others relate to their perspective. *Metacognitive participants* develop strategies for generating knowledge and monitoring one's own and other's knowledge. They contribute to each other's development of this type of strategies. Metacognitive participants not only consider their own role in the dialogue, but also consider how other participants view their role. They understand knowledge construction as a process of participation and knowledge as being distributed among participants.

Three levels of the role concept

The review of the CSCL literature clearly illustrates the use of roles at various levels to support collaborative learning. Figure 1 illustrates these three levels: role as a task (micro-level),

role as a pattern (meso-level) and role as a stance (macro-level).

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Insert Figure 1 about here

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We have reviewed four studies for each role type (see Table 1). There is an increasing body of research on scripted roles and the interaction between scripted and emergent roles. From the descriptions found at the macro-level it becomes apparent that the 'role as a stance' can have a great impact on the way participants approach and contribute to collaborative learning, as well as how participants execute the (multiple) tasks assigned to them. We believe that the ability to identify and raise awareness about participants' individual stance will increase the groups' (and teacher's) ability to facilitate collaborative learning processes and products at the micro and the meso-level. In this study we contribute to the concept of emergent roles, more specifically 'role as a stance', as they are equally important to understand scripted roles and scripted collaboration, but under-researched. As a first step to further conceptualise the role as a stance in collaborative learning, we present a framework of roles as participative stances. Subsequently, we will discuss empirical examples of these stances.

Roles as participative stances

The conceptual framework portrays eight participative stances. These stances are defined along three dimensions group size, orientation and effort.

The first dimension consists of *group size*: student behaviour in a small group (three to six members) is quite different from that in a large group (seven or more) (Forsyth, 1999). In a small group CSCL setting roles are also frequently scripted, whereas in the large groups roles are more often emergent. Within a larger group, like a community of learners, diffusion of responsibility is

more likely to occur. Similarly, the effect of the participant stances on group efficiency and their ability to collaborate is different within large and small groups. A Lurker in large groups can be tolerated or even go unnoticed, whereas in a small group this person will be missed immediately and jeopardise the group's functioning.

The second dimension consists of students' *orientation* during collaborative learning: a student is either oriented towards individual goals or the group goals. Hakkarainen, Lipponen, Järvelä and Niemivirta (1999) distinguish three learning orientation dimensions of which two are particularly relevant in relation to the proposed framework: the 'autonomy' dimension "stresses students' opportunities to take up leadership roles, develop a sense of personal control and autonomy in the learning process" (p. 265), and the 'grouping dimension' which "focuses on the students ability to work effectively with others on school tasks" (p. 265). The participation by a Lurker is often motivated by individual goals and what they can learn from this community; in contrast, a Free-rider specifically endorses the group's goal (although with the hidden agenda to participate as minimal as possible).

The third and final dimension consists of the *effort* that students invest in the collaborative assignment. A Lurker usually invests a limited amount of effort (for a variety of reasons as is apparent from the review) in the group task and the contributions are mostly product-oriented, whereas other group members may invest a lot of effort in the group task; often this is reflected by a process and product focus and a genuine concern for the group's progress and well-being of group members. It should be noted that effort is not the same as impact, meaning that even a group member with few contributions can still be very influential. Nevertheless, effort is relatively easier to determine than impact. Considering the three dimensions, eight participative stances can be defined (Figure 2).

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Insert Figure 2 about here

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The top half shows participative stances for a small group and the bottom half for a large group. On the right side are the group-oriented roles, and roles with individual orientation are on the left side. Each quadrant is divided in a low versus a high effort. The horizontal axis serves as a mirror for the comparison of small and large groups, for example a 'Captain' in a small group has the 'Pillar' in a large group as its mirror image. These two roles represent the more active and social responsible learners in the group. In the literature review these roles were typified as social participants and active learners (Bento, Brownstein, Kemery, & Rawson-Zacur, 2005), as dialogical participants and meta-cognitive participants (Knowlton, 2005), and dialectical and emphatic interlocutors (Berzsenyi, 1999). Our conceptual framework also contains two roles frequently used to typify behaviour – 'Free-rider' and 'Lurker' – but in line with Preece et al. (2004) we do not regard these roles as synonyms.

The role of the 'Free-rider' in a small group has the 'Hanger-on' as its mirror image in a large group. Both have a strong interest in the group task and need the group to accomplish their goal. The 'Free-rider' contributes to the group task when explicitly prompted but minimises the effort as much as possible; often leading to substandard contributions. The 'Hanger-on' is also actively engaged the group process, but contributions are limited and connected to their own experiences. They are typified by Knowlton (2005) as developmental participants, and by Bento et al. (2005) as witness learners.

In addition, there are the roles of 'Lurker' in a large group and its mirror image of 'Ghost' in a small group. Both can be typified by non-participation (Hammond, 1999), or as missing in action

behaviour (Bento et al., 2005). In a large group the impact of students contributing less effort to a group task will not be very strong as long as there is a core of students investing a high amount of effort, whereas the impact of students with a low amount of effort (or even no effort) will be much stronger in a small group.

Finally, the conceptual framework shows the roles of 'Over-rider' in a small group and the mirror image of a 'Generator' in a large group. Students occupying these roles strive to realise personal goals rather than a group's goals and will invest considerable effort to direct a group towards their personal goals or make them a prominent part of the group goals. The generative participant as proposed by Knowlton (2005) and the hierarchical interlocutor (Berzsenyi, 1999) are both to some extent examples of this kind of behaviour.

The degree of rigid role behaviour is expressed by the gray-scale colouring. In the outer ring participants are strongly acting according to a stance and exert a high influence on the group as a whole. In the middle ring there is still a difference in their main orientation – "I" versus "We" (which are important identifiers of participants' orientations; Trausan-Matu, Stahl, & Sarmiento, 2006; Tuomela & Tuomela, 2005) signalling differential positions during collaboration.

