FLURESP
online educational prioritization tool

REFERENCE GUIDE

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Online Educational Priorization Tool

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Introduction

The objective of this software is to generate one single aggregated value (composite indicator) for each response strategy of one Public Health Program and constitutes an open access decision support.

This new application has been developed in the frame of the FLURESP European project and represents an original and innovative contribution in Public health decision making, as it would allow public health stakeholders to prioritize by themselves various strategies according to a set of defined criteria, using advanced multi-criteria approaches.

1. Input Excel file

1.1. Example

The two next figures displays an example of the two sheets of the input file:

Figure 1. Sheet 1: data
1.2. Filling

On the first sheet (data), you have to indicate the number of criteria, and the number of strategies:

Then you have to fill the names of the criteria and strategies (see figure 4).
You should indicate the specifications of each criterion on the 2nd sheet (parameters):

<table>
<thead>
<tr>
<th>Type</th>
<th>Coordination</th>
<th>Performance 1</th>
<th>Performance 2</th>
<th>Ethic</th>
<th>Direct Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>qualitative</td>
<td>quantitative</td>
<td>quantitative</td>
<td>qualitative</td>
<td>quantitative</td>
</tr>
<tr>
<td>minimum value</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>maximum value</td>
<td>20</td>
<td>60</td>
<td></td>
<td>yes</td>
<td>40</td>
</tr>
<tr>
<td>to be maximized ?</td>
<td>no</td>
<td>yes</td>
<td></td>
<td>very low</td>
<td>no</td>
</tr>
<tr>
<td>Items (from worst to best)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>low</td>
<td>medium</td>
<td>high</td>
<td>very high</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5. Criteria's specifications

There are two kinds of criterion:

- **Quantitative**: it corresponds to a numerical criterion. You have to indicate the minimum and the maximum values for the criterion. If the criterion has to be maximized the best value is the higher one.
- **Qualitative**: it corresponds to a categorical criterion. The value is chosen in an exhaustive list. You have to write this list, starting from the worst item, to the best one.

After that, you can fill data on the first sheet (data).

- **Weight**: the weight of the criterion compare to others. By default, the weights are 1 (equal importance of criteria)
- **Veto**: this value is used in the outranking graph: a strategy A is considered as better than another B is there is enough criteria for which A is better than B (this number of criteria is defined by the concordance threshold in the software). For criteria where A is worst than B, the gap between the two values has to be inferior to the veto. In case of qualitative criteria, we suppose that the gap between two successive items is equal to 1. If a veto is not defined, the software will consider that there is no veto for the criterion.
- **Data table**:
  - Numeric values: only integer or intervals of integers (in case of intervals, values have to be separated by a semicolon)
  - Qualitative values have to belong to the list defined previously.

If the file is not correctly filled, an error will occur when uploading.

## 2. Uploading the file

When your file is ready, you can upload it using the form on the welcome page (see Figure 6). The upload takes a few seconds.
Then, a new page shows data and results in distinct tabs:

Figure 6. The uploading page

Figure 7. The results page
3. Results

3.1. Spider chart

Each spoke represents one criterion. On each spoke, a point indicates the data value of the strategy for the corresponding criterion. A line is drawn between each point, for each strategy, giving rise to a surface.

The higher the surface is, the better the strategy is.

Figure 8. displays an example:

![Spider chart](image)

In this example, "Intervention 3" is the best for the criterion “Performance 1” (far from the centre). On the other hand, “Smartphone 5” is the worst one (close to the centre).

3.2. Outranking graph

In this outranking graph, if there is an arrow from a strategy $S_i$ to another strategy $S_j$, it means that the strategy $S_i$ is "better" than the strategy $S_j$. If two strategies cannot be compared, there is no arrow between the two strategies.
The figure 9 shows that, for example, "Intervention 6" (S6) outranks "Intervention 1" (S1) and "Intervention 4" (S4). The graph shows that S5 and S6 are outranked by no interventions; and that S3 and S4 outrank no interventions.

The outranking graph is been obtained with the Electre method. The Electre method is an outranking multicriteria decision analysis method (see section 1). In this method, each pair of strategies is compared, according to the different criteria. Calculations corresponding to this method are given below the graph (concordance table, veto table and preference table).

The threshold can be changed (on the left of the graph); calculations and the graph will be changed too. 0 is the minimum value for the threshold and 1 is the maximum value.

