Identifying a transition period at the midpoint of an online collaborative activity: a study among adult learners

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Abstract

This case study describes the group development in an online learning group. Adult learners enrolled in a MBA partially delivered at a distance were observed during fifteen weeks to better understand the group development of an online learning group. Both qualitative and quantitative methods were used to capture the dynamic of social interactions within the group and some affective reactions of members. The results revealed a transition period at the midpoint of the collaborative activity showing a decline of task-oriented communications, motivation and positive mood from this period. Results were discussed through models of group development validated in face-to-face environments. Some implications were proposed to facilitate online activities in computer-supported learning groups.

Keywords: Group development; Computer-supported collaborative learning; Computer-mediated communication; Online facilitation; Lifelong learning

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1. Introduction

Today, electronic learning environments over Internet encourage the development of online communities of learners who work at a distance in shared workspaces. These environments offer geographically remote individuals the possibility to collaborate without either time nor space constraints and to perform a common task together under the guidance of teachers and online tutors or facilitators. Closely related terms such as computer-mediated communication (CMC), computer-supported collaborative learning (CSCL), and computer-supported group-based learning (CSGBL) have been used to describe these environments. In such electronic learning environments, collaboration is known as a very fruitful pedagogical method facilitating individual learning via computers. This method has been popularized under the term of collaborative learning by social scientists (e.g., Johnson & Johnson, 1989; Slavin, 1983). Collaborative learning generally takes place in an environment in which participants feel free to exchange ideas and share experiences in order to create knowledge. While collaborative learning have been widely investigated in face-to-face groups (e.g., Johnson & Chung, 1999; Johnson & Johnson, 1990; Slavin, 1983), the impact of such a model of learning in electronic environments has received little attention until recently (e.g., Brandon & Hollingshead, 1999; Kreijns, Kirschner, & Jochems, 2003; Uribe, Klein, & Sullivan, 2003). Similarly, the development and the processes of online learning groups were not thoroughly investigated by researchers despite numerous models of group development in face-to-face contexts (see Carabajal, LaPointe, & Gunawardena, 2003). The purpose of the present case study was to examine the group development during an online learning session involving adult learners.

1.1. Group development in face-to-face groups

There are several models of group development in face-to-face environments which can be applied to highlight issues of online learning groups. A majority of models about group development are linear-progressive models sharing the assumption that there is an order of progression in the group from stage to stage (e.g., Bales & Strodbeck, 1951; Tuckman, 1965). By contrast, non-linear models assume that group development reflects a discontinuous progression in which phases of stability interspersed with radical changes of transition (e.g., Gersick, 1988, 1989). Based on these different conceptions of group development, two classical models may be distinguished in the literature: the Tuckman (1965) normative model in which groups move through five sequential stages, and the Gersick (1988) punctuated equilibrium model structured in two phases with a midpoint period of transition.

The Tuckman (1965) model proposed a widely accepted model of group development in which groups are viewed as progressing through five developmental stages, each described by a unique pattern of behaviors: forming, storming, norming, performing, and adjourning. Stage 1 (forming) refers to a period in which members try to determine their positions in the group, procedures to follow, and the rules
of the group. Stage 2 (storming) starts when conflict arises as members resist the influence of the group and rebel against the accomplishment of the task. Stage 3 (nourning) is a period where people try to resolve the conflicts of the previous stage, clarify goals, increase cohesiveness and member satisfaction. At this stage, communication becomes more open and task-oriented, and more mature about goals, roles, organizations and procedures can take place. At the stage 4 (performing), work starts immediately after group formation but reaches an optimal state at this stage. Tuckman’s final stage (adjourning) involves the termination of task behaviors and disengagement from relationships. Each stage of Tuckman’s model is an essential step for the group, and if the first step is not accomplished, the latter stages will not be successful. Each of these stages involves two aspects: interpersonal relationships and task behaviors. Such a distinction is similar to that of Bales (1950) equilibrium model which argues that a group is in a continuous state of dividing its time and work between instrumental (task-related) needs and expressive (socio-emotional) needs trying to maintain a balance between these two states through three distinct progressive phases: orientation (exploration), evaluation (seeking opinions), and control (norms that guide actions).