Method

The data concerns asynchronous CSCL in higher education. The samples are drawn from two previously collected datasets – one where students collaborated in small groups (Strijbos et al., 2004) and one where students collaborated in a large group (De Laat, 2006) – to illustrate the viability of the participative stances.

Participative stances in small groups

The analysis is based on group communication of students who participated in a master's course on policy development (PD) or local government (LG). Students in both courses

conducted the same group task, worked in groups of four students and communicated via e-mail during the course. Their task was to collaboratively write a policy report regarding reorganisation of local administration. The current data-analysis focuses on the unscripted groups that received no role instruction (and used as control group in Strijbos et al., 2004) to identify emergent participative stances. The data for small groups was derived from two out of five nonrole groups and they will be referred to as PD 5 and PD 7. The students will be referred to by their initials. Each quote from the messages will show the time stamp given by referring to the Beginning (B), Middle (M), or End (E) of the collaboration (each representing one-third of the collaborative process).

Participative stances in large groups

The analysis is based on group communication and critical event recall interviews of students who participated in a Master's Programme on E-Learning (see De Laat, 2006; EQUEL, 2004). The programme establishes a 'research learning community' among the participants and tutors in which activities are undertaken around five workshops over a two-year period. The students work in large groups ranging from seven to ten members plus the tutor. During the course participants become engaged in collaborative learning and tutoring as they support each other in a wide range of structured activities (McConnell, 2000). Here, tutoring processes are not the exclusive domain of the designated tutors and may be undertaken by students as well (Gartner & Riessman, 1993; De Laat & Lally, 2003).

The data for large groups was derived from two out of eight groups (four in cohort A (CA) and four in cohort B (CB), and will be referred as 'Group 1, CA' and 'Group 1, CB'. The teacher of both groups was Brian, and the students will be referred to by anonimised names used in De Laat (2006). Each quote from the messages will also show the time stamp given referring to the

Beginning (B), Middle (M), or End (E) of the collaboration (each representing one-third of the collaborative process). Data from critical event recall interviews is provided to further illustrate these roles – this includes reflections on participant behaviour by the teacher and other members of the group.

Analysis

During the first analysis step all transcripts of all groups in one of the two courses were read by the principal investigator who had collected that data. Simultaneously, transcripts were split to create separate overviews of contributions by group members, to identify typical behavioural patterns. During the second step all messages containing student behaviour associated with a participative stance were marked. Subsequently typical messages and patterns were reviewed by the principal researcher who had not collected the data, to determine whether a specific participative pattern was recognised by both researchers and to ensure that a participative stance is not reflected by a single message, but in fact, persistent and consistent throughout the entire collaboration. During the final step of the analysis the individual behaviour patterns were again compared with the entire transcript to validate the participative pattern within the context of the group and the collaborative learning process.

The data display in the next section consists of exemplary cases to illustrate typical behaviour of students exerting these stances. Participative stances will be presented as a summary followed by a narrative interspersed with representative excerpts of the transcript.

Eight participative stances

We will first present the summaries and narratives for the small group participative stances of ‘Captain’, ‘Over-rider’, ‘Free-rider’ and ‘Ghost’ followed by large group participative stances and narratives for ‘Pillar’, ‘Generator’, ‘Hanger-on’ and ‘Lurker’.

Captain

A Captain is a person who invests a lot of effort in the collaborative task. The Captain has a strong orientation towards the group and tries to manage and facilitate the collaborative task with the group in mind. A Captain aims to bring the group together, keep the group on track and enforces deadlines, aims to find consensus in the group about how to approach their task – but at the same is not afraid to assign tasks to other group members. Often the tone is positive and contributions span more than simply a focus on work aimed at group building or socialising. Usually a Captain does not start off with the ambition of becoming one – although the potential is visible early on during the collaboration as reflected in the following message:

I received the mails by G. and N. and I agree with the proposals. I am sending this mail in between other stuff. I have today (Monday) two meetings and a nightshift so I cannot discuss further agreements right now. N., we are group 1. Will you give a quick suggestion for next week? As of tomorrow I am available for further task division. [PD 5, Ve, B]

After some time – when confusion about task division creeps in – and progress appears to stall, a Captain will slowly take charge by first trying to get a clear picture of where the group stands.

I agree with the comments on the proposal, but I still assumed that we had made an agreement during the practice assignment on how we would handle both assignments. Group 1 N. and I made a first draft of the report and then group 2 would finish the draft which would be checked again by group 1. I believe this is still stuck in phase two. For the test assignment we would reverse the lot and to my knowledge we are still in the first phase of that. It is a pity that things changed without any consultation. If I missed that I apologise. I thought we had made good agreements and was still waiting on the final report of the first phase by M and G. If we are going to do it different that is fine by me, but let's be clear about that. If you now expect me to make the first draft for the test assignment I am afraid that I cannot guarantee that it be finished by February 1st. Besides my study (which does not consist of

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this course solely) I have a family, a 36 hour job and I am a member of the city council. I am willing to try my best to deliver on that date, but don't get on my back if I am a couple of days late. [PD 5, Ve, M]

This well-intended message to structure the collaborative work actually had the outcome that the Captain did most of the work in the end and had a lot of problems to get the others involved.

As agreed it would be the turn of N. and I to work on finalising our report. I have worked on it for some time, but I have not made much progress in comparison to the last time. I mailed you last time that I was rather stuck because the additions to open chapters actually only result in repetitions of text. As of yet I have not had a response from anyone. I think that anticipation also means that we give each other pointers so that we can make progress. I am starting to feel upset about this. On February 8 I already sent it out. I made some time available in the next weekend. If we put our shoulders underneath it we will make it ????? [PD 5, Ve, E]

Over-rider

An Over-rider is a person with strong individual learning goals and tries to push the other group members into adopting his/her agenda or proposals to approach the group task. They often kick-start collaborative activities, but during the project they will also frequently refer back to previous proposals by themselves that were not taken up by the group – hoping the group will act on their proposals after a second pass (or even a third pass). Because of their personal interest in the project they often devote a lot of effort and time to the project. An Over-rider starts with setting the stage for the final product and stimulates a focus on the group product.

