Statistical Analysis Tool Manual

Je lève la main

Speechi
Les solutions interactives

TABLE OF CONTENTS

Introduction

To access the statistical analysis tool Je Leve La Main, go to this address: http://statistics.jelevelamain.fr/

Purpose of the Je Leve La Main statistical analysis tool

The purpose for the design of such a statistical analysis tool is to give the teacher, schools, local education authorities, the Department of Education and to researchers, the means - hitherto reserved for professional statisticians - to have objective, rapid and effective feedback on teaching methods. With this tool, the teacher, for example, has the freedom to evaluate their own practices, to compare several teaching methods, to have a clear vision of the progress of their teaching groups, to carry out comparative analysis with other classes in the county, in another county, from another region, or nationally.

Ultimately, the aim of such a system is to assess the relevance of educational policies and school reforms carried out nationwide to improve schools through data collected using an experimental scientific process.

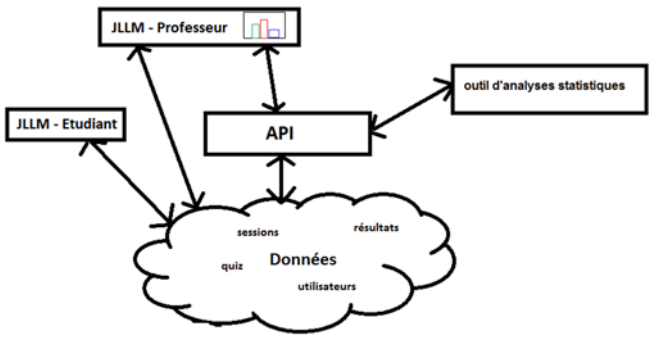
Warning

The statistical analysis tool Je Leve La Main is a tool - initially reserved for professional statisticians - that we have strived to make available to everyone. Mastering such a tool therefore requires training for several hours to understand the features and master the interpretation of its graphs. Although an investment of time is needed, it's a worthwhile endeavour. By making this advanced tool available to as many people as possible, we hope that the studies that will be generated by it and the conclusions to be drawn from it will provide lessons for the path that our school must take for the success of everyone.

Data confidentiality

The tool renders all data that does not belong to you anonymous. Only data such as quizzes, sessions, results and student identifiers in the form of a sequence of numbers can be retrieved by a third party to carry out their study. When you log in to the statistical analysis tool, only you have access to the names of your students.

Overall operation of the tool



Student and quiz data are stored in the cloud (Cloud) and retrieved by the API to answer your queries on the Je Leve La Main application and the statistical analysis tool.

An API is a web service that acts as an intermediary between you and the cloud data. Depending on your queries, the API will take from the cloud the necessary data to answer in order to generate your graphs.

Notes on the manual

This manual is built around two types of reading:

- A quick read that allows you to quickly get the hang of the tool and its various features.
- A more in-depth reading is located in the orange boxes that provide explanation on important concepts, precisely interpret a graph, give examples to better understand the statistical tool.

Studies of the statistical analysis tool

The statistical analysis tool Je Leve La Main allows you to perform two types of study:

- The level assessment study
- The progress study

What is a level assessment study?

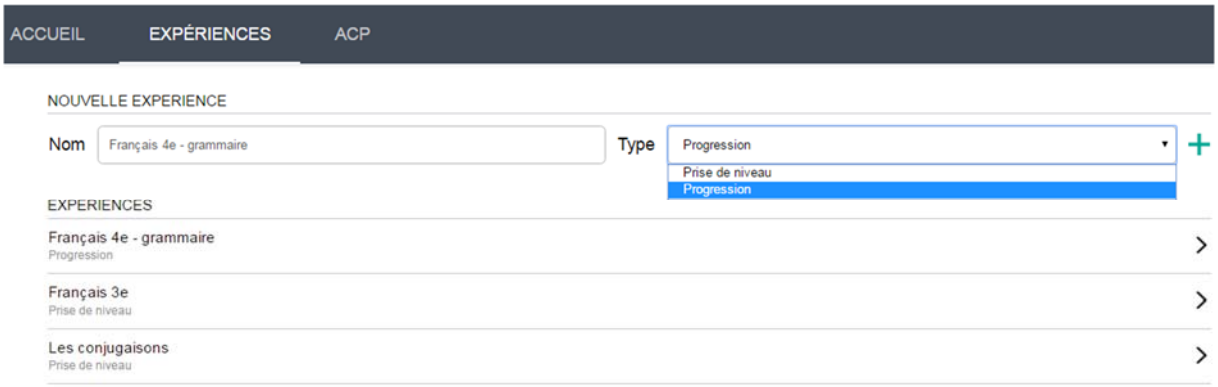
The level assessment study compares the level of several populations over a set of quizzes. Compare one of your classes with your other classes, your classes with classes from another city, county, several other counties, with the entire population. The map tool completes the analysis tools to provide you with a level map.

What is a progress study?

Unlike the level assessment study that informs you of the level of a class at a point in time, the progress study informs you of the evolution of their results over time. It makes it possible to compare the progress of several populations. Perform, for example, a comparative study between two teaching methods implemented in your own classes, with those of a colleague or with an enlarged population (city, county etc.) to determine the method that allows better progress in results. To undertake this progress study, a minimum of two quizzes are therefore required which will have been taken by at least two different groups.

