Personalization of a group learning situation

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Abstract

Personalization has become a key factor for any success of a remote learning situation wherein the participant profile (learner or group) is the pillar. Several works of personalization were created. The majority of these works are interested in the individual learning situation.

In this paper we will expose our personalization vision of the group learning situation, by specifying the various personalization types as well as the most relevant personalization criteria. We will also project our personalization vision on IMS-LD (IMS learning Design).

1. Introduction

In order to improve the quality of learning and by drawing profile from the new pedagogical and technological visions, the personalization of remote learning has become indispensable for online pedagogy.

Indeed several works of personalization were created. The majority of these works are related to the online pedagogy which considers that the learner is the only centre of any remote learning. Yet, the studies of the psycho-cognition [1,2,3,4] have lately confirmed that the pedagogical tendencies have converged towards the collaborative learning which primarily stresses group interaction. And since the group is a number of learners in interaction where each one is responsible for their learning progress, two situations of learning can be raised: the individual learning situation[1] and the group learning situation. The latter will be dealt with in section 3.

Personalizing learning situation means personalizing its progress based on some criteria specific to the learner and others related to a group of learners gathered respectively in the learner and group profiles.

Our research orientation is the personalization of the online learning situations (individual and in group). In this article, we present our vision concerning the personalization of a group learning situation related to the group profile.

The questions which arise: What are the criteria which constitute the group profile? What are the most relevant personalization criteria of a group learning situation?

To answer these questions this document is organized as follows:

The next section of our article tries on the one hand to describe what is a group to extract all the criteria which are associated to it (group profile). On the other hand it evokes the need for standardization of the group profile and our choice of the model of standardized profile. The Following section is devoted to the description of a group learning situation as well as the approach of more adapted modeling (IMS-LD). Afterwards we expose our vision of personalization of a group learning situation as well as the most relevant personalization criteria.

And in the last section we project our personalization vision on IMS-LD *(IMS learning Design).*

2. Group profile

A group is a number of individuals (learners, teachers) gathered for a common goal (to do exercise together, exchange opinions on a given subject...), during a given time.

The interactions between the group members define the whole of the exchanges between them. They are influenced by the size, the attitudes, the remarks, the reactions of the group members. The interactions are structured and they develop with time [2,3,10].The structuring of these interactions is based on the roles

[1] It is a set of conditions and events able to lead a person to build knowledge.

knowing that a role represents the general attitude of a group member during the group learning situation.

Each group member has a role (learner, stimulator, assistant, manager, etc) but the paramount role is that of the manager called also the leader because it is the guarantor of the group unit.

After an analysis of this group definition, we released two principal categories of criteria:

- That connected to the group constitution;
- That connected to the interaction within the group.

2.1. Categories of criteria

In this section we will define by category the criteria which constitute the group profile. Then we will point out the relation between the learner and the group profiles before evoking the need for the profile standardization.

2.1.1. The group Constitution category. The most significant criteria relating to the group constitution are:

☞ The size of the group:

According to studies in pedagogy [3, 13, 14], to ensure a better balance of group between the group dynamism, the time of production and the richness of this production, the group should not be:

- Large:

  The possibilities of interactions inside the group increase exponentially with the number of its members. Thus the larger the group is, the more difficult it is to control it.

- small:

  For not to make the group poor as a social reality where individualities dominate the process of the group (relations depend only on the influences of each individual on the other) [13,14].

☞ objectives: they are the learning goals pursued by the group (resolution of a problem, acquisition of a technique, experience sharing...). These objectives represent the reason of the group existence. They relate to the group type (working groups, discussion groups) [13,14].

☞ duration of association:

It is the lifespan of the group which is related to times required for achievement of those objectives. It is within this frame time that the group is active.

☞ roles:

So that a group achieves the goals, it is obliged to structure itself by allotting to roles (learner, tutor, manager...). Each member of the group has a role.

☞ the leader:

It is the most significant role. The member of the group having this role can influence without constraint the behaviours of the group members to make them converge towards the common objectives, by forging acceptance, adhesion and the motivation of the group members towards these objectives.

☞ prerequisite:

It is the set of knowledge or experiments which the achievement of the objectives requires.

2.1.2. The Interaction category. For a group learning situation the criteria of the interaction are related to those allowing the communication inside a group knowing that:

☞ the interaction type:

The interaction within the group is exchanges between the group members or between a member and the whole group. It thus supposes a communication which can be synchronous or asynchronous. The interaction type is a criterion which specifies if the communication is synchronous or asynchronous.

☞ the communication preferences tools:

This criterion is related to the first criterion for example:

- For the asynchronous interaction, the group can have like preference forums or mails...
- For the synchronous interaction the group can have like preference chatting or videoconference...

2. 2. Relation between the group profile and the learner profile

The personalization of a group learning situation is based on the group profile. But since a group is a number of learners, some criteria pertaining to the learner profile (case of the learning objective and the learning prerequisite) are criteria that we have already defined in the group profile. These intersection criteria of the two profiles (see figure1) intervene in the personalization of the group constitution (This will be discussed in section5).

