**[UR-DTASF-11] Making grouping suggestions to the teacher**

As mentioned above, one of the main challenges in the Catalan language course of the First Reception Service is meeting the different learning speeds of the students (TCNs). To do that, the teachers usually divide the class into smaller working groups. A course consists of multiple consecutive lessons (classes), one per day in the course period.

In WELCOME, the language course coordination (LCC) scenario refers to a language course of, initially, three consecutive lessons (or classes). In each lesson, every student performs exercises of four types of Catalan language learning activities related to the reading, writing, grammar, and vocabulary of Catalan. Each student is assigned to one working group per lesson. At the end of each lesson, the progress made by the students is individually assessed through means of a specific set of language learning assessment exercises for each of the four types of learning activities. Language speaking activities are not considered in WELCOME. The grouping of students per lesson is usually made by the teacher upon various factors, both course and individual constraints, and depending on the overall course progress level of individual students.

In this context, to facilitate the intervention of the teacher, it would be very helpful if the developed WELCOME technology can support the teacher in her language course coordination. The objective of the agents of the students would be to coordinate among each other for finding an (approximately) optimal assignment of students to groups with similar level of course progress. In particular, the WELCOME platform should allow to assess the progress of each of the students and make grouping suggestions to the teacher at the end of each lesson based on the following constraints:

1. **Individual constraints** specified by the students (TCNs)
2. **Gender**: Gender can be a major constraint for the participation of women in the language learning course. Although this limitation can be considered less important in large groups (such as a class), when working in smaller groups, female TCNs, who do not want to interact with the other gender, are less likely to participate freely in the exercises of the lessons if they are grouped into a mixed-gender group. This can also happen to male-TCNs, although it is less likely to happen.

Therefore, the agent should respect the preference of its TCN about being assigned to a mixed-gender group or not. In fact, this individual constraint must be satisfied.

1. **Nationality**. Although many people do not have a problem when working with other nationalities, some of the TCNs might have. To ensure the progress of all members of a group in a class, the agent should respect the preference of its TCN about being assigned to a group with other nationalities than her own one. This constraint, however, may be ignored for sake of finding an overall grouping solution.
2. **System constraints** to be satisfied by the coordinating agents of the TCNs
   1. Each class (lesson) has at least two and at most twenty students
   2. Each group in a lesson has at least two and at most five students
   3. Each group has students with similar course progress level
   4. Each group should have at most one student who missed the preceding lesson.

The **progress assessment scheme** to be used by the agents for their finding of an optimal grouping of students is as follows:

* The language learning skill of a student is measured at the end of each lesson of the course as the equally weighted average sum of percentages of correct answers for each language learning activity (reading, writing, grammar, vocabulary) given by the student in the lesson.
  + The *language learning assessment* score (LLA-X) for a given type X of language learning activity (X in {Reading, Writing, Grammar, Vocabulary}) denotes the percentage of correct answers for assessment exercises of this type by the student. An LLA-X score in the interval of 0-49, 50-59, 60-69, 70-79, 80-89, 90-100 is interpreted as “insufficient”, “sufficient”, “good”, “remarkable”, respectively, “outstanding” progress, respectively. Besides, the time a student spent to complete the assessment exercises of a given type of language learning activity in the interval of 0-5, 5-10, 10+ minutes is interpreted as „Student is doing OK“, „Student is facing difficulties“ and „Student is struggling“, respectively, in this regard.
  + The *language lesson* (LL) score of an individual student is defined as the equally weighted sum of the LLA-X scores she obtained for performing assessment exercises for the selected four types of language learning activities in multiple-choice form.
* The *course progress level* (CPL) score for a student is determined as the averaged sum of the LL scores for all lessons she attended so far.