Content

Important Information

Each item in the list (below) is **taken into account** during the computation of **results** (which are described in the next slides). The list below, is **agreed with User Partner, Marlen**.

1. Each TCN is able to specify 3 options for each individual preference:
    1. *Same*: **explicit preference** to be in the same gender/nationality group
    2. *Mixed*: **explicit preference** to be in the mixed gender/nationality group
    3. *Don't mind*: **not caring** whether the group is same or mixed
2. **Similarity of Course Progress Level (CPL)** is nearly 2,5 times more important than **satisfaction of individual preferences**. (70% vs 30%, Figure 1)
3. **Gender preference** is 3 times more important than **nationality preference**. (75% vs 25%, Figure 1)
4. It is **penalized** to **violate** both preferences of same TCN such that the violations are **distributed equally**.
5. It is **allowed** to have **2 TCNs** who missed the previous lesson in the same group **only if** the number of TCNs who missed the previous lesson is **higher** than the number of possible groups. For example, if there are 16 TCNs in the classroom and 9 of them missed the previous lesson, then it is allowed to have at most 2 of those 9 in the same group because otherwise (otherwise = each group has at most 1 TCN who missed previous) there will be no possible solution.
6. The agents **will share** personal info, preferences and TCN names with each others. However, no agent is allowed to share the personal info or preferences of other TCNs with its own TCN.
7. Agents will save the result of each executed LCC process. However, there is no need to present the previous results to TCNs in LCC. Therefore, such a functionality is not required to be provided in MyWelcome app.
8. Furthermore, all of the rest of the constraints in Informal Description of LCC are taken into account.

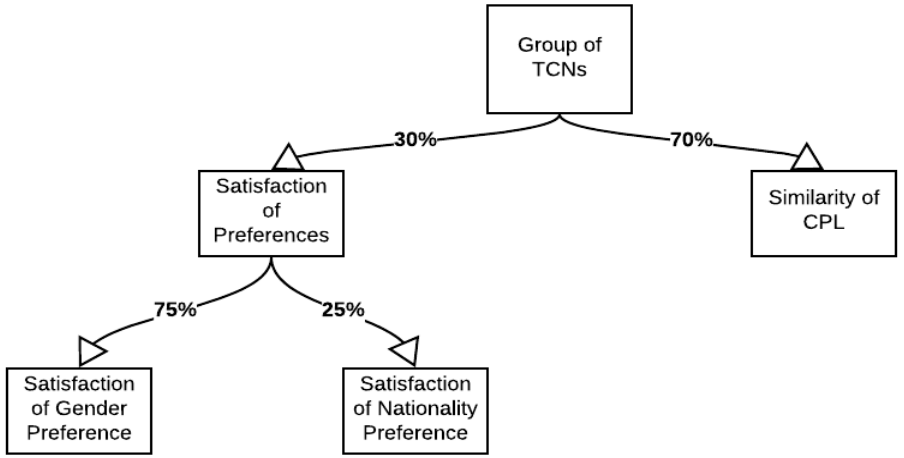

Figure 1. Overview of making a group for LCC

Explanation of Tables and Technical Terms

Following slides consist of an **example** and a set of **grouping results**. In this slide, technical terms and abbreviations are explained appropriately.

1. The list of TCNs: **Example**

The following table consists of information of 10 TCNs. The data is not collected from real TCNs nor given by a teacher. **The data is randomly designed such that the algorithm can be tested**. In the table, the name (Gender, CPL, Prev. Lesson, etc.) of each row clearly explains the type of information.

Example 4											
TCN	**Configuration**	**TCN1**	**TCN2**	**TCN3**	**TCN4**	**TCN5**	**TCN6**	**TCN7**	**TCN8**	**TCN9**	**TCN10**
Gender	50% Male, 50% Female	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Nationality	3 types of nationalities	C	B	C	A	C	B	B	A	A	C
Average CPL	[45,83]	51	83	45	74	53	73	63	70	57	81
Previous Lesson	30% missed	Missed	Attended	Attended	Attended	Attended	Missed	Attended	Attended	Missed	Attended
Gender Preference	60% same, 20% mixed, 20% don't mind 40% of male-same, 20% male-mixed 80% of female - same, 20% female-mixed	Same	Same	Same	Don't mind	Same	Same	Same	Mixed	Mixed	Don't mind
Nationality Preference	30% same, 30% mixed, 40% don't mind 40% of male-same, 20% male-mixed 20% of female-same, 40% female-mixed	Mixed	Mixed	Mixed	Same	Don't mind	Don't mind	Don't mind	Same	Same	Don't mind