I do not think that it matters what your point of departure is. In essence we have to write a policy report for the county Oost-Dammerdam. A quick scan of three sites (BiZa, prov. Noord-Brabant and prov. Utrecht) revealed that there are more recent articles on the site of Brabant compared to Utrecht, since in Utrecht reorganisation of local administration is finished. In Brabant it is still ongoing. Whether this is a correct line of thought I do not know, but I am sending this message CC to our supervisor so they can respond to this omission. With respect to the study

assignment I agree. Concretely this means that everyone collects pros and cons before March 27 after which these are exchanged to further discussion. [PD 7, Ro, B]

After a while the Over-rider takes a leading role in the composition of the group's product:

Attached is a first draft with respect to the policy report to be written. I propose that we all put additions in this document with our name behind them so we know who wrote what. I simultaneously added a short introduction. When we have a draft version of the entire report I am willing to do the final layout and formatting. I am now still busy with digging through paragraphs 2 thru 9 of part 4 of the knowledge domain of policy development. In my opinion this is a case of a 'wicked problem' and the problem definition should be addressed from this angel. It is unclear to me, however, whether you are supposed to incorporate the knowledge from the knowledge domain literally in the text (including references) or that you simply write down the problem and the solution as I am used to do with my current employer. Since R. left our group it is not clear to me who is next to work on our task, consult please. [PD 7, Ro, M]

The Over-rider is also concerned with the progress; however, in contrast to the Captain, the Over-rider is concerned with the product and not so much with the collaboration or social climate and messages are characterised by the frequent use of "I":

Attached the rough version of the entire report. I elaborated on the recommendations. I am only missing a bit of 'body' with the local support analysis. I put some remarks about that in the text. Can we discuss this through mail during the next week so we can convert this to a good running text. With respect to the recommendations: We have described a goal, test the recommendation for yourself again to this and reply. If we get this done this week I can start with the layout next week. [PD 7, Ro, E]

Free-rider

A Free-rider is a person who has a strong interest in the task with the intention to get the most performance benefit (a high grade) from the group task with as little input as possible. Especially in relation to deadlines or tasks a Free-rider is usually quick to respond that she/he will do the

task “tomorrow” or “somewhere in the very near future”. In some cases pressure by the other group members can force a Free-rider to participate to some degree, but their participation will still be lower compared to that by fellow group members. A typical way for a Free-rider to set the stage would be the following message.

Because of work I cannot respond to questions immediately. At the moment I am travelling a lot. I have a job with a high responsibility, that is why. For your information I am Lead Engineer Mechanical. Anyway, I appreciate that you keep us so well informed en that you have done extremely much of the preparatory work. In addition I inform you that I am catching-up with other courses because they are no longer available or expire in the near future. As soon as I have more time in my schedule I will invest more time in our group task. I hope I informed you enough. [PD 7, Ka, M]

There is a strong emphasis on external factors (i.e., work and other courses) to make a claim for a special treatment. Most striking in this example is the emphasis on the ‘importance’ of the job as to provide more credibility to this claim. At a later stage, the Free-rider promises to do his/her part and appeals to the group in a flattering and complimentary way.

I will have to put something on paper during this weekend. It is a nut-house at work at the moment. I feel obliged to contribute with respect to the group task. Anyway, I appreciate a lot how you guys give me some space. [PD 7, Ka, M]

The Free-rider also has the perception that the fellow group members provide additional space for him/her to contribute when ready. Reviewing the entire transcript actually shows the complete opposite. The other group members, and one student particular, are constantly urging the student to finally do what she/he promised. Halfway the collaboration a fellow group member is no longer able to tolerate this lack of participation and sends an e-mail with only one phrase in bold red font “Where are you !!!”. Interestingly, this Free-rider responded a little over

one hour after a request for the student identification number that appears on the report. In the end, the group had to revise their product. Again, the Free-rider promised but failed to deliver:

I will work on the local support analysis. [PD 7, Ka, E]

To be honest: no. Reason, because of vacation of colleagues a lot of work is put on my shoulders. In Week 33 I will be on vacation for two weeks. I will finish the analysis before that time. [PD 7, Ka, E]

Thanks P. for giving a bit more body to the local support analysis. I have no further comments or suggestions. For your info R., I will be on vacation in week 33 and 34. [PD 7, Ka, E]

Finally, when asked about their experiences with the group task it is striking that the Free-rider appears to view the entire process quite differently than the fellow group members. Two explicit Free-riders (one discussed here) both rated their group process as a positive experience, whereas all other group members reported a negative experience.

Ghost

A Ghost is a person who has strong individual learning goals, but is very passive – i.e. close to non-existent – during most or the entire collaborative process. Whenever she/he contributes to the collaboration it is very likely to be unrelated to the discussion. His/her contributions are a reflection of his/her own interests and problems, and not connected to the group task. Below a message by a student after three weeks into the collaboration:

Here finally a mail from me. My provider erased all my messages and I could not access the university network. This is all very inconvenient. Fortunately everything is now solved. I think it is a good idea to exchange pros and cons on March 27. I think it is important to compose a problem definition when we continue with the assignment. It is the basis for everything anyway. Perhaps it is an idea that I will work on the problem definition after March 27 and then send to you for comments and suggestions. [PD 7, Kn, B]

Followed by a month long silence and then this message was sent:

My apologies that you have not heard from me in a while. We only recently heard that my wife is seriously ill. This puts a strain on the family. This makes it no longer possible for me to continue my study at the OUNL. This means that I will not be a part of the group anymore. I understand that this will be a problem with the schedule and such. I still hope that you will understand my decision. I wish you the best of luck with the assignment. [PD 7, Kn, M]

Similar to normal classrooms there is a lot more going on than what is communicated directly. In this case the family issues were the major trigger on top of all the technical problems this student experienced, and direct communication with the supervisor also revealed that she/he did not have any experience with e-mail (let alone online communication) prior to the course.

