Conditioning Factors for Group Management in Blended Learning Scenarios

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Abstract

The management of groups is an essential task in collaborative learning scenarios. In a blended learning situation, in which online activities and face-to-face activities are combined, this group management becomes more complex. Different technological solutions have been proposed for supporting the group management in the CSCL field. However, these approaches fail to consider factors inherent to the blended learning scenarios. In this paper we discuss and propose a conceptualization of the main factors that condition the group management in these scenarios: the pedagogical method, the participants, the space and the history. These new conceptualization may help on incorporating more flexibility and accuracy on the whole learning design process for a wide range of learning situations.

1. Introduction

Grouping students, assigning roles or distributing activities are common tasks in CSCL [4, 10]. These CSCL practices can be carried out in many ways depending on different aspects, such as the learning objectives, the type of activity or the number of students. We term these aspects as the conditioning factors that influence the group management. In blended learning –where online, technology supported, and face to face (f2f) activities are combined in a given space [8] - a broader range of learning experiences is possible [7] and the number of factors to control increases making the group management more complex. In this context, technology can help by facilitating and supporting group management.

Many studies propose technology for supporting some aspects of the group management. Some of them provide solutions for automating the group formation based on genetic algorithms to meet multiple group criteria [5] or by considering the semantic data about the students and constraints specified by the teacher [10]. Others propose graphical support for the instantiation of groups according to the pedagogical structures determined in the edition [4]. However, all these approaches are not flexible enough and fail on capturing some of the factors inherent to blended learning scenarios such as the space, the group restrictions imposed by the activity sequence or the unexpected situations that arise from a real scenario.

In this paper we propose and define a conceptualization of four factors that condition the group management (section 2). Section 3 discusses the benefits of this conceptualization when designing technological support for collaborative blended learning scenarios, its implications on the phases of the learning design and the plans for a further research.

2. Factors conditioning the group management

From the literature in the field and observations from real learning experiences we identify two main needs regarding the group management to be considered when orchestrating a collaborative activity: educational (e. g. the required number of groups for each activity); contextual (e. g. the actual number of students or the characteristics of the learning space and its elements). Literature on CSCL and ubiquitous computing give some keys to conceptualize the factors covering both the educational and contextual aspects.

For the educational needs, we acquire the concepts of the CSCL scripting processes. The scripts have been proposed as a way to structure collaborative learning processes (typically flows of activities and groups or roles involved in the activities) in order to trigger group interactions that may be rare in free collaboration. One of the components of the script is the envelope: the temporal and the social structures to define types of activities (individual or collective) [1]. For the script operationalization, some studies introduce the differentiation within the intrinsic (principles from which the script has been generated) and extrinsic constrains (those elements induced by the contextual factors) [12]. In this study, we adopt the envelope as the basis to define the conditioning factors connected with the educational aspects and to propose
how these factors map to the intrinsic and extrinsic constrains.

From ubiquitous computing, we borrow the concept of space as an agent able to shape users’ interactions and to activate collaborative learning [9]. Whether physical or virtual, the space becomes a determining contextual factor in blended learning scenarios.

Goodyear [3] defines a networked learning model of three areas (learners’ activity, social context and learnspace) that gives us the key for relating the educational with the contextual factors. We go one step further and identify for each area the elements related with the group management and their implications on the identified educational and contextual factors. The result is the conceptualization schema depicted in Figure 1 and explained in the following subsections.