Creating a new statistical study

To undertake a new statistical study, name your new experiment, then choose from the drop-down list “Level assessment” or “progress”. Click on the experiment you just created. You access the interface allowing you to determine the factors of your study.



View or modify an existing study

To edit or view a study you have created, click on the study.

1. The level assessment study

The level assessment study allows you to evaluate the level of your group compared to other groups. To be able to carry out the level assessment study, you will need to determine several factors:

- The quiz or quizzes on which you want to evaluate your groups.
- The groups you want to compare (your group in comparison to other groups).
- The reference level on which you will base your statistical study.

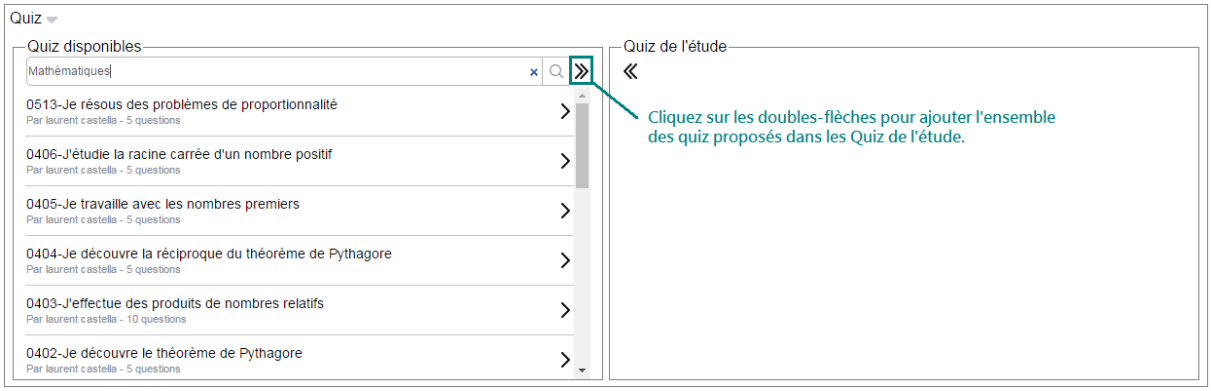
Once your level assessment study has been selected, you can rename or delete your study by clicking on the icons shown here.

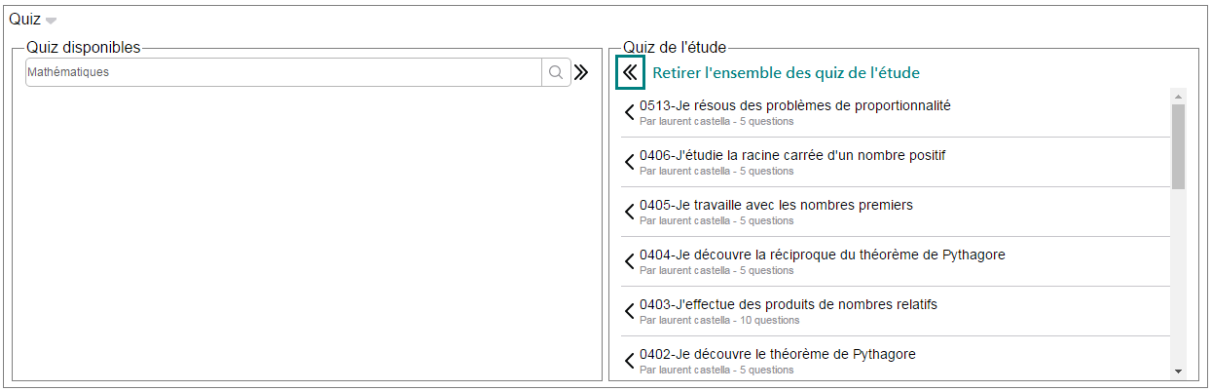
1.1. Select quizzes

The collection of “public” quizzes that you create on the Je Leve La Main software are shared in the cloud. They will therefore be accessible to other teachers who can use your quizzes with their own classes. Once the quiz has been taken, all the data related to it (the results obtained, the geographical data, the criteria assigned to your students) will be stored in this cloud and can be retrieved through queries made by Je Leve La Main users. Data that does not belong to your classes is automatically rendered anonymous (no teacher or student name).

Search the “**Available quizzes**” for quizzes on which you want to make a statistical level assessment study. You will find all the quizzes available in the “Quiz Portal” of the Je Leve La Main application, that is to say yours as well as all those made public.

Once selected by clicking on ›, they appear in “Quiz of the study”.





Note: Do not be surprised if the word typed in the search bar is not necessarily in the title of the quizzes offered. The system also offers quizzes in which the word has been spotted in questions, tags, answers, PDF documents or videos.

1.2. Create and select groups

A group is a set of Je Leve La Main users. The queries made to create groups allow to gather Je Leve La Main users that satisfy criteria. For example, depending on which criteria you assign to your queries, a group can:

- group several of your classes
- group all classes in a school
- group all classes in a county
- group all students in a county living far from their school
- group all students in the country whose parents belong to a certain socio-professional setting
- etc.