Pillar

Moving to the large group, a Pillar is a person who puts in a lot of effort in the collaborative task. However instead of being driven by personal goals the Pillar has a strong orientation towards the group and tries to manage and facilitate the collaborative task with the group in mind. The Pillar is aimed at bringing and keeping a group together, tries to involve everybody and make sure that there is consensus in the group on how to go about their task and the learning goals. Often the tone is very positive and contributions span more then simply a focus on work and also aimed at group building or simply socialising.

The message below clearly indicates how Andrea tries to bring together the voices of other group members as a way to reflect on the group's task. Andrea's style is not to come up with conclusions or making decisions on behalf of the group, instead Andrea keeps responding with questions to the group or individual participants:

Hope you had a good time this morning. I'm looking forward to getting a view of the transcript. Until then I've got some burning questions from reading the most recent messages: Brian says "You could either develop a notional course in the intranet for example and do a guide (might be a large task for this project) or you could just explore

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the different features and facilities to produce a guide to teaching and learning generally within that environment (then your discussions might centre around which aspects and how to present them etc)" - I would be more interested in the latter. Perhaps we could take one feature each? Katie mentions "and would this guide be paper or computer based so that you follow it on screen after logging on to the site" - could it be both? When I'm starting something new I welcome paper guides (something to cling onto!) and when I feel more confident then I welcome on-line support. Charles says "What's interesting about this is managing the process of migrating between interconnected and interlayered virtual spaces without blurring our focus or losing track of the process" - you've lost me there Charles. It sounds interesting though! Hope I haven't picked up the wrong end of the stick with any of these comments/questions. [Group 1, CA, Andrea, B]

In the example below Andrea supports Charles's proposal but at the same tries to open the floor to the other members to check what they would think of this approach.

It's really good that you are helping to get us started with your proposal. The idea of exploring a readily available tool sounds interesting and useful - are they freely available? If so is there any place we can look at them? [Group 1, CA, Andrea, B]

Similar in the next message.

I've visited the site and it looks excellent - I immediately want to use the s/ware in other areas of my life! I like your idea Felicity of a site with the theme of learning and teaching. Using this as a subject I think we would all have lots to contribute from our different perspectives. [Group 1, CA, Andrea, M]

The critical event recall interviews for Andrea indicated that she was concerned with learning (i.e., the group's task and her own learning) and tutoring (i.e., the facilitation of group processes). Andrea's contribution to the group remains high throughout the entire period they were working on the group task. Although new to this way of learning and working, Andrea showed a rapidly developing awareness of the characteristics, contributions and needs of others in the group, and recalled:

"I was constantly checking."

"Charles offered a lot of technical assistance."

"Pauline needed time to think."

"Katie was struggling to find a voice online, and was struggling with the technology and family responsibilities."

"I was aware that we were pulling it together with Bill's help."

Andrea was also very conscious of her own learning and online behaviour:

"I learned to just 'go with the flow' and trust the group, and I learned this from watching the group process, to let it happen and go along. I think we learned to work together and listen to each other, and take ideas from each other. Each contributed in different ways."

The teacher recalled Andrea as a …

"… strong figure, and possible counter-figure [to Charles]; the great thing about her was that she was not only participating, but she was offering help as well, still being supportive and considerate of Charles's view, but offering a wider possibility."

"I really felt like Andrea was almost doing a holding thing on Charles as well. Saying that, there are other possibilities. Partly as a slight counter against Charles strong direction, and again just to buy time for the others."

Generator

A Generator is a person who has strong individual learning goals and tries to use the enthusiasm of other group members and the community recourses to focus the group's attention on his/her learning goals or problems. They often kick-start collaborative activities or jump right in making proposals about how to do things and what to focus on. Because of their personal interest in the project they have a lot of energy and time to devote to the project.

Below is an early message posted by Charles to the group, with a first proposal to activate the

group and make some initial arrangements and agree on the task ahead.

How does Fri morning 9.30 - 10.30 sound for a chat? I've looked at the messages already posted in NLC1 and I feel that Friday will be the earliest we can meet in the Chatroom. If F is not to be excluded it will need to be a morning session. If Friday morning is OK, perhaps we should prepare for the chat session by attempting, between now and then, to choose, from the list offered, the general topic for our project and, if possible post some ideas as to how we might proceed. Perhaps we could decide in advance how the issues of substance that will arise will be decided on and shortlist the type of issues that can be dealt with in the chat-room. During the Chat we could discuss "housekeeping", the day-to-day organisation and the 'who will do what, when, where and how' issues. It's my personal opinion that the chat has some shortcomings when it comes to working through more complex problems. Hi Brian Are we allowed to use conventional e-mail or other internet tools in this project? [Group 1, CA, Charles, B]

This message is followed by another message that same day making further, more detailed, suggestions for the group task.

I apologise if I seem to be jumping the gun a bit but I think it is easier to focus on the task of formulating a proposal if there is something on the table that can be replaced or amended. That's the purpose of this draft. It is a combination of the first two mentioned in the list of possible topics. I've recently become aware that there exists on the Internet highly sophisticated and really simple to use tools which, with a little work, could be turned into wonderful support tools for anybody attempting to establish a networked learning environment. I believe that they would be particularly useful for teachers/trainers who may lack the technological skills to design and build such resources themselves. I believe this can be achieved within the time allowed, but I'm not sure whether it's substantial enough as a task for this workshop. Please feel free to bin this if you don't think it's what we should be doing as a group. [Group 1, CA, Charles, B]

A couple of days later Charles continues to coordinate the group's activities.