Gersick’s model (1988, 1989) argued that, instead of gradually developing over time, groups experience long periods of stability that are punctuated by revolutionary periods of dramatic change. She therefore suggests a group development model composed of two temporal phases. In the first phase, which starts with the first meeting, the group develops an implicit framework that will guide its activity until the transition. When the group reached the midpoint between the first meeting and the deadline, a sense of urgency to complete the task triggered a transition meeting, where phase one framework is abandoned and a new framework adopted. This “halfway” emerges as the most likely moment at which groups will call attention to time or pacing. The midpoint acts interrupts the group’s basic phase 1 strategies and facilitates the transition towards phase 2. In this latter phase, the group focused on solving task problems, and therefore they were more similar to each other. Finally, the group entered the completion phase where the focus was on outside requirement and edited the results obtained in the form required.

Studies supporting these models of group development have been conducted in face-to-face environments, and there is today little evidence to indicate if these models can apply to online learning groups.

1.2. Group development in online learning groups

Online learning groups refer to the participation of individuals in a course without being physically in the same location. By contrast to the behavior of individuals in more traditional group settings interacting in a face-to-face manner, we may more clearly understand the implications of electronic communication on group development and processes. Although models of online learning groups are very scarce, they are not non-existent. Indeed, a five-stage model, based on constructivist principles of education, was elaborated by Salmon (2000). This model describes the progress of a
computer conference—or discussion forum—incorporating stages of contact through computer-mediated communication. The five stages are: (1) access and motivation: participants learn to use electronic tools for learning as a prerequisite for conference participation; (2) online socialization: participants establish their online identities and find others whom to interact with; (3) information exchange: participants give each other information relevant to the course; (4) knowledge construction: participants involved in course-related group discussions and the interaction becomes more collaborative; and (5) development: participants look for more benefits from the system to help them achieve personal goals, explore how to integrate e-learning into other forms of learning. This model reflects a positive progression in the quality and intensity of interaction among students and between students and their teachers. Indeed, teachers are progressively encouraged to develop online interactions that foster critical thinking skills at the highest level of learning, whereas students are challenged to demonstrate reflective thinking by interpreting information at a deeper level.

A majority of models suggests the need to design electronic learning environments in sequential periods in order to facilitate collaborative processes. However, given the inconsistent results in the literature, more research is needed about the impact of such design on group development and processes based on computer-mediated communication, and more specifically within a group-based learning context (e.g., Lowyck & Pöysä, 2001; Strijbos, Martens, & Jochems, 2004). Examining the dynamics among learners through their electronic communications can help us to design effective online learning environments using asynchronous communication tools and, more basically, shared workspaces. The aim of the present case study was to examine group development and affective reactions among adults learners involved in a small online learning group.

2. Method

2.1. Participants

The participants involved in the present case study were seven adult learners (four women and three men, aged from 25 to 55) enrolled in a MBA of a French University called “Advanced practices of Personal skills assessment”. All of whom possessed master degrees and a good experience about practices of skills assessment. Such practices consist in assessing workers’ skills, thus making an inventory of what they are able to do individually in their occupational context. The evaluation resulting of this technique will be used to guide people in their career when they are engaged in a work transition. The main objective of this MBA was to improve knowledge and practices of adult learners through a complex task consisting in producing a conceptual and operational definition of the controversial notion of skills. The seven participants enrolled in this online course were geographically dispersed throughout several areas of France. They were not
familiar with teamwork in their professional setting and it was their first experience with online learning.