1.2.1. Predefined groups

In "**Available Groups**" 4 predefined groups will be displayed that have been created automatically:

Surveyed population	This group brings together all the Je Leve La Main users who answered the quiz(es) in the study.
My school	This group gathers all the users in your school (if it has been indicated in your profile).
My county	This group gathers all the users in your county (if it has been indicated in your profile).
My groups	This group gathers all the groups that you have previously created in the Je Leve La Main software.

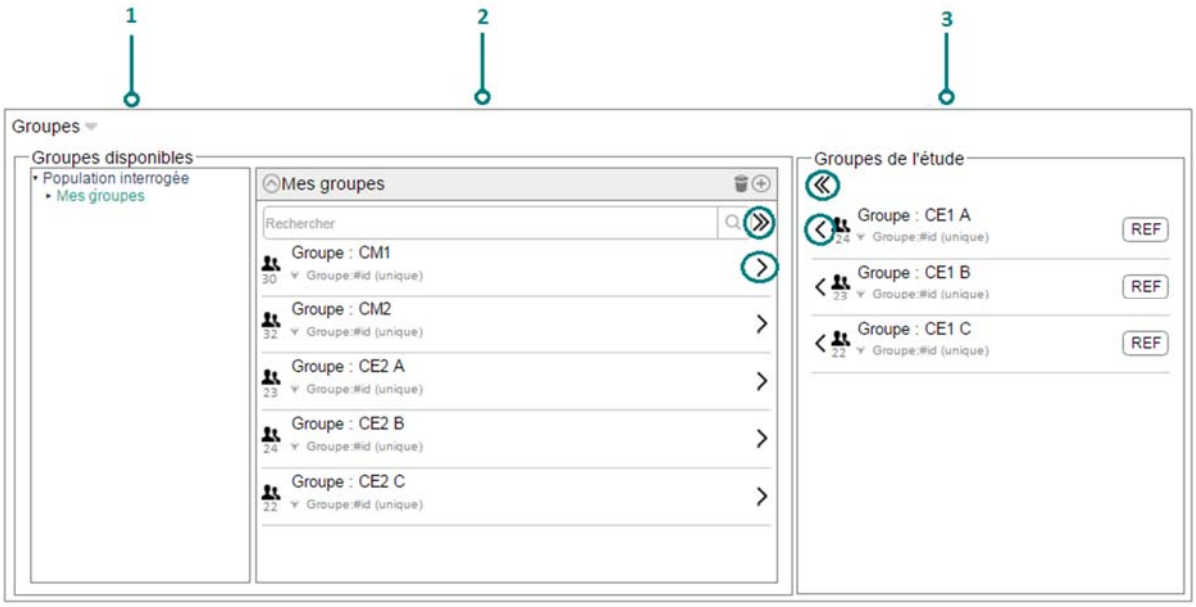
1.2.2. Select and search groups

Select groups

(1) To select groups, click on one of the “available groups” in the left column.

(2) The subgroups of the selected group will be displayed in detail in the middle column. To select one or more groups for the study, click the subgroup arrow. To select all subgroups, click the double-arrows.

(3) The groups selected for the study are displayed in the last column. To remove a group from the study, click the group arrow. To remove all the groups in the study, click on the double-arrows.



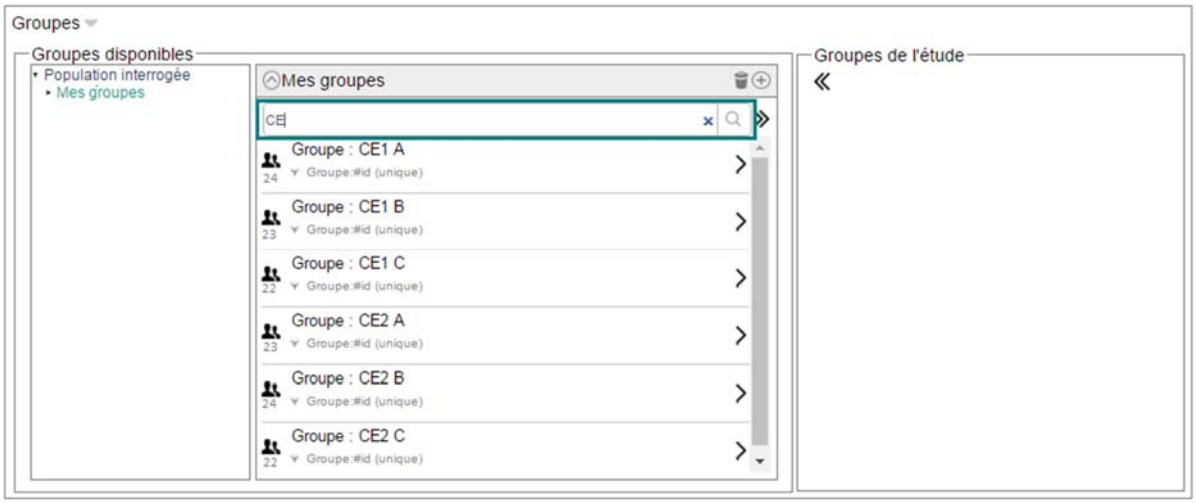
It is useful to know that the groups that were selected for the study (3) intentionally remain “frozen” in your study, to ensure the stability of results. Some groups are, indeed, destined to evolve constantly. Thus, it is likely that a group of classes in a county will grow larger as teachers enrol their students in Je Leve La Main. However, the results of your study will be based on the groups as they were at the time of the set-up of your study.