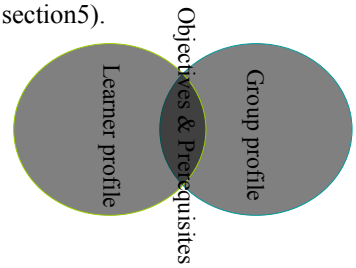

Figure 1.Intersection between the group profile and the learner profile

2.3. Need for the standardization of the group profile

The participant profile (learner or group) is a major factor of personalization of a learning situation. In order to ensure the interoperability and the exchange between profiles, the need for participant profile standardized is essential as a paramount need. Indeed the greatest organizations which contribute to the elaboration of standards are: ISO/IEC JTC1/SC36 and the IMS Learning Consortium.

The question which arises: what is the most adequate standardization model that meets best our needs?

To answer this question, we prepared a study of the two organizations in order to choose the model which answers best the personalization needs. By mapping our personalization criteria towards the works of the two organizations (IMS-Enterprise of IMS, Learner to Learner Interaction Diagram of SC36...) [15]. We were able to confirm that the works on participant profile of both organisations meet our personalization needs.

Thus, for our choice, we chose the works of the IMS knowing that one can easily switch those of the ISO.

3. A group learning Situation

To work out the most relevant personalization criteria of a group learning situation, we will initially present what is a group learning situation.

A group learning situation is a situation wherein several actors (learner, tutors…) intervene, playing different roles, and wherein the learning is based on the dynamics of the group [3,13,14].

The progress of a learning situation aims at the acquisition of some knowledge by specifying the roles as well as the resources, tools and services associated with the activities[2] implementation.

The acquisition of knowledge is a product or a result of the interaction of all the group members. The question which arises:

To describe the activities of a learning situation as well as the interactions between the various actors of this situation, what is the most appropriate modeling language to model the group learning situations as well as their progress?

[2] entity which represents the basic elements describing how to reach knowledge [18]

3.1. Modeling of a group learning situation

Generally, there are two principal approaches of learning environments modeling: the approach of resources and the approach of activities [16, 17].

The first approach focuses on the pedagogical objects[3]. The work of standardization in this field led to the development of the specification LOM (Learning Object Metadata). The latter defines a set of metadata allowing the indexing of the pedagogical objects to permit their accessibility and interoperability.

The second approach is interested in modeling learning situations. EML (Educational Modeling Language) [12], defined by Rob Koper, was the first language to describe a learning situation provided that the activities and not the pedagogical objects are the ones which constitute the key of a learning environment. This language was the base of the appearance of a new specification: IMS-LD (IMS learning Design) [11] of the IMS. IMS-LD provides, on the one hand, a methodological modeling framework and allows, on the other hand, the precise conception of a learning situation.

Contrary to LOM (*it answers only the behaviourist approach*), the IMS-LD answer different pedagogical approaches (behaviourist, constructivist, socio-cultural...). And since the group learning can be based on the socio-cultural pedagogical approach or the constructivist pedagogical approach, it is clear that for the modeling of group learning situations the IMS-LD is more interesting than LOM.

4. Personalization of a group learning situation

For a group learning situation, we raised two types of personalization which relate to the categories of the group profile raised before.

- the first type relates to the group constitution (personalization of the group members) while answering the following question: for a collaborative activity[4] how to form a group of learners?

[3] it is defined like any numerical *entity or not, which can be used, re-used or be referred during* a learning [9]

[4] It is an activity which requires, for its achievement, the collaboration of several learners.

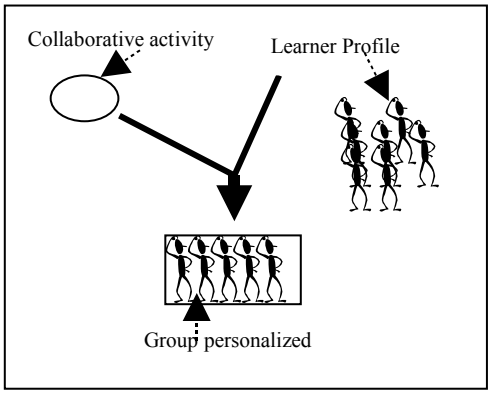

Figure 2. The group constitution personalization

- The second type relates to the personalization of the communication environment while answering the following question: on which level of the learning situation granularity [see figure4] the personalization of the communication environment can intervene?

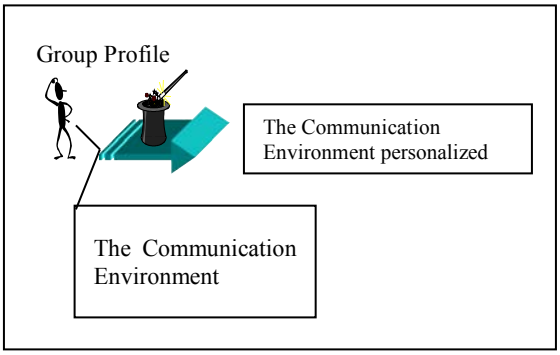

Figure 3. The communication environment personalization

Thereafter, we will release the most relevant personalization criteria of the two types of personalization of a group learning situation.