2.2. Design of online activities and equipment

The learning programme of the MBA was designed as a blended learning method combining online and face-to-face approaches. In the present study, we only examined one of the seven modules dispensed in the programme. This module was at the core of their occupational activity and concerned a reflection about the complex notion of skills. A conceptual and operational definition of this notion was considered as a preliminary step in a good practice of skills assessment. Implicitly, participants had to answer questions such as: how can skills be defined? How can skills be distinguished from other notions such as competencies and abilities? How can skills be assessed? and so on.

A constructivist principle was applied to this module starting from a diversity of knowledge, experiences and practices among the group members and ending in the construction of a common knowledge through a series of activities sequentially designed. The module was delivered during fifteen weeks and subdivided into three sequential periods: (1) socialization, (2) production, and (3) evaluation. During the socialization period (week 1), once participants have filled in their individual (presentation) record, they get to know each other to find out together how they could name their group. To do so, they attend synchronous meetings (chats), they list the proposed names, and vote. The production period is itself subdivided into three activities: electronic brainstorming (from week 2 to 4), individual production (from week 5 to 7), and collective production (from week 8 to 14). Only this last activity may be considered as collaborative. Finally, the evaluation period (week 15) consists in addressing the individual and collective productions during an asynchronous debriefing with teachers and experts in the subject of skills assessment. During this period, data were gathered through multiple source of information for qualitative and, to a less extend, quantitative analysis.

A shared workspace accessible with a login and an individual password was used in the present study (QuickPlace, IBM Lotus Team Workplace). The workspace was organised through a main menu in the left part of the window. A list of the online modules was proposed and communication tools (chat and discussion forum) opened in new windows by clicking on a link. Other tools were accessible from the main menu such as a shared calendar and a schedule to organise the learning process throughout a series of activities. Learners had the possibility to consult the members’ profile and a manual to study and collaborate online. The manual provided information such as the name of the pedagogical staff members (group process facilitator, teachers and tutors), a schedule to contact them, a description of activities, educational objectives, communication tools, technical constraints to perform activities, guidelines to behave online, assessment criteria and so on. An online Gant diagram was also provided to describe the learning process through a list of activities sequentially structured. This diagram, basically used to offer a graphic representation of tasks over time, was modified for the purpose of the present study to give
a description of online activities to perform over time (instructions, beginning and dead line of each activity was indicated in the diagram).

2.3. Data analysis

Data were collected over a 15-week period during the online learning (Week 1–Week 14) and the evaluation period (Week 15). An observational case study design was used employing multiple sources of information (Yin, 1994). Three different methods were used in the present study: (1) online observation of synchronous and asynchronous communications, (2) questionnaire, and (3) individual interview. These methods were used to study both group development and some affective reactions of the group members.

2.4. Online observation

All the messages posted in the forum and conversations in chat were saved for data collection and statistical analysis purposes. The online contributions were important to analyze the group development (i.e., socialization, communications and interactions, sense of belonging, perceived cohesion and leadership). Quantitative and qualitative analyses were applied to these data. The quantitative analysis consists in examining the total number of messages posted in the forum, the duration of each chat, and the number of messages by learners, tutors and teachers. Moreover, the responses were coded as far as possible according the coding scheme described by Bales (Interaction Process Analysis, 1950). This coding system contained two broad classes. The first categorized the actions group members took to manage a work process, i.e., task oriented contributions. There were different types of task oriented interactions such as giving and asking for information, opinion, suggestion, trying to convince, and holding his/her own. The second class of categories included socio-emotional contributions such as encouragement, criticism towards the group and/or him (her)self, and a Sense of Belonging Index (SBI = number of “We” words or group name divided by total number of contributions). Following the group development model of Gersick (1989), we also coded statements regarding group members’ direct references to time (for instance, “We have got two days left”). Finally, we examined online communication style. The online communication category focused on the learner’s use of message construction, i.e., greetings, conclusions, use of emoticons, specific characters (underlined, capital letters etc.). Unclear or unfinished contributions were unclassified. The two coders (online tutors) achieved acceptable reliability (Cohen’s κ = .75).