On the other hand, if you remove the groups selected for the study and select them again, these groups will have been updated in the meantime.

Search groups

After selecting one of the “Available Groups”, search in the middle column for the groups that interest you. The search bar allows you to do:

- a name search by typing the exact name of the group you are looking for.
- a pre-selection of several groups. In the example below, I search in “my groups” for all the groups starting with the letters “CE”. My CE1 and CE2 classes are now displayed.



Group information

When in the left column you select a group, it appears in the middle column with a certain amount of information.

Figure 1: Group including all the schools in my county:

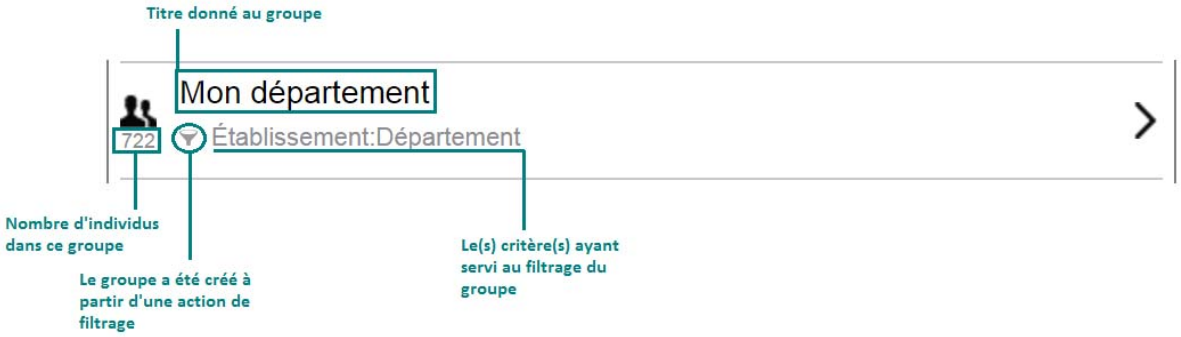
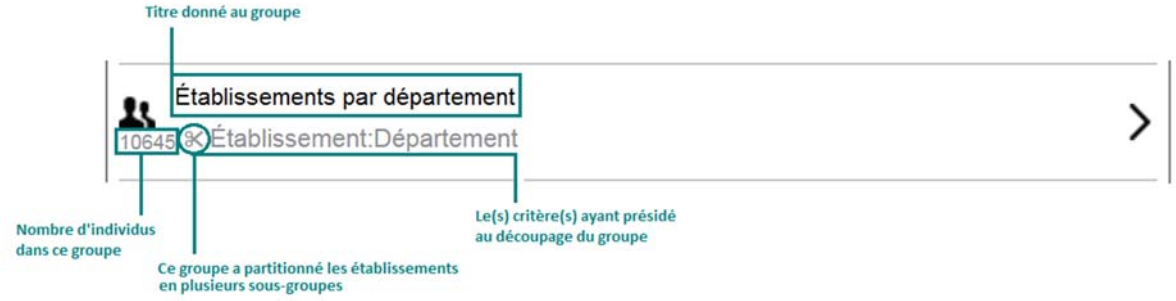


Figure 2: Group distributing schools by county:



N.B.:

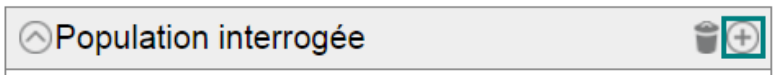
. The title of the group is the one you give it. Be specific about its title so as to reveal the criteria that led to the creation of this group.

. The image of the scissors means that you have partitioned the population or group.

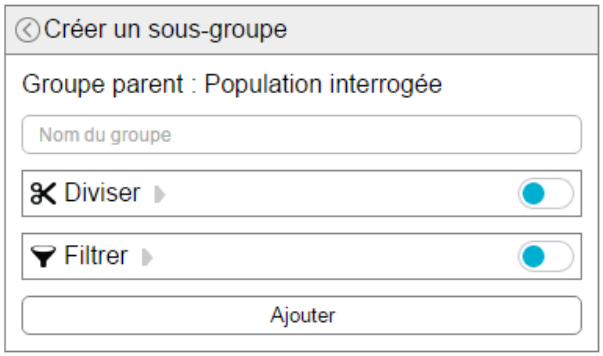
. The image of the filter means that you have filtered the population or group.

1.2.3. Create new groups

Create one or more new group(s) from any existing group. To obtain other groups formed from criteria other than the predefined groups, click on one of the “Available groups”, for example the surveyed population, and then create a subgroup in this population by clicking on ⊕.