2. The set of grouping results:

In the table below, the **rank list (top 8) of the best** grouping results is described (**computed by the algorithm**). First, "Gender Violation" column describes the total amount of violations of gender preferences in the grouping result. Same for "Nationality Violations" and "Total Violations" which is the sum of "Gender Violations" and "Nationality Violations". **"Total SD" represents the total Standard Deviation (SD) of the grouping. SD value describes how close the CPL of TCNs in the group are. Smaller SD shows that the CPL of TCNs are more closer to each others. For example, if all TCNs would have the same CPL, then SD would be 0. And higher SD shows the opposite (CPLs are farther to each others).** See the next slide for further explanations…

Best Grouping Results	**Gender Violati**	**Nation. Viol**	**Total Viol**	**Total SD**
1. [[1, 5], [2, 10], [3, 7], [4, 6], [8, 9]] -- n1,n4	0	2	2	18
2. [[1, 7], [2, 6], [3, 5], [4, 8], [9, 10]] -- n2,n3,g8,n9	1	3	4	29
3. [[1, 5], [2, 6], [3, 7], [4, 8], [9, 10]] -- n1,n2,g8,n9	1	3	4	29
4. [[2, 6, 10], [3, 5, 7], [1, 8], [4, 9]] -- g1,n8	1	1	2	29,7
5. [[2, 6, 10], [3, 5, 7], [1, 4], [8, 9]] -- g1,n4	1	1	2	29,7
6. [[1, 5, 7], [2, 6, 10], [3, 8], [4, 9]] -- g3,n8	1	1	2	30,6
7. [[1, 5, 7], [2, 6, 10], [3, 4], [8, 9]] -- g3,n4	1	1	2	30,6
8. [[1, 3, 7], [2, 6, 10], [4, 5], [8, 9]] -- g5,n4	1	1	2	28,8

Explanation of Tables and Technical Terms

2. The set of grouping results:

Regarding the explanation of a grouping result, let's take the best (number 1) result and explain on the example. The best grouping is ***[[1,5], [2,10], [3,7], [4,6], [8,9]] – n1, n4***. In figure 2, the meaning of brackets and numbers are shown. Furthermore, "**n1, n4**" should be interpreted as "*the nationality preferences of TCN1 and TCN4 are violated in this grouping*". For example, "**g3**" means that "*the gender preference of TCN3 is violated in the grouping*".

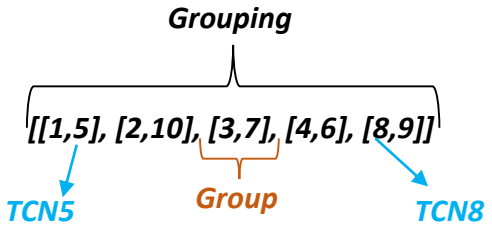

Figure 2. A grouping result

Best Grouping Results	Gender Violati	Nation. Viol	Total Viol	Total SD
1. [[1, 5], [2, 10], [3, 7], [4, 6], [8, 9]] -- n1,n4	0	2	2	18
2. [[1, 7], [2, 6], [3, 5], [4, 8], [9, 10]] -- n2,n3,g8,n9	1	3	4	29
3. [[1, 5], [2, 6], [3, 7], [4, 8], [9, 10]] -- n1,n2,g8,n9	1	3	4	29
4. [[2, 6, 10], [3, 5, 7], [1, 8], [4, 9]] -- g1,n8	1	1	2	29,7
5. [[2, 6, 10], [3, 5, 7], [1, 4], [8, 9]] -- g1,n4	1	1	2	29,7
6. [[1, 5, 7], [2, 6, 10], [3, 8], [4, 9]] -- g3,n8	1	1	2	30,6
7. [[1, 5, 7], [2, 6, 10], [3, 4], [8, 9]] -- g3,n4	1	1	2	30,6
8. [[1, 3, 7], [2, 6, 10], [4, 5], [8, 9]] -- g5,n4	1	1	2	28,8

LCC Example 1

Example 1											
TCN	**Configuration**	**TCN1**	**TCN2**	**TCN3**	**TCN4**	**TCN5**	**TCN6**	**TCN7**	**TCN8**	**TCN9**	**TCN10**
Gender	50% Male, 50% Female	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Nationality	4 types of nationalities	A	C	A	B	C	A	A	C	D	B
Average CPL	[55,93]	74	84	55	93	62	58	92	80	70	66
Previous Lesson	30% missed	Attended	Missed	Attended	Attended	Missed	Attended	Attended	Missed	Attended	Attended
Gender Preference	30% same, 30% mixed, 40% don't mind 20% of male-same,20% of male-mixed 40% of female-same, 40% of female-mixed	Mixed	Same	Same	Mixed	Same	Don't mind	Mixed	Don't mind	Don't mind	Don't mind
Nationality Preference	30% same, 20% mixed, 50% don't mind 20% of male-same, 20% of male-mixed 40% of female-same, 20% of female-mixed	Same	Mixed	Same	Same	Mixed	Don't mind	Don’t mind	Don't mind	Mixed	Don't mind

In this slide, 2 set of grouping results **(“without penalty” and “with penalty”)** are shown. The meaning of Penalty is given at **Item 4 in Slide 2**. In “**Without Penalty**” table, the Item 4 is **not implemented** in the algorithm in order **to show the effect** compared to “**With Penalty**” table.