Figure 10. displays 3 tables: the first one corresponds to the concordance values; the second table indicates “true” if the veto has been applied and “false” otherwise; and the last one is the combination between the first table, the second table and the concordance threshold.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention 1</td>
<td>1.0</td>
<td>0.2</td>
<td>0.6</td>
<td>0.8</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td>Intervention 2</td>
<td>1.0</td>
<td>1.0</td>
<td>0.8</td>
<td>0.6</td>
<td>0.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Intervention 3</td>
<td>0.6</td>
<td>0.2</td>
<td>0.6</td>
<td>0.6</td>
<td>0.2</td>
<td>0.6</td>
</tr>
<tr>
<td>Intervention 4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.8</td>
<td>1.0</td>
<td>0.6</td>
<td>0.2</td>
</tr>
<tr>
<td>Intervention 5</td>
<td>0.6</td>
<td>0.8</td>
<td>0.8</td>
<td>0.4</td>
<td>1.0</td>
<td>0.6</td>
</tr>
<tr>
<td>Intervention 6</td>
<td>0.8</td>
<td>0.6</td>
<td>0.6</td>
<td>0.8</td>
<td>0.6</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Figure 10. Tables associated to the outranking graph: concordance values, veto and combination of concordance and veto
3.3. Borda count

The Borda count determines an order between strategies by giving each a certain number of points corresponding to the position in which it is ranked by each criterion. For each criterion, the strategies are sorted, and points are affected depending to the rank. Then, the sum of all points is calculated for each strategy. So we get an order between strategies.

Default Borda coefficients are canonical coefficients. These coefficients are editable on the web page.

![Borda result](image)

The figure 11 allows us to say that “Intervention 2” and “Intervention 6” are equivalent and are the best ones; the last one is “Intervention 3”.

Example:

**Borda coefficients** (the number of coefficients and the number of strategies are equals):

<table>
<thead>
<tr>
<th>Rank</th>
<th>#1</th>
<th>#2</th>
<th>#3</th>
<th>#4</th>
<th>#5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borda Coefficient</td>
<td>15</td>
<td>10</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Strategies and criteria** (all to be maximized):

<table>
<thead>
<tr>
<th></th>
<th><strong>Criterion 1</strong></th>
<th></th>
<th><strong>Criterion 2</strong></th>
<th></th>
<th><strong>Criterion 3</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Value</td>
<td>Borda</td>
<td>Value</td>
<td>Borda</td>
<td>Value</td>
</tr>
<tr>
<td><strong>Strategy 1</strong></td>
<td>12</td>
<td>10</td>
<td>6</td>
<td>(10+5+3)/3</td>
<td>50</td>
</tr>
<tr>
<td><strong>Strategy 2</strong></td>
<td>10</td>
<td>(5+3)/2</td>
<td>6</td>
<td>(10+5+3)/3</td>
<td>10</td>
</tr>
<tr>
<td><strong>Strategy 3</strong></td>
<td>13</td>
<td>15</td>
<td>10</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td><strong>Strategy 4</strong></td>
<td>10</td>
<td>(5+3)/2</td>
<td>6</td>
<td>(10+5+3)/3</td>
<td>35</td>
</tr>
<tr>
<td><strong>Strategy 5</strong></td>
<td>8</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>13</td>
</tr>
</tbody>
</table>

1 These points are the Borda coefficients. If several strategies are equivalent, the average is affected.
3.4. Weighted sum

The strategies are compared according to the weighted sum, that is, for a strategy, the sum of the percentage values\(^2\) obtained for each criterion, multiplied by the weight of the criterion considered. In red, the minimal values are used, in blue, the mean values and in green, the maximal values.

![Weighted sum graph](image)

Figure 12. Weighted sum

On the graph, the different strategies are ordered, starting from the best strategy to the worst one.

3.5. Stacked bar chart

The bars in the stacked bar figure are divided into categories, the criteria. Each bar represents the values obtained by the strategy according to the corresponding criterion.

It allows comparing the importance of a criterion in different strategies.

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\(^2\) For each value in the table, a percentage is calculated. 100% correspond to the maximum value defined for the criterion, and 0% to the minimum. The weighted sum is divided by the sum of the criteria weights.
In the example, for the criterion “Ethic”, we can see that the value is better for “Intervention 1” than for “Intervention 2”. The value of “Coordination” is the same for “Intervention 2”, “Intervention 4” and “Intervention 5”.

Figure 13. Stacked bar chart