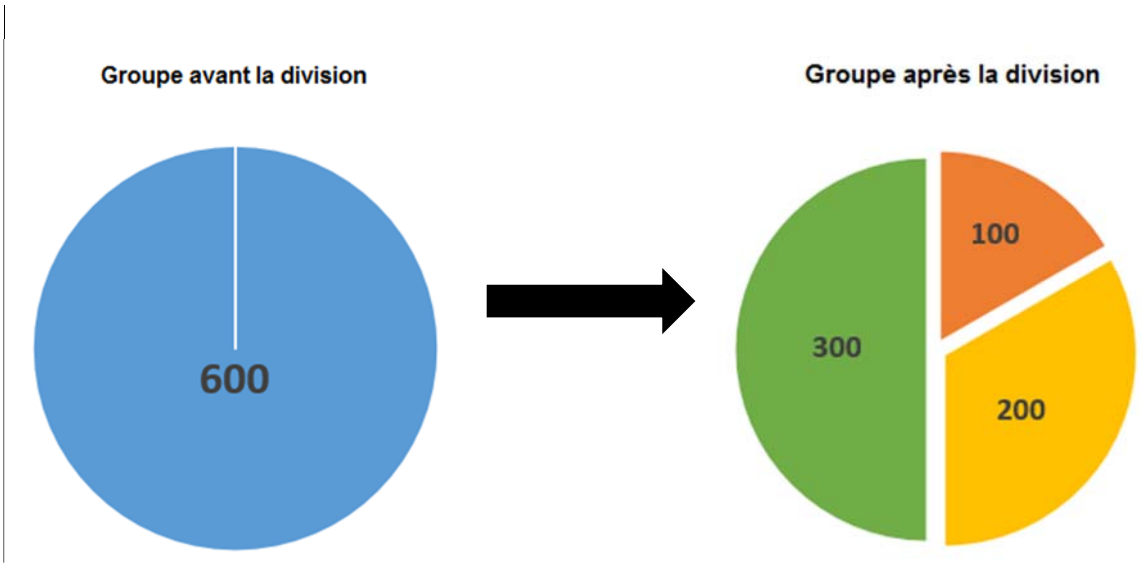
You can “Divide” and/or “Filter” the selected group.



Dividing a group

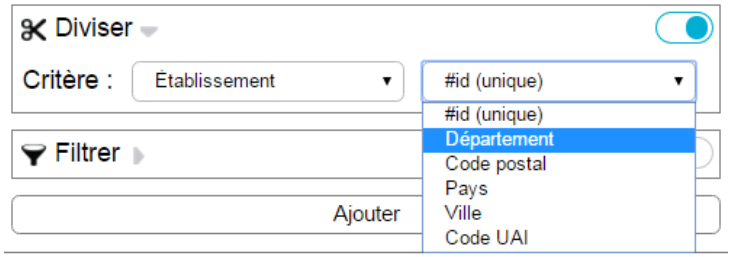
To divide a group is to partition it into several subgroups. When partitioning a group, the entire group is kept and does not separate from any of its members. It is simply distributed differently.

In the example below, the group has been partitioned into 3 subgroups. Before distribution, the group includes 600 individuals. After division, the group still includes 600 individuals, but divided into 3 subgroups of 300, 100 and 200 people each.

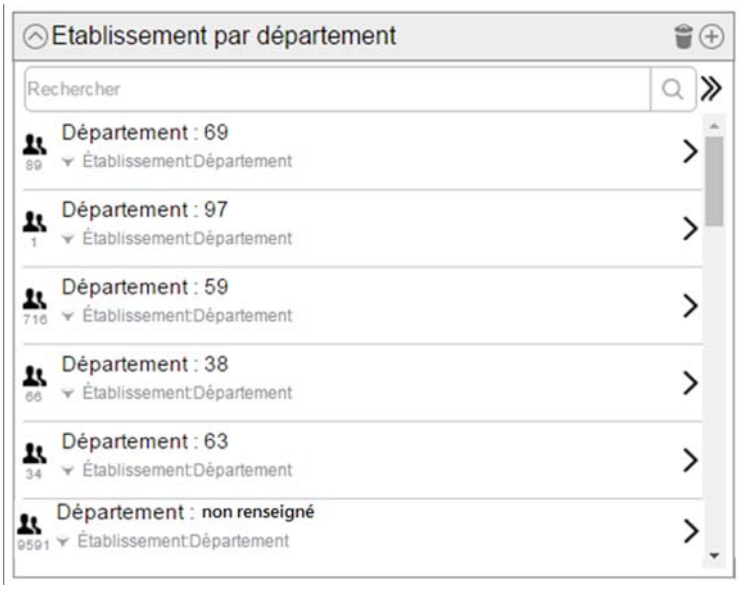


To divide your group into several subgroups, you have the choice between several criteria. You can divide by:

- School.
- Group.
- Your criteria.
- Public criteria, that is criteria entered by others, on the same principle as the quizzes. For example: age, education level of parents' education etc.



Once this first criterion has been selected, select from the drop-down list one of the sub-criteria that is attached to it. For example, you can choose to group the different schools by county.



All you have to do is select the counties with which you want to compare your group to see the geographical differences.

Click on ›. They will appear in "Study groups".