Felicity has offered to set up the site. If there's no objection, then I suggest that she goes ahead and does that. Once

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the Intranet has been registered, Felicity simply uses the "Invite others to join" facility to get the rest of us signed up. Once that step is complete, we then use the tools inside the Intranet to begin researching our guide. What's interesting about this is managing the process of migrating between interconnected and interlayered virtual spaces without blurring our focus or losing track of the process. It should be fun. [Group 1, CA, Charles, B]

Critical event recall interviews with Charles and the teacher on their contribution to the group, the emerging role and teaching and learning strategies reveal that Charles was a very active person at the beginning of the collaborative task, however this reduced in the middle phase, resulting in a low contribution at the end of the task period. Charles was apprehensive at the beginning, but keen to have his ideas taken up by the group:

"At the very beginning of the project I was apprehensive about how it might take off. I was quite pleased that my proposal about the intranet resources was taken up. It received a positive reaction from the rest of the group. Now we had something on the table. I enjoyed this workshop enormously."

Charles showed a very strong task focus throughout the workshop:

"I wanted the process in Workshop 1 to create the solution to the problem I was having in my work."

The teacher remembered Charles as a very active student (especially in the beginning) but seemed to have a strong personal idea about the task:

"Yeah, well, Charles seemed to me very task-oriented. He seemed to be a do-er. He seemed really like he didn't want to think about it or talk about it: 'I have got this idea and I really want to try and implement it together'. And he really struck me as that; he was very active but as soon as it came to the discursive side of it he disappeared."

"He is a very procedural person, and he had lots of clear ideas and experiences but he did not want to get into the dialogue overtly, apart from 'how do we get this done?'"

"The other thing was that I felt that Charles was concerned to get the task done, to get the group on board, and to

get everybody active."

This matches the individual participation pattern for Charles: high involvement in the beginning, to start up the project. Later on, when the community was in 'motion' and started to reflect on their task, as the teacher recalls it, Charles became less involved.

Hanger-on

A Hanger-on is a person who has the intention to make this group task work and aims to put in his or her fair share, but for some reason this does not get of the ground as intended or she/he is struggling with online learning in general. This can result in dealing with information backlog, making promises and making just about enough contributions to the group task to stay on board. In some cases Hanger-on behaviour is legitimised in the group, after it has been discussed and some form of participation has been negotiated.

In most contributions by Katie there is some sort of indication that she is having difficulties with learning in this way. Katie keeps on making contributions, doing the best she can, although Katie's contributions kept on reducing to almost zero at the end of the course.

The pressure is certainly on now - and yes as I was writing the Task/Group/Individual contribution I was a little worried about its length so I don't mind your suggestion at all. I am experiencing the same thing with my Section 1 and have completed just over half of it. Again it is looking very lengthy and I think I may need to condense it. The section alone on types of purposes for a group has a discussion thread analysis which in itself is long. I now realise that I was too ambitious with the areas I included and will have to shorten it somehow. I have certainly learnt a great deal from this part of the project and feel that it will enhance my future contributions. Before the intensive reading around organisational theory and collaborative learning I was a little unsure about my knowledge base - I feel a lot better now. From the analysis of the discussion threads I have learnt a great deal about our group members in terms of their wonderful motivation and support network. I certainly think that we have made tremendous strides in the past few weeks in terms of building a learning community. [Group 1, CB, Katie, M]

The other group participants acknowledged Katie's struggling to some extend and assured Katie that her contributions are welcomed and appreciated.

Thanks very much I am currently finishing off the work requested by you and Andrea and then I hope to start analysing the early and late chat shows. Thanks for the offer of assistance - I shall certainly take this up.

At last my Section 1 on The Purpose of the Group. I hope it is okay. I will also now be able to get around to reading both your sections with a lot more care. [Group 1, CB, Katie, M]

The teacher recalled some observations about the low level of participation of Katie:

"It doesn't surprise me in some time senses, because she had difficult personal circumstances. So that could have contributed to it."

"Her model of the experience to come was possibly of a more directive nature, so it was a struggle then to accept a new mind-set, of knowledge being distributed amongst themselves."

Lurker

This is a person who is very passive during most or the entire collaborative process. His/her contributions often contain false promises or they reflect some problems that she/he had in the past, aimed at apologising for a lack of commitment to the group. In most cases, however, the Lurker has a vested interest in staying onboard with the group task – mostly for personal learning gain – but their participation is very minimal and consists of reflective comments rather than contributing new knowledge. In this example Mort starts off by mentioning scheduling issues:

Just wanted to say that this week is really hectic for me. exams. end of term. Christmas parties, etc. I won't be able to get too much work done. Will be on it at the weekend though. And next week will be much better. will definitely get some serious work done then. talk to you soon [Group 1, CB, Mort, M]

Followed by a message with some reflective comments, but not really adding something to the

task that the group is working on.