4.1. Personalization Criteria of the group constitution

The constitution of the group is related to a collaborative activity. The activity has its own characteristics (the number of participant, the objective, the prerequisite...) [11] and these are the characteristics which implement the category "group constitution" of the group profile (see 2.1.1).

On this level, the criteria which can intervene at the time of personalization (see figure2), are those pertaining to the intersection of the group and the learner profiles (see figure1). These criteria are:

- The objective: for the group construction, the objective of the activity must be included in the intersection of the learner profile objectives pertaining to the group.
- The perquisite: it is the set of knowledge and experiments required by the activity and which must be included in the intersection of the prerequisite learner profiles pertaining to the group.

4.2. Personalization Criteria of the environment of communication

Personalizing the communication environment of a learning situation (see figure3) means personalizing all its levels of granularity. These levels of granularity are represented as follows:

- The first level: this level relates to the hierarchical structure of activity (course, lesson, discussion ...).
- The second level: this level relates to the organization and the sequence of the activities composing the structure activity.
- The third level: this level relates to the elementary activity (to read a text, to do an exercise...).

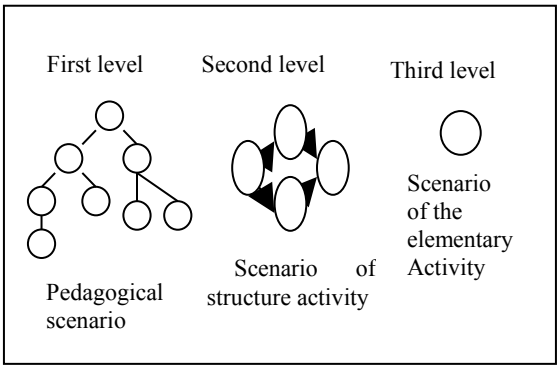

Figure 4. Granularity levels of a learning situation

Therefore, for a group learning situation the personalization of the communication environment according to the profile group can be applied to all the granularity levels. The most relevant personalization criteria which can intervene, in this type of personalization, are:

- The interaction type: the communication between the group members must respect the interaction type defined in the group profile.
- The communication preferences tools: the personalization of the communication tools is done according to the preferences of the communication tools which are in the group profile.

5. The personalization approach Modeling

In this section we will briefly present the IMS-LD before exposing the mapping of our personalization vision with the IMS-LD.

5.1. Description of the IMS-LD

We saw in what preceded that the IMS-LD is a model that allows us to describe a group learning situation. Indeed, IMS-LD defines the structure of a learning situation like a totality of acts made up of partitions which associate the roles to the activities. An activity is located in an environment including services (chat, forum, etc) as well as resources of contents described using the LOM.

IMS-LD proposes three levels of design (A, B and C)[11]:

- Level A: where the progress of the learning situations is in a static way.
- Level B: this level adds to level A properties, conditions, services of tutoring, to personalize the contents according to the learner profile.
- Level C: this level adds notifications to the level B for the collaborative learning situations. It is this level that describes the group learning situations.

5.2. Personalization Model

In this section we will present our personalization model while basing ourselves on IMS-LD according to the personalization types:

- For the personalization of the group constitution: this operation is not automated in IMS-LD. It is the instructor who selects the members of the group and attributes roles to them. All the criteria of personalization, for this type, are available in the definition of the group profile (in IMS-Enterprise) and that of the learner profile (in LIP for example). Consequently we will add a layer above IMS-LD to offer a personalization service of the group constitution.
- For the personalization of the communication environment: According to model IMS-LD, three types of scenarios (pedagogical Scenario, Scenario of structure activity, Scenario of the elementary activity) can be extracted [11]. Each type of scenario represents a granularity level of the learning situation concerned. These scenarios represent in fact the progress of the activities (Learning Activity, Support Activity, Activity-Structure) defined by IMS-LD. For the personalization of the communication environment we will add a layer of personalization above IMS-LD, knowing that all the necessary information is available in the association of the activity with its environment.

For our model of personalization, we propose a layer of personalization above IMS-LD while basing ourselves on LIP and IMS-Enterprise which gather all information respectively concerning the learner and the group. The objective of this layer is to be able to offer a personalization service of a group learning situation (see figure 5).

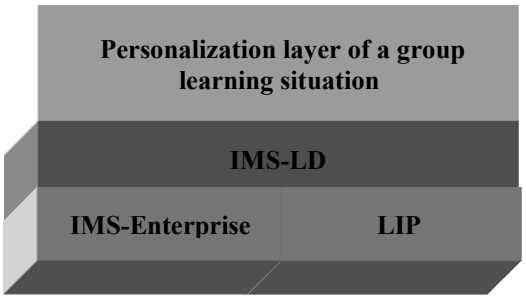

Figure 5. Personalization model

6. Conclusion

In order to improve learning, the personalization of the group learning situation is essential. In this article we presented the most relevant personalization criteria and our layer model of personalization which is based on IMS-LD. To validate our approach, we conceived a personalization service which is under development among our team.

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Thanks

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