Best Grouping Results (without penalty)	**Gender Violati**	**Nation. Viol**	**Total Viol**	**Total SD**
1. [[1, 6], [2, 10], [3, 5], [4, 7], [8, 9]] -- n3,n4	0	2	2	26
2. [[1, 4], [2, 6], [3, 5], [7, 8], [9, 10]] -- n1,n4, n3,	0	3	3	34
3. [[1, 6, 7, 8], [3, 5], [4, 9], [2, 10]] -- n1,n3,n4	0	3	3	36,3
4. [[1, 4, 6, 7], [3, 5], [8, 9], [2, 10]]--n1,n4,n3,	0	3	3	31,9
5. [[1, 5], [2, 6], [3, 9], [4, 7], [8, 10]] -- g1,n1,n3,n4,	1	3	4	34
6. [[1, 6, 7, 8], [3, 5], [9, 10], [2, 4]]--n1,n3,g4,n4	1	3	4	22,3
7. [[1, 3, 5, 9], [4, 7], [6, 8], [2, 10]]--g1,n1,n3,n4,	1	3	4	27,8
8. [[1, 6], [2, 7], [3, 5], [4, 8], [9, 10]]--g2,n3,g4,n4,	2	2	4	24
Best Grouping Results (with penalty)	**Gender Violati**	**Nation. Viol**	**Total Viol**	**Total SD**
1. [[1, 6], [2, 10], [3, 5], [4, 7], [8, 9]] -- n3,n4	0	2	2	26
2. [[1, 4], [2, 6], [3, 5], [7, 8], [9, 10]] -- n1,n4, n3,	0	3	3	34
3. [[1, 6, 7, 8], [3, 5], [4, 9], [2, 10]] -- n1,n3,n4	0	3	3	36,3
4. [[1, 4, 6, 7], [3, 5], [8, 9], [2, 10]]--n1,n4,n3,	0	3	3	31,9
5. [[1, 4], [2, 6], [3, 9], [5, 7], [8, 10]] -- n1,n4,n3,g7,	1	3	4	52
6. [[1, 3], [2, 6], [4, 5], [7, 8], [9, 10]] --g1,g5,n4,	2	1	3	41
7. [[1, 6, 7, 8], [3, 5], [9, 10], [2, 4]] -- n1,n3,g4,n4	1	3	4	22,3
8. [[1, 6], [2, 7], [3, 9], [4, 5], [8, 10]] -- g2,n3,g5,n4,	2	2	4	42

LCC Example 2

Example 2											
TCN	**Configuration**	**TCN1**	**TCN2**	**TCN3**	**TCN4**	**TCN5**	**TCN6**	**TCN7**	**TCN8**	**TCN9**	**TCN10**
Gender	30% Male, 70% Female	Male	Female	Female	Male	Female	Female	Female	Male	Female	Female
Nationality	4 types of nationalities	B	D	A	C	B	A	C	C	A	B
Average CPL	[51,95]	88	66	55	77	51	95	80	57	90	68
Previous Lesson	60% missed	Missed	Attended	Missed	Attended	Missed	Missed	Attended	Missed	Attended	Missed
Gender Preference	40% same, 20% mixed, 40% don't mind 0% of male-same, 0% of male-mixed 60% of female - same, 30% of female-mixed	Don't mind	Same	Mixed	Don't mind	Same	Mixed	Same	Don't mind	Don't mind	Same
Nationality Preference	30% same, 0% mixed, 70% don't mind 30% of male-same 30% of female-same	Same	Same	Don't mind	Don't mind	Same	Don't mind	Don't mind	Don't mind	Don't mind	Don't mind

Best Grouping Results	**Gender Violati**	**Nation. Viol**	**Total Viol**	**Total SD**
1. [[4, 6], [5, 10], [1, 9], [3, 8], [2, 7]] -- n1,n2	0	2	2	26,5
2. [[1, 6], [2, 7], [3, 8], [4, 9], [5, 10]]--n1,n2,	0	2	2	26,5
3. [[1, 4, 6], [2, 5], [3, 8], [7, 9, 10]]--n1,n2,n5,	0	3	3	24,9
4. [[4, 6, 8, 9], [2, 7], [5, 10], [1, 3]]--n2,n1	0	2	2	46,9
5. [[1, 3, 4], [2, 7], [5, 10], [6, 8, 9]] -- n1,n2,	0	2	2	46
6. [[1, 5], [2, 7], [3, 8], [4, 6], [9, 10]]--g5,n2,	1	1	2	46,5
7. [[1, 4, 6, 7], [2, 10], [3, 8], [5, 9]]--g7,n1,n2,n5	1	3	4	28,5
8. [[1, 6], [2, 7], [3, 5], [4, 8], [9, 10]]--n1,n2,g3,n5	1	3	4	33,5