Thanks for your ideas, and sorry for not getting back to you straight away. The structure seems quite good. We'll probably have to define it a little more as we go on. My initial reaction is that the first two points you mention would be the basis for our research (problems/advantages) and point three (overcoming problems) would be more what the final product would be as the format should be advice for a new online tutor (the 'starter pack' idea). Obviously referring back to the problems and advantages we researched. Is this how you see it too? Well, these are my ideas for now. Haven't had time to read your suggested readings yet. Hope to get that done tomorrow. [Group 1, CB, Mort, M]

Later on Mort announces that he is in Italy for a vacation and – sadly – is unable to contribute to the group project:

Thanks for your reply Mary. A very happy new year to you too. I am still in Italy and it is misty and cold as you well remember. I am near Venice. They really do have four extreme seasons in northern Italy. It's a real pity I can't contribute anything. You have all done excellent work and I feel totally out of the swing of things. Is the final report that what A posted in message n. XX? If so, it does look like it needs to be corrected for typos etc. Do you not agree? Also, I was wondering, how is the final product actually going to be presented? Will the ppt be something extra to the report or will there be links to it? Will it be an online document? etc. Have you discussed all of this? Thanks for taking time to reply to my message. All the best for 200x [Group 1, CB, Mort, E]

In response a fellow group member jumps in to make clear that some communication about this event would have been appreciated:

Hi Mort, First of all I wish you a happy New Year. I am glad to hear from you finally, but I have to say that I would be happier if you had sent a message earlier. What I mean is that for a very long time, while I had been working for Subtask 3, I sent messages, waiting for some kind of cooperation from you and received no answer, that made me really very anxious, since I did not know what to do with the subproject, that we were supposed to work together: go on or wait for your participation too. Well it would be easier for me if you had sent a simple message earlier

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informing me that you would go for holidays to Italy and would not be able to contribute, so as not to wait for you and stress in vain. I accept your apologies and sorry if this message of mine is a little "hard", but I had to express my complaints and how embarrassing it was for me to talk to the vacuum, especially in a period that we had to meet with certain deadlines. As to you proofreading the final work, I agree with all the others. This would be a useful thing to be done in this phase. [Group 1, CB, Anka, E]

To which Mort replies:

No. you're not hard enough. You are right a short message would have been enough. I actually thought I would get around to contributing but everyday seemed to end up with some other commitment coming up. Again, huge apologies for not keeping in touch and thank you for being so honest, I appreciate it. I will look over the report today for any errors and post it asap. [Group 1, CB, Mort, E]

In a later message this is followed by apologies for his lack of contribution and appreciative comments as to the work by the fellow group members so far. At this stage of the group project he proposes ways in which he can still contribute to the group project, but also mentions being uncertain about what to do and the suggestions are not definite. Finally in the end, one fellow group member is very explicit about his/her expectation of what Mort can possibly still contribute the current project.

Nice to hear from you. Happy 200x to you. I'm glad you enjoyed Italy so much. I spent several Christmases there and I remember the cold misty Christmas morning in Milan. Please allow me to butt in here, as I see it the project is practically finished. Perhaps you could work on the next project from the beginning. [Group 1, CB, Mary, E]

Discussion

In line with the increased interest in the role concept to facilitate and evaluate CSCL, this research first presented a literature review on the basis of which the conceptualisation of roles was synthesised as multiple levels of participation: micro (role as a task), meso (role as a pattern)

and macro (roles as a stance). The macro-level was further conceptualised as participative stances: student activity that can emerge in any collaborative process along three dimensions (small group versus large group, an individual orientation versus a group orientation, and high effort versus low effort invested in the group assignment).

Data derived from two authentic asynchronous CSCL courses were analysed to illustrate the viability of the participative stances (macro-level). We argue that our analysis provides support for eight participative stances that students enact consistently throughout the entire collaborative process. Summaries were constructed for each participative stance and narratives were applied to illustrate how the students enact these stances (and to some extent how the stances are perceived by fellow group members).

It should be noted that it is fairly easy to label certain roles as negative or positive. For all the roles it is important to keep in mind that when enacted in their extremes they will have a strong impact on the collaboration. A Lurker does not necessarily have a negative impact, as long as a Lurker does not make promises that she/he is later unable to keep (if she/he is unable to keep a promise the Lurker becomes more similar to a Free-rider in that sense). A Captain is not always positive, because the strong commitment to the group and subsequent enforcement of deadlines can also become too authoritarian (in that sense the Captain becomes similar to an Over-rider). In sum, when enacted in their extremes these roles are sure to affect the collaboration, but whether this is positive or negative depends on the dynamics within the group. Nevertheless, the impact of a group member performing rigidly to either one of these roles is stronger in a small group as compared to a large group.

It should also be borne in mind that student role behaviour can change over time (De Laat, 2006). During the collaboration a teacher might show a representation (visualisation) of role

behaviour which may trigger certain students to adapt the behaviour towards the groups (e.g., from a Lurker to a Pillar, or from an Over-rider to a 'We' orientation). Furthermore, roles – regardless of the level (micro, meso or macro) – are not exerted in isolation but they are interconnected with the roles that other group members play. One can say there is a kind of creative tension between them, the presence of a 'Ghost' in the group might lead other group members to start acting more as a 'Captain' to coordinate the group work more effectively. The execution of any role by individuals affects the behaviour of other participants. If there is a leader (s) there will automatically be followers, but this not necessarily causal by definition; there are also, for example, natural born Pillars or 'soft leaders' (Hmelo-Silver, Katic, Nagarajan, & Chernobilsky, 2007).

Nevertheless, several participative stances share some behaviours and statements. The Lurker, Hanger-on, Free-rider and Ghost appear to suffer more than other group members from practical issues, such as local elections, computer and Internet, family and social issues, unexpected tasks at work, etc. This coincides with the quiet learner and non-participant as suggested by Hammond (1999). The Free-rider and Lurker share a long delay between their contributions. The Hanger-on and the Free-rider share 'the promise of tomorrow', which coincides with the developmental participants (Knowlton, 2005), and they place an emphasis on belonging to the group (more so than the Lurker and Ghost). The Captain and Pillar share their focus on the progress of the group and maintaining a positive social climate (see Knowlton, 2005 and Bento et al., 2005). Finally, a Generator and Over-rider are both strongly focused on the group product. Although, the Over-rider likely continuously repeats his/her own proposals or position, whereas the Generator will introduce many ideas without putting his/her own ideas on the forefront all the time.