2.5. Questionnaire

At the end, participants filled in a questionnaire regarding their attitudes and behaviors at the different periods of the online activity (see Appendix A, for an example of questionnaire). The questionnaire consisted of a series of five ques-
tions. The first question examined the use of various modes of communication, i.e., e-mail, phone, chat, forum, fax, letter via postal services, informal face-to-face meetings. The second question asked the participants if they ever felt the need for physical contact with others. In a third question, learners indicated their motivation, i.e. their desire to drop out the online learning session. They indicated also the feelings they experienced during the online learning session. For this, learners received a list of 20 adjectives describing possible feelings, 10 for positive affect and 10 for negative affect. The adjectives were partly a translation of the Multi-Affect Adjective Checklist (MAACL; Zuckerman, 1960). The adjectives for positive affects were happy, interested, proud, confident, enthusiastic, inspired, calm, optimist, joyful, relieved. The adjectives for negative affects were angry, depressed, discouraged, dissatisfied, annoyed, anxious, nervous, worried, pessimistic, frustrated. The learners were asked to indicate which of the described feelings they experienced during the online learning session. Eventually, a last question was a measure of perceived cohesion (see Appendix B). The vignettes represented what could be considered as a measure of the perceptual unity within the online group. Learners decided which of the vignettes had best represented their group.

2.6. Interview

Semi-structured interviews were conducted with participants one week after the online activity by two independent assistants. The open-ended questions included in interviews referring to participants’ perception of online learning environment (e.g., use of communication tools, improvement) and online group dynamics (cohesion, conflict, leadership, and satisfaction) during the fifteen weeks of the module. The interviewers asked these pre-determined questions, and explored other relevant issues. The responses collected through interviews allowed the researchers to clarify issues for data analysis and interpretation.

3. Results

3.1. Group development

We observed group development through several aspects: socialization, contributions, task oriented and socio-emotional interactions, sense of belonging, perceived cohesion and leadership.

Socialization. We observed the first step of group development during the socialization period (week 1). The quantitative analysis revealed that the learners discussed together about their group name within three chats (duration of chats: 37, 44 and 46 min, respectively). All the participants contributed in chat, but male participants contributed more than female participants; the three males participated in all chats. A total number of 15 group names were proposed, essentially during the first chat (12 propositions). Finally, the participants chose the name of their group through
a voting procedure for each proposition (1 = Very bad name to 4 = Very good name). The final group name was “compass card” (\(M = 2.62, \ \text{S.D.} = 0.81\)), a proposition initially made by L., a male participant. This choice suggests a common goal or an orientation expressing the feeling to embark on a same ship in which the group guides learners as the compass card of a ship. The rationale of this choice was the following:

We all come from various horizons, geographically and occupationnally speaking. But we have a common goal, though, and referring to some of us coming from the Navy, we can say that we have all embarked on the same ship and had better form a solid team to arrive safe and sound (L., male).

**Contributions.** The results of the quantitative analysis revealed that 73 messages were posted in the forum by learners. Overall, learners contributed throughout the collective production period. However, we observed a decrease of contributions after W11 corresponding to the midpoint of the collective production activity (W8–W14). The analysis of the number of messages for each participant revealed that a member (L., male) delivered more messages than other members during all the online activities. This observation may suggest the presence of a “leader” or a “main organizer” in the online group. The debriefing session provides some useful information about the leadership in this group. Regarding the number of contributions among tutors and teachers, we respectvively counted 14 and 6 contributions. A longitudinal observation showed that these contributions have decreased from Week 9, and more specifically after Week 11.