The criterion "#id (unique)" vs "UAI code"

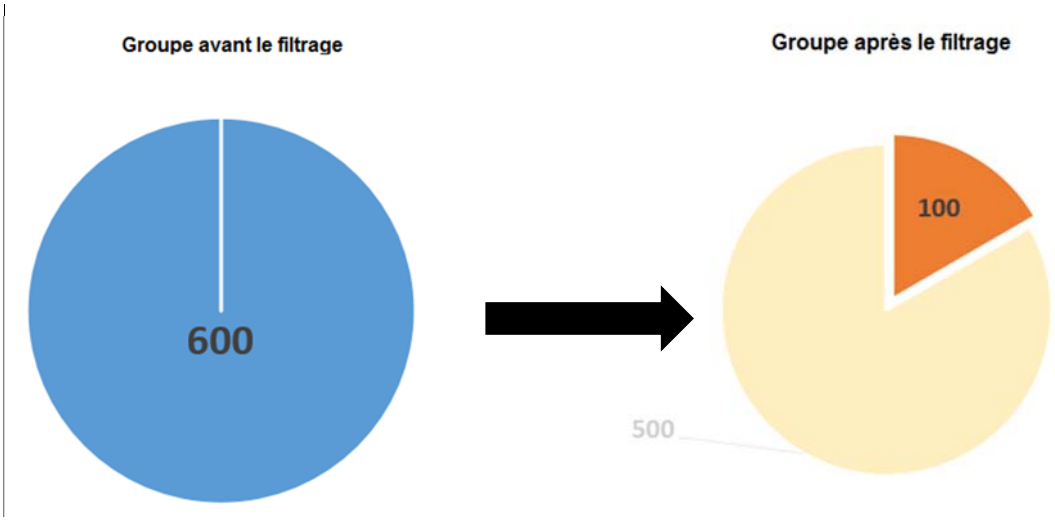
The id# (unique) is a unique identifier assigned by the software to each school and group when registering with Je Leve La Main. The UAI code, meanwhile, is an identifier assigned by the Department of Education to each public and private school under contract.

Teachers who have registered their school will not necessarily have filled in their UAI code, either because they do not know it or because their school does not have a UAI code (schools outside of France for example). By choosing the id# (unique), you are sure to be in the presence of all schools registered in Je Leve La Main, as each subgroup created will represent a single school.

By choosing the "UAI code" criterion to divide schools into subgroups, each school with an UAI code when it is registered will be grouped. On the other hand, all schools whose UAI code has not been entered will be grouped into a single sub-group for which it will be noted as "unspecified".

Filtering a group

To filter a population is to reduce and extract only a portion of that population, as shown in the diagram below.



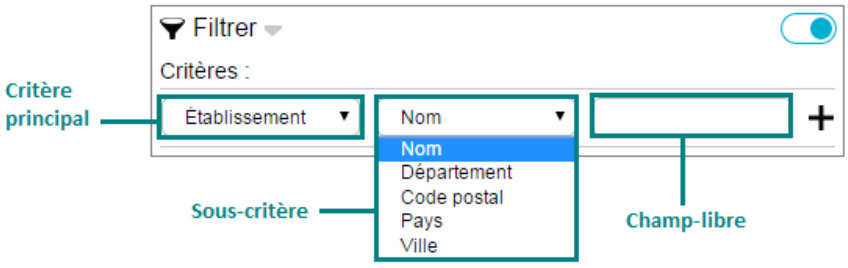
Filtering a group will result in only one subgroup. You can filter a group by:

- school
- your criteria
- public criteria

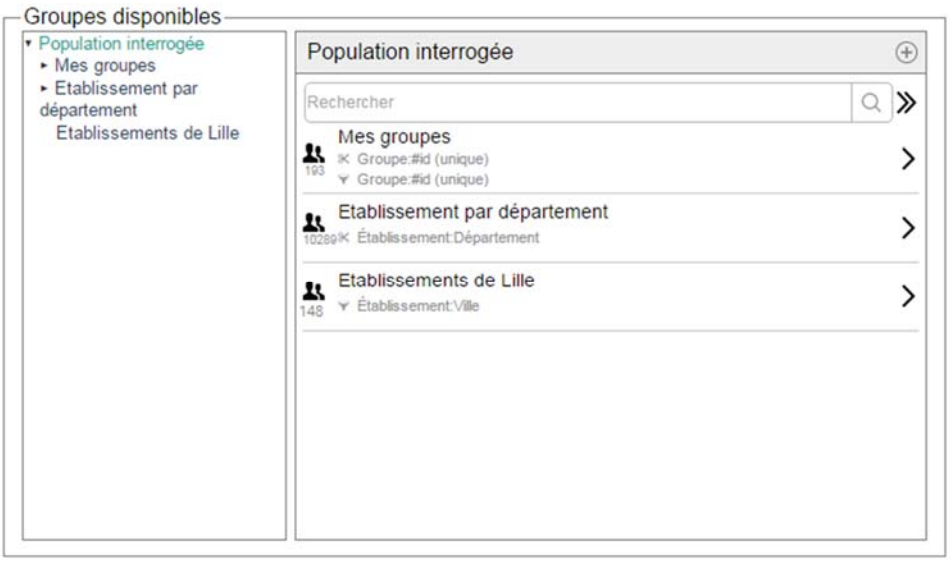
Once this first criterion has been selected, select from the drop-down list one of the sub-criteria that is attached to it.

Filtering by school

You can filter schools by name, county, post code, country, or town. Once this 2nd criterion has been selected, complete the empty field.