Limitations and future research

The analysis is based on a small number of groups in two datasets. Although the analyses reveal to a reasonable degree the existence of participative stances, further validation using other datasets is required. In addition, an audit procedure can be organised to validate the results of the present analysis (Akkerman, Admiraal, Brekelmans, & Oost, 2008). Both issues specifically relate to the 'Ghost' and 'Lurker', as their participation is very low, making it difficult to gather substantial data for an accurate description.

Furthermore, these participative stances are not intended as a means for assessment of group behaviour. Rather, they can be used to assist teachers and students in recognising certain patterns in group member behaviour and enable them to respond to these behaviours. It is crucial that a teacher communicates with students that are missing in action early in the group task – i.e. the 'Ghost' and 'Lurker' – in order to understand their needs (Bento et al., 2005). The stances can also make the behaviours visible for the group, enabling a particular student and his/her fellow group members to sort out the problem by themselves (e.g., the Generator or Over-rider is likely to overpower other group members and some reflection on each group members' participation might result in a more even level of contribution). Such an empowerment could stimulate both self-regulation and group regulation, and enhance student motivation.

Overall, we think that our framework to conceptualise roles as multiple levels of participation provides new opportunities for research on roles in CSCL. In particular, the participative stances provide a framework for meaningful description of student behaviour and enhance the teacher's and a group's awareness of systematic behaviour by individual group members, which may lead to changes in individual participation to group tasks.

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Table 1. Literature review of roles applied in CSCL.

Study	Scripted (S) or emergent (E)	Roles	Product (Po), process (Pr) or combination	Type of role
Berzsenyi (1999)	E	Agonistic; Hierarchical; Dialectical; Emphatic	Pr	Macro: Stance towards collaboration in the group
Hammond (1999)	E	Communicative learner; Quiet learner; Non-participant	Pr	Macro: Stance towards collaboration in the group
Hara et al. (2000)	S	Starter; Wrapper	Pr	Micro: Role consists of a single task
Arvaja & Häkkinen (2001)	E	Occupational and societal roles in 19th century Brittan and India	Pr	Meso: Role consists of multiple tasks and behavioural preferences
Pilkington & Kuminek (2004)	E	Task management focus; Challenge; Elaborate/explain; Nettiquette police; Balance of participation; Encourage through feedback;	Po & Pr	Micro: Role consists of a single task and behavioural preferences
Bento et al. (2005)	E	Missing in action; Witness learners; Social participants; Active learners	Pr	Macro: Stance towards collaboration in the group
Knowlton (2005)	E	Passive participants; Developmental participants; Generative participants; Dialogical participants; Metacognitive participants	Pr	Macro: Stance towards collaboration in the group

Table 1. Literature review of roles applied in CSCL (continued).

Study	Scripted (S) or emergent (E)	Roles	Product (Po), process (Pr) or combination	Type of role
Weinberger et al. (2005) – study 1	S	Analyst; Constructive critic	Po	Micro: role consists of a single task
Strijbos et al. (2004, 2007)	S	Project planner, Communicator; Editor; Data collector	Po & Pr	Meso: role consist of multiple tasks
De Laat & Lally (2005)	E	Discussion manager; Process manager; Content manager; Knowledge manager; Technical manager	Pr	Meso: role consists of multiple tasks and behavioural preferences
Ertl et al. (2006) – study 2 & 3	S	Explainer; Listener	Po	Micro: Role consists of a single task
De Wever et al. (2007)	S	Starter; Moderator; Theoretician; Source searcher; Summariser	Po & Pr	Meso: Role consists of multiple tasks and behavioural preferences

Figure captions

Figure 1. Synthesis of roles in terms of a micro-, meso- and macro-level.

Figure 2. Eight participative stances.