**Task-oriented and socio-emotional interactions.** Results of the interactions analysis showed that online participants spent most of their communication time on the task. The learners’ style of communication focused on the task, and very few participants used greetings and conclusion sentences in their messages. Methods of working on the task were analyzed in details through the type of interactions using a modified version of the Bales (1950) Interaction Process Analysis (IPA). Eleven categories were distinguished in the present study (see Table 1): eight task-oriented categories, two socio-affective categories, and one reference to time category. Table 1 showed that the participants most frequently gave personal opinion, the others’ behaviours were either moderate (e.g., give suggestion and information, ask for suggestion and opinion, hold his/her own) or low (e.g., ask for information, convince others). More interesting for our purpose, the longitudinal analysis revealed a break in the amount of contributions in the forum (W11–W12), suggesting a transition period at the midpoint of the collective production activity (see Fig. 1). Moreover, the use of references to time by participants appeared at the same period (W10) when the outcome deadline approached. Indeed, references to time linearly increased from W10 to W14 except, for unclear reasons, during the week 12 in which no reference was mentioned. Finally, we observed a higher number of socio-emotional interactions, and more especially contributions related to group encouragements at W10 (see Table 1). Moreover, the use of emoticons and specific characters appeared during the
Table 1
Frequency of each interaction (number of interactions/number of messages) in function of time during the collective production activity

<table>
<thead>
<tr>
<th>Categories</th>
<th>Type of interactions</th>
<th>Time</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Mean frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>W8</td>
<td>W9</td>
<td>W10</td>
<td>W11</td>
<td>W12</td>
<td>W13</td>
<td>W14</td>
</tr>
<tr>
<td>Task-oriented</td>
<td>Give suggestion</td>
<td>1</td>
<td>.55</td>
<td>.43</td>
<td>.04</td>
<td>0</td>
<td>.45</td>
<td>.33</td>
</tr>
<tr>
<td></td>
<td>Give information</td>
<td>.5</td>
<td>.66</td>
<td>.43</td>
<td>.38</td>
<td>.60</td>
<td>.81</td>
<td>.33</td>
</tr>
<tr>
<td></td>
<td>Give opinion</td>
<td>1</td>
<td>.77</td>
<td>2</td>
<td>2</td>
<td>.40</td>
<td>.72</td>
<td>.66</td>
</tr>
<tr>
<td></td>
<td>Ask for suggestion</td>
<td>1</td>
<td>.55</td>
<td>.43</td>
<td>.25</td>
<td>.60</td>
<td>.27</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Ask for information</td>
<td>0</td>
<td>.33</td>
<td>.25</td>
<td>.08</td>
<td>0</td>
<td>.09</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Ask for opinion</td>
<td>1</td>
<td>.44</td>
<td>.43</td>
<td>.13</td>
<td>.20</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Convince others</td>
<td>0</td>
<td>.44</td>
<td>.31</td>
<td>.13</td>
<td>0</td>
<td>.18</td>
<td>.33</td>
</tr>
<tr>
<td></td>
<td>Hold his/her own</td>
<td>0</td>
<td>.55</td>
<td>.38</td>
<td>.38</td>
<td>.40</td>
<td>.45</td>
<td>.33</td>
</tr>
<tr>
<td>Socio-emotional</td>
<td>Criticisms</td>
<td>0</td>
<td>.22</td>
<td>.94</td>
<td>.16</td>
<td>.40</td>
<td>.45</td>
<td>.50</td>
</tr>
<tr>
<td></td>
<td>Encouragements</td>
<td>0</td>
<td>0</td>
<td>1.31</td>
<td>.16</td>
<td>0</td>
<td>.73</td>
<td>1</td>
</tr>
<tr>
<td>References to time</td>
<td></td>
<td>0</td>
<td>0</td>
<td>.50</td>
<td>.63</td>
<td>0</td>
<td>1.36</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Fig. 1. Frequency of task-oriented contributions during the collective production activity.
same period (use of two positive emoticons (🙂) by a learner, and majuscule characters by another learner saying “COOL!”). These data supported Gersick (1988, 1989) model suggesting that a stress appeared at the midpoint of a collaborative sequence.