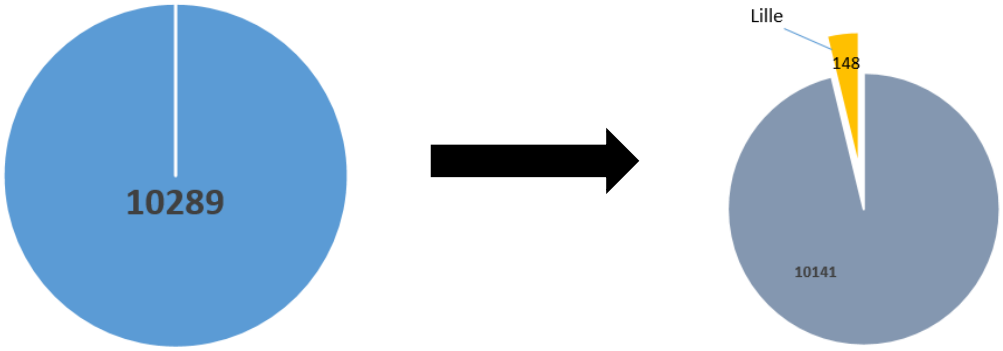


By clicking on the parent group, that is the group you have divided, you will see the newly created subgroup.



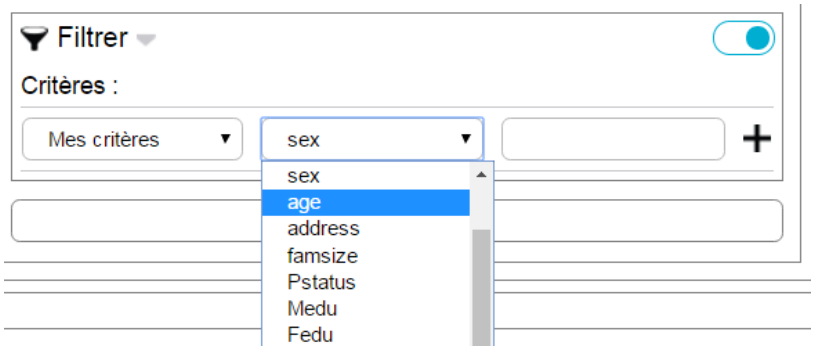
Les établissements inscrits à JLLM

Création du sous-groupe "Établissements de Lille" après filtrage



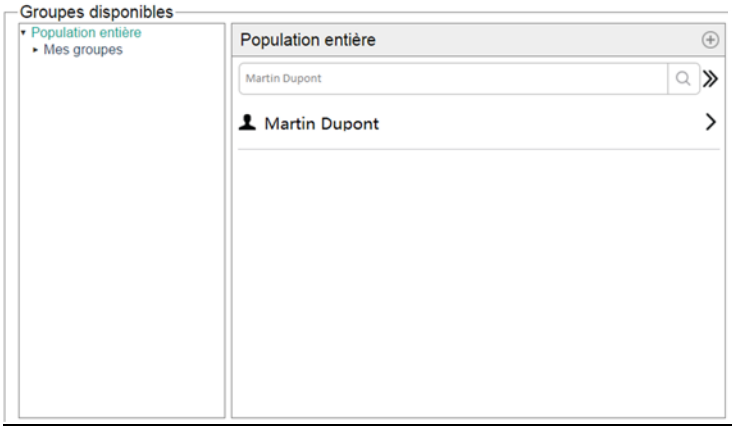
Filter by my criteria or by public criteria

After choosing between your criteria and the public criteria, select from the 2nd field one of the proposed sub-criteria, then enter in the last field the value that interests you. For example, if you want to create a subgroup of all 14-year-olds, select the “age” criteria from the drop-down list and enter in the “14” field.



After completing the empty field, **click on** + for the system to take into account your criteria, then click on "Add". Clicking on the parent group that has been filtered will bring up the newly created subgroup.

Create a group from a student



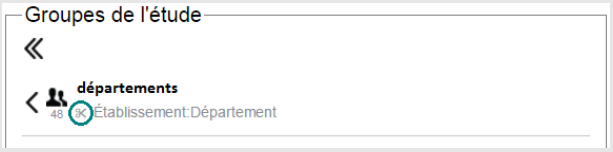
A student has the opportunity to compare them-self with any group. It just requires them to enter in the search bar their first name and surname, and to click on › to constitute a group of their own.

Similarly, they can enter the id# of their group in the search bar to compare them-self with the whole class.

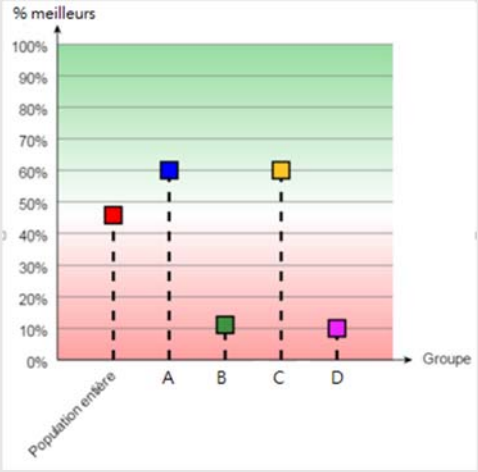
1.2.4. Select a reference group

The reference group is the group against which you will compare the level of the other groups. From the list of "**Study groups**", you can choose your reference group, by clicking on "REF". If you do not select a reference group, the default reference group will be the surveyed population.