Figure 1

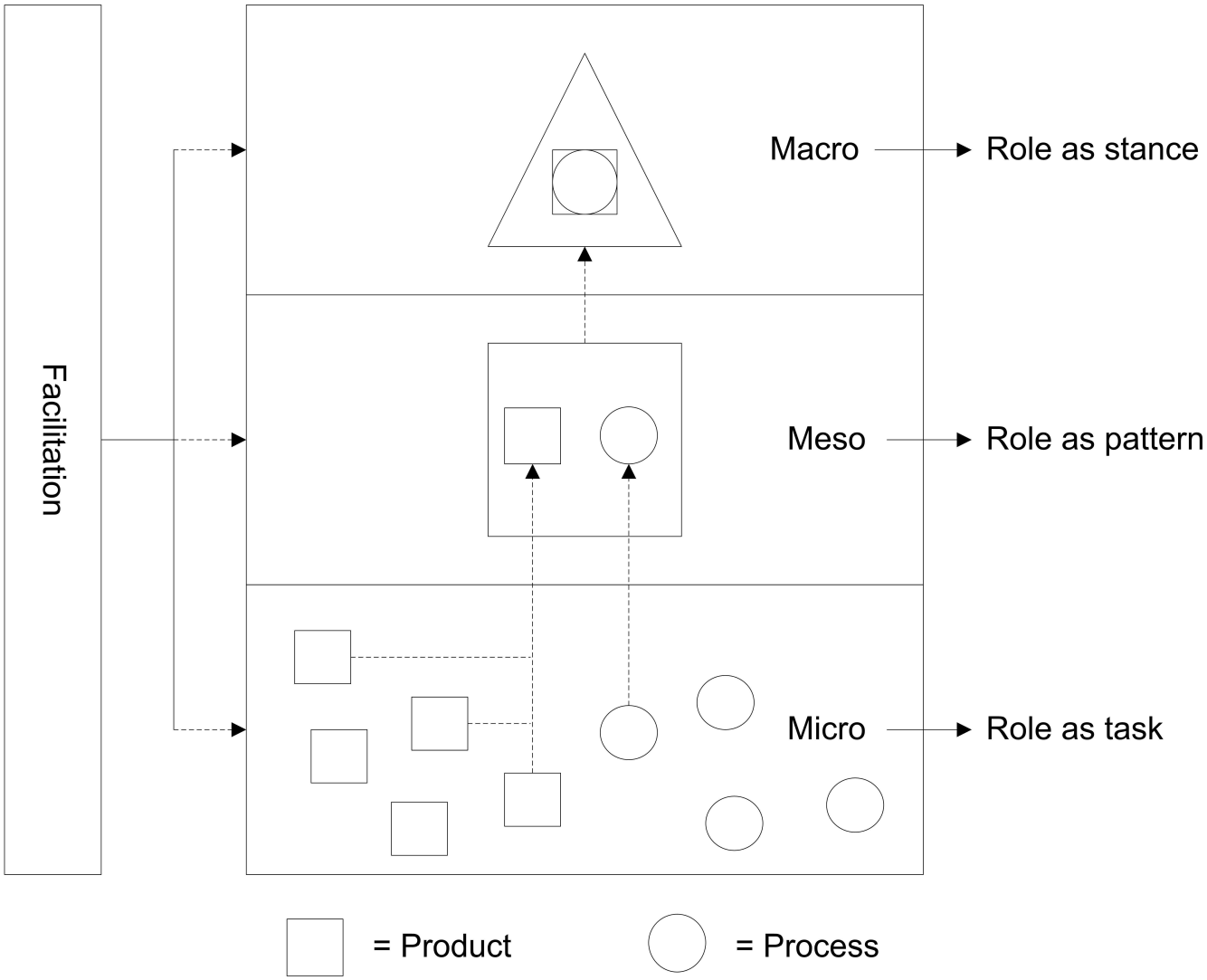
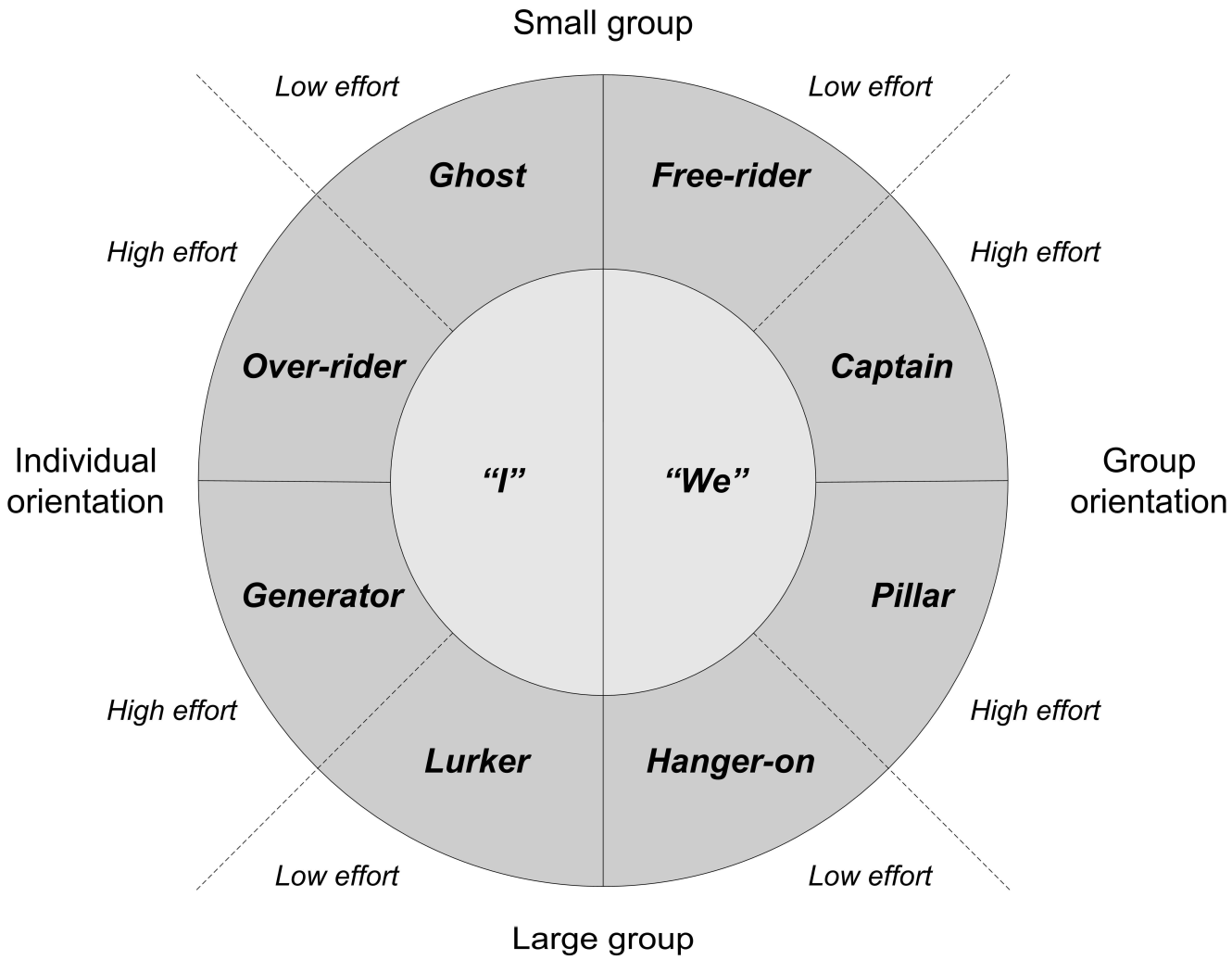

Facilitation
Macro
Role as stance
Meso
Role as pattern
Micro
Role as task
= Product
= Process

Figure 2


Small group
Low effort
Low effort
Ghost
Free-rider
High effort
High effort
Over-rider
Captain
Individual orientation
"I"
"We"
Group orientation
Generator
Pillar
High effort
High effort
Lurker
Hanger-on
Low effort
Low effort
Large group