*Sense of belonging.* The frequency of “We” words in synchronous conversation decreased after the midpoint of the collective production activity (W12: 33 “we” words out of four chats, W13: 11 “We” words out of two chats, W14: 0 “We” word out of one chat). Similarly, the Sense of Belonging Index reveals a constant diminution until the end of this activity. This decrease of sense of belonging was mentioned in an interview excerpt:

> I have felt at home with the group, I have had the feeling to belong to it, but have felt a certain hesitation from the midpoint of the online activity onwards: what had become of the group? (P., male).

Nevertheless, data revealed also that when the facilitator sends messages to learners using their group name instead of individual references, the sense of belonging slightly enhances. Such group oriented communication, instead of that aimed at individuals, could be used to build a sense of community.

*Perceived cohesion and leadership.* The self-reported measure of perceived cohesion showed that the vignette selected by most of the learners (i.e., four out of six) represented a group with a central point of four elements and two isolated elements (see Appendix B, cell number 6 in the figure). This selection suggested that the learners perceived a relative cohesive group. Some interviews’ excerpts completed these data:

> This has not been a conflict group but yes, they have been ups and downs (G., male); I have felt a strong cohesion and a lot of mutual aid (V., female); I have had the feeling to belong to a real group with, as soon as the beginning, the presence of a spine and electrons (C., female).

Regarding the role of a leader in the online group, the data of quantitative analysis tend to show that L., a male participant was the group leader acting as the moderator or regulator. Data from individual interviews confirmed such analysis:

> Thanks to his requests, “L.” has had a federative role and has boosted motivation. He was proposing... (C., female); “L.” has been the group leader, he was the one to intervene most of the time, to propose things and he was following up. He was our reference point, he was always there (G., male).

It can be pointed that L., the male participant was also at the origin of the group name during the socialization period (see above).

3.2. Affect

We observed affective reactions of members with their group experience through three aspects: motivation, mood and satisfaction. Data analysis involves a method
frequently used in the group development research which has the advantage to provide a visual representation of different events and their evolution in time (cf. the visual mapping strategy described by Miles & Huberman, 1988). A summary of results was presented in Table 2.

Motivation (need for contact, desire to drop out, and effective drop out). During the first 6 weeks, the learners did not report needs for social contact. The learners felt that it was necessary to meet face-to-face, particularly near the half of the collective production activity (W10) and at the end (i.e., W13–W15). Moreover, learners reported that synchronous tools (e.g., phone and chat) were essentially used at the same period (W12–W15). A similar tendency was observed as for the use of an asynchronous tool (e-mail) although participants reported they had widely used this tool throughout the online learning session. The use of synchronous tools, and to a less extend asynchronous one, may have restored a “social presence” among group members who are geographically distant from one another. In the same way, the desire to drop out the programme was higher for the period W9–W10, and an effective drop out (a female participant) appeared at the end of W10. The distance group was finally reduced to six learners at the midpoint of the collective production activity.

Mood. A first global analysis revealed that the learners used more positive adjectives than negative ones ($M$s = 5.07 and 2.73 respectively, Wilcoxon $Z = -2.25$, Table 2

<table>
<thead>
<tr>
<th>Time</th>
<th>Social Production</th>
<th>Brainstorming</th>
<th>Ind. Production</th>
<th>Collective Production</th>
<th>Assess.</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>**</td>
<td></td>
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<td>W2</td>
<td>**</td>
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<td>W4</td>
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<td>W5</td>
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<td>W6</td>
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<td>W7</td>
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Table 2
Group members’ references (*) to modes of communication, motivation and mood during the online learning session
p < .02). Secondly, we made two separate chi-square analyses for positive and negative adjectives to examine the evolution of mood over time (time 1: W1–W5, time 2: W6–W10, time 3: W11–W15). For positive adjectives, a chi-square statistical procedure revealed a significant effect of time, $\chi^2 = 7.24, p < .03$. Pair-wise comparisons showed that the significant differences were between time 1 and time 2 ($M_s = 7.60$ and $4.20$ respectively), and between time 1 and time 3 ($M_s = 7.60$ and $3.40$ respectively). For negative adjectives, the chi-square test did not reveal a significant effect. However, descriptive analysis showed that a great number of negative adjectives appeared at the midpoint of the collaborative production activity (for each period respectively $M_s = 2.00, 3.20$, and $3.00$). The observation of Table 2 suggests also that learners remained interested throughout the learning session, and two negative adjectives were never selected (angry and pessimistic). The feeling of frustration reported by learners at the end of the collective production activity could also be explained by the dissatisfaction regarding collaborative writing (see next section for more details).