LCC Example 3

Example 3											
TCN	**Configuration**	**TCN1**	**TCN2**	**TCN3**	**TCN4**	**TCN5**	**TCN6**	**TCN7**	**TCN8**	**TCN9**	**TCN10**
Gender	30% Male, 70% Female	Male	Female	Female	Male	Female	Female	Female	Male	Female	Female
Nationality	4 types of nationalities	B	D	A	C	B	A	C	C	A	B
Average CPL	[51,95]	88	66	55	77	51	95	80	57	90	68
Previous Lesson	50% missed	Attended	Attended	Missed	Attended	Missed	Missed	Attended	Missed	Attended	Missed
Gender Preference	40% same, 20% mixed, 40% don't mind 0% of male-same, 0% of male-mixed 60% of female - same, 30% of female-mixed	Don't mind	Same	Mixed	Don't mind	Same	Mixed	Same	Don't mind	Don't mind	Same
Nationality Preference	30% same, 0% mixed, 70% don't mind 30% of male-same 30% of female-same	Same	Same	Don't mind	Don't mind	Same	Don't mind	Don't mind	Don't mind	Don't mind	Don't mind

Best Grouping Results	**Gender Violati**	**Nation. Viol**	**Total Viol**	**Total SD**
1. [[1, 6], [2, 5], [3, 4], [7, 10], [8, 9]] -- n1,n2,n5	0	3	3	44,5
2. [[1, 6], [2, 5], [3, 4], [7, 8], [9, 10]] -- n1,n2,n5,g7	1	3	4	44,5
3. [[1, 6], [2, 5], [3, 7], [4, 8], [9, 10]] -- n1,n2,n5,g3	1	3	4	44,5
4. [[1, 6], [2, 3], [4, 8], [5, 7], [9, 10]] -- n1,g3,n2,n5	1	3	4	44,5
5. [[1, 3], [2, 5], [4, 6], [7, 8], [9, 10]] -- n1,n2,n5,g7	1	3	4	55,5
6. [[1, 5], [2, 10], [3, 7], [4, 6], [8, 9]] -- g5,n2,g3	2	1	3	57,5

LCC Example 4

Example 4											
TCN	**Configuration**	**TCN1**	**TCN2**	**TCN3**	**TCN4**	**TCN5**	**TCN6**	**TCN7**	**TCN8**	**TCN9**	**TCN10**
Gender	50% Male, 50% Female	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Nationality	3 types of nationalities	C	B	C	A	C	B	B	A	A	C
Average CPL	[45,83]	51	83	45	74	53	73	63	70	57	81
Previous Lesson	30% missed	Missed	Attended	Attended	Attended	Attended	Missed	Attended	Attended	Missed	Attended
Gender Preference	60% same, 20% mixed, 20% don't mind 40% of male-same, 20% male-mixed 80% of female - same, 20% female-mixed	Same	Same	Same	Don't mind	Same	Same	Same	Mixed	Mixed	Don't mind
Nationality Preference	30% same, 30% mixed, 40% don't mind 40% of male-same, 20% male-mixed 20% of female-same, 40% female-mixed	Mixed	Mixed	Mixed	Same	Don't mind	Don't mind	Don't mind	Same	Same	Don't mind

Best Grouping Results	**Gender Violati**	**Nation. Viol**	**Total Viol**	**Total SD**
1. [[1, 5], [2, 10], [3, 7], [4, 6], [8, 9]] -- n1,n4	0	2	2	18
2. [[1, 7], [2, 6], [3, 5], [4, 8], [9, 10]] -- n2,n3,g8,n9	1	3	4	29
3. [[1, 5], [2, 6], [3, 7], [4, 8], [9, 10]] -- n1,n2,g8,n9	1	3	4	29
4. [[2, 6, 10], [3, 5, 7], [1, 8], [4, 9]] -- g1,n8	1	1	2	29,7
5. [[2, 6, 10], [3, 5, 7], [1, 4], [8, 9]] -- g1,n4	1	1	2	29,7
6. [[1, 5, 7], [2, 6, 10], [3, 8], [4, 9]] -- g3,n8	1	1	2	30,6
7. [[1, 5, 7], [2, 6, 10], [3, 4], [8, 9]] -- g3,n4	1	1	2	30,6
8. [[1, 3, 7], [2, 6, 10], [4, 5], [8, 9]] -- g5,n4	1	1	2	28,8