2.1. Pedagogical Method Factor

The pedagogical method factor affects group management regarding what the participants of the learning activity have to do. This factor describes the learning flow with the set of phases, the activities composing each phase and its relations. It also defines the roles involved in each activity and the recommended groups and group formation policies. The pedagogical method factor conditions the intrinsic constrains that assure potentially effective learning outcomes. It is characterized by the following facets:

1. The learning flow describes the structure of the phases as an association of activities and the relations between these activities. This facet is connected with the didactic envelope defined by Dillenbourg or the learning activity by Goodyear and corresponds to the script defined by the teacher in the practice.
2. The activity defines the learners’ and teachers’ tasks, the input resources and the expected outcomes. It also specifies the roles of those involved in the activity. It can be enclosed in a phase and connected to other activities through the learning flow.
3. The Activity-dependent associations define the best grouping management for a phase/activity. Specifies the number of groups, the desired amount of participants per group and the best policy formation according to the activity (e.g., random distribution).

2.2. Participants factor

The participants’ factor defines who participates in the learning activity. It conditions the group management by specifying the potential or actual number of participants. It is described by:

1. Number of potential/actual participants: defines the number of persons that will potentially participate or that are actually taking part in the activity.
2. The profile: defines the profile of each of the participants (age, language, gender, etc.)
3. Location: defines the participants’ presence in relation to the activity. It can be physical or virtual depending on whether the learner is located in the place where the activity occurs or it is different.
4. Profile-dependent associations: defines the grouping and formation policies based on the participants’ profiles (e.g., students grouped by their language).

2.3. Space factor

The space factor defines the space where the learning activity occurs and which elements compose it. We differentiate between the physical and the virtual space. The physical space is the place (e.g., a classroom) where the participants are located and can physically manipulate the elements of the environment (e.g., tables, whiteboards). In the virtual space (e.g., a learning management system) the participants manipulate virtual elements that are not necessarily located on the same place (e.g., shared documents for collaborative edition, chat rooms). Both spaces are composed by physical/virtual elements characterized by a set of attributes that can influence the group management:

1. Affordance: defined “as the perceived properties of a thing in reference to a user that influences how it is used” [7]. Elements are characterized by its affordance: individual or collective, activity-support or management-support (whether the element is used for mediating the learning activity or for supporting the management of the activity).
2. Mobility: determines if the element is portable or fixed (e.g. groups distributed according the computer’s proximity).
3. Arrangement: depending on the distribution of the space’s elements different activities can be supported (expositive, collaborative, formal, informal...).
2.4. History factor

Defines what has happened in the past regarding all the factors defined before and how this affects the learning activity. Some facets are frequently modified by the history and can strongly alter the group management. We underline three facets that have to be specially considered: a) the activity, if a specific role has been assigned to a student in the first session, it might not be assigned to the same role for the next one; b) the number of participants, which can vary a lot from session to session and c) the arrangement, if a particular distribution in class has not resulted effective for a particular learning objective, it will not be repeated in future sessions.

3. Conclusion and future work

In this paper we proposed a conceptualization of the conditioning factors for group management in blended learning scenarios: the pedagogical method, the participants, the space and the history. This conceptualization is innovative mainly for two aspects: (a) it provides a global description of the blended learning scenarios by introducing the space an history factors and (b) establishes the basis for considering the implications that each of the factors have on the different phases of a complete learning design process (edition, instantiation and enactment). Altogether provides a deep understanding of how technological systems should be designed for flexibly support collaboration in such as complex scenarios.

As next steps in the research, we plan to provide a formal representation in XML of the conditioning factors and study their relation with the intrinsic and extrinsic constrains of a script. According to this analysis, we plan to develop prototypes implementing solutions for facilitating the group management specified by the script by taking into account the conditioning factors at design, instantiation and enactment times, from teacher’s and the student’s side [11]. The implementations will interoperate with IMS LD [6] compliant tooling and will include two modules: (1) a constraints control module for notifying the possible violation of the constraints underlying the script and (2) a recommendation module for proposing solutions taking advantage of the potential offered by the context and the interpersonal dynamics that arise from it [2]. This prototype will be evaluated in different educational scenarios, from a traditional classroom (formal learning) to a museum (informal learning). This will serve to understand whether the approach proposed is efficient and flexible enough for solving the group management problems and facilitating innovative blended learning scenarios.

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5. References