**Satisfaction.** Interview analysis suggested that this new way of learning based on the sharing of knowledge, experiences and practices produced a relative satisfaction among adult learners:

For the first time, I felt confident in learning. Contrary to my school experience, I practice and only then I get back to theory to boost my practice (G., male); This is practice sharing. This is more efficient than individual work thanks to sharing (P., male); No hang ups, no good or bad things (C., female).

Nevertheless, this satisfaction must be qualified by the frustration resulting from the final product and, indirectly, by the difficulty to write a common document collaborating with others at distance:

I have the feeling to disagree with the final definition, to feel outside the collective production” (C., female); Our definition is not the right one, it took us three months to deliver it and the baby is not necessarily nice! (L., male); The others’ production in enriching but we know the collective one will not apply. The production is frustrating (P., male).

Taken together, and accordingly with Gersick (1989) model, the present results reveal a *transition period* at the half of the collective production period consisting in producing a common document. At the same period (W10–W11), we observed a number of specific events reflecting a decrease of motivation and positive mood.

### 4. Discussion

The purpose of this study was to investigate the group development during an online learning session among adults involved in lifelong learning. Some data about the affective reactions of those adult learners were also collected. We found online group development and functioning much like face-to-face groups. Especially, our findings support Gersick (1988) *punctuated equilibrium model* of group development. Indeed, Gersick showed that teams do not follow an universal series of stages in
accomplishing their work, but rather follow a punctuated equilibrium pattern of two phases of stability separated by a midpoint period of major transition or revolution. This model states that groups develop and change in a discontinuous, stepwise manner. When groups are under a specified time constraint with a deadline, they modify their behavior at the halfway point of the time frame. Groups develop habitual routines which they maintain (equilibrium) until a crisis occurs or the project is half-way completed, whichever occurs first.

The results of the present study showed a transition period at the midpoint of the collective production activity reflecting a decline of task-oriented communications, motivation and positive mood. This period, where crisis emerges, can be considered as the “valley of despair” for group members experiencing stress. It can be characterized by a growth of messages on the forum, and more specifically socio-emotional communications. However, very few socio-emotional communications were observed during the online learning session. Maybe this form of interactions appeared during synchronous communications by phone or informal chat and consequently, they were neither identifiable by the group process facilitator nor by online tutors and teachers. Such interactions might have been used for the social sharing of emotions (e.g., Rime, Finkenauer, Luminet, Zech, & Philippot, 1998), which were more negative during this period. A growth of online tutors’ and teachers’ interventions can be observed during the same period associated for participants with a decline of motivation, a need of face-to-face contact and an increasing use of synchronous communication tools (phone and chat). Moreover, the use of references to time by participants appeared at the same period (W10) and increased until W14 reflecting a stress among participants when the outcome deadline approached.

The present findings did not support linear-progressive models such as Tuckman’s model (1965) nor the Bales’s equilibrium model (1950). Indeed, Bales (1950) argued that a group is in a continuous state of dividing its time and work between task-related needs and socio-emotional needs trying to maintain an equilibrium between these two states. Contrary to this model, the present findings suggest that interactions in online groups are essentially oriented towards the task and very few socio-emotional interactions were observed during the online learning session (see also Hillman, 1999). The reverse pattern is observed in face-to-face groups where only 40% of time is spent on task-focused interactions, and more than half of a group’s interaction is off task (Huang & Wei, 2000). However, we must be cautious with the inferiority of socio-emotional interactions in online groups because these interactions can not be identified if they are supported by synchronous tools such as the phone or through informal chats.

To conclude, this study suggests to consider groups as complex adaptive systems that should be dynamically studied in their embedding context (e.g., Arrow, McGrath, & Berdahl, 2000; Arrow, Poole, Henry, Wheelan, & Moreland, 2004; McGrath, Arrow, & Berdahl, 2000). According to McGrath et al. (2000), “groups develop as systems over time, and change as a function of changing conditions over time” (p. 98). Such dynamic and adaptive approach contrasts to the linear or progressive models that consider groups as closed systems defined by a static
developmental pattern without taking into account external influences and internal group dynamics. Moreover, the authors argued that a group also includes the tools used by members, and specifically electronic communication tools defined by time independence, text-based communication, and computer-mediated communication. Extending this approach to online groups, nonlinearity in the dynamics of interactions within groups can be observed through computer-mediated communication. Indeed, electronic environments may be used to capture group dynamics in the long run and to better understand online group development in the context of distance learning. In this perspective, Gersick’s model may be considered as a framework for analyzing online group development over time. However, the present data are not sufficient to offer a dynamical view of online group development. Further research with other online learning groups will be needed to support more strongly these findings. Indeed, given that the case study was conducted with adult learners performing a collaborative task in a lifelong learning context, the question of the generalization of the results to other populations, tasks, and contexts remains to be addressed in future studies. Nevertheless, as recently suggested by Carabajal et al. (2003), “it is time to examine the patterns, cycles, and interrelationships of online groups in order to derive models, laws, and theories of online group development (…). The available literature points to a very real need to develop theory and research to understand the process of group development in natural electronic learning communities” (p.230). The present study is only a first step in this direction.

5. Practical implications

Like many descriptive studies, the present results can not be generalized to all online groups, but they provide insight into how they develop and progress. Indeed, the findings of the present case study may be important for teachers and online tutors to rethink their pedagogical practices using collaborative learning methods. Knowledge about group development and progress of an online group would give them an indication about the type of intervention required at each stage of an online learning session. Undoubtedly, if teachers and tutors want to be successful online, they need an understanding of the dynamics of online communications and interactions. One of the most difficult tasks for teachers and online tutors is to determine when they should get involved in group activities. The present study suggests that a stronger attention is particularly useful during a transition period at the midpoint of an online collaborative activity. During this critical period, the presence and interventions of teachers and tutors are crucial to better monitor collaborative activities. They can act as online facilitators taking a “social” role (e.g., McFadzean & McKenzie, 2001). To do that, they can contribute to make the group identity salient and encourage students to develop a sense of community (see Michinov, Michinov, & Toczek-Capelle, 2004; Rovai, 2000). They can also create a kind of textual atmosphere that would encourage students to engage in a text-based environment. Such tutor-
ing actions could be used to help learners better collaborate at a distance and lead greater group performance and individual learning. As suggested by some researchers, the success of a group may be jeopardized if the social dimension of the groups is neglected (e.g., McGrath, 1991; Mennecke, Hoffer, & Wynn, 1992).

Appendix A. Questionnaire

In the table below, indicate the means of communication used during the different week(s) (e.g., e-mail, phone, chat, forum, fax, surface mail, informal face-to-face meetings).

<table>
<thead>
<tr>
<th>Periods</th>
<th>March</th>
<th>March 17 – April 6</th>
<th>April 7–27</th>
<th>April 28 – June 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socialization</td>
<td>Brainstorming</td>
<td>Individual production</td>
<td>Collective production</td>
<td>Evaluation</td>
</tr>
<tr>
<td>Week 1 (W1)</td>
<td>W 2</td>
<td>W 3</td>
<td>W 4</td>
<td>W 5</td>
</tr>
</tbody>
</table>

Appendix B. Perceived cohesion measure

Please choose the vignette which best describes the structure of your group.

References


1 A similar questionnaire was used to assess the need for physical contact, the motivation, and the mood participants experienced during the online learning session.