Note: You can not select a partitioned group as a reference group, since that would amount to selecting as a reference group all of its subgroups. To understand what a partitioned group is, refer to the "Dividing a group" section, p. 9.



In the same sample of groups, the graph will look different depending on **the reference group** you choose. Changing the reference group is a good way to get additional information about the level of each group. In the example below, **the reference level** remains **the average of the reference group**.

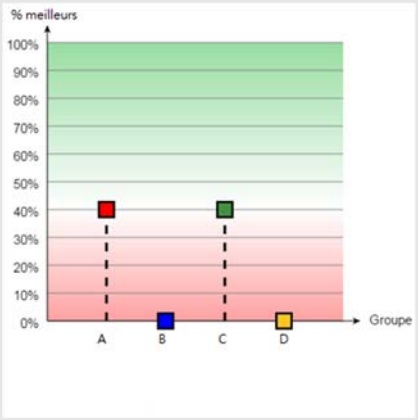


For this first graph, we selected four study groups without determining the reference group. By default, the surveyed population is our reference group. All groups are therefore on the ordinate axis according to the % of people who had a result equal to or greater than the average of the population surveyed.

Among the surveyed population, just under 50% had a result equal to or above average.

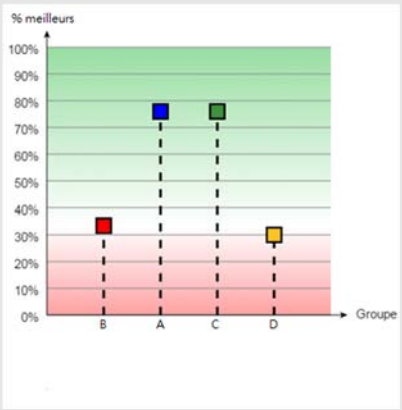
60% of group A and group C have a result equal to or greater than the average of the population surveyed.

About 10% of group B and D have a result equal to or greater than the average of the population surveyed.



In this second graph, group A became my reference group. The other groups will therefore be on the ordinate axis according to the percentage of people who had a result equal to or greater than the group A average.

I learn that no student in group B and D has a grade equal to or greater than the group A average.



In this last graph, group B became my reference group, which allows me to better appreciate how groups B and D are different.

By making group B my reference group, I was able to measure with a different point of view their levels that were equivalent when compared to group A, as no one in groups B and D had a result. equal to or greater than the group A average.

<u>Conclusion</u>:

Multiplying points of view by interchanging reference groups is one way of getting more information about how groups are in relation to each other.

1.3. Selecting the reference level

In **"Reference Level"**, choose from 3 kinds of reference level:

- The average of the reference group.
- The percentage of the best of the reference group.
- The percentage of correct answers.

The *average of the reference group* and the *percentage of the best of the reference group* are reference levels calculated by the tool relative to the reference group.

The *percentage of correct answers* is, for its part, a reference level that you set yourself, without being linked to the reference group.

What is the percentage of the best of the reference group?

By choosing as the reference level the% of the best of a group, I decide the% of people in my reference group who will be above the reference level.

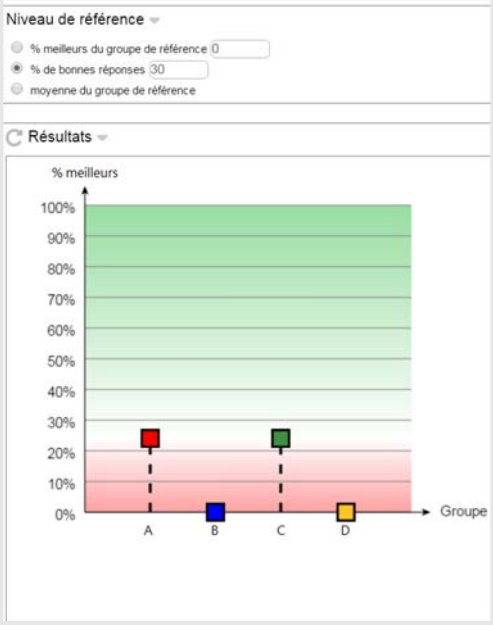
In the example below, my reference group is a class of 10 people who were graded out of 20. I decide to set my reference level in such a way that the top 50% of my reference group are above this level, the top 5 grades in my class. From this percentage of people, the statistical tool calculates the percentage of correct answers corresponding to this reference level in order to make comparisons with other groups who have undertaken the same quizzes.

Grades from my reference group		
	Grade out of 20	% of correct answers
Student 1	16	80%
Student 2	14	70%
Student 3	13	65%
Student 4	12	60%
Student 5	12	60%
Student 6	10	50%
Student 7	9	45%
Student 8	9	45%
Student 9	9	45%
Student 10	8	40%

By setting my reference level to 50% of the best of the reference group, the statistical analysis tool calculates that this reference level has 60% of correct answers.

Grades of the group studied		
	Grade out of 20	% of correct answers
Student 1	20	100%
Student 2	20	100%
Student 3	20	100%
Student 4	9	45%
Student 5	8	40%
Student 6	7	35%
Student 7	6	30%
Student 8	5	25%
Student 9	3	15%
Student 10	2	10%

I compare my reference group to this group. I learn that only 30% of this group is at or above 50% of the best in my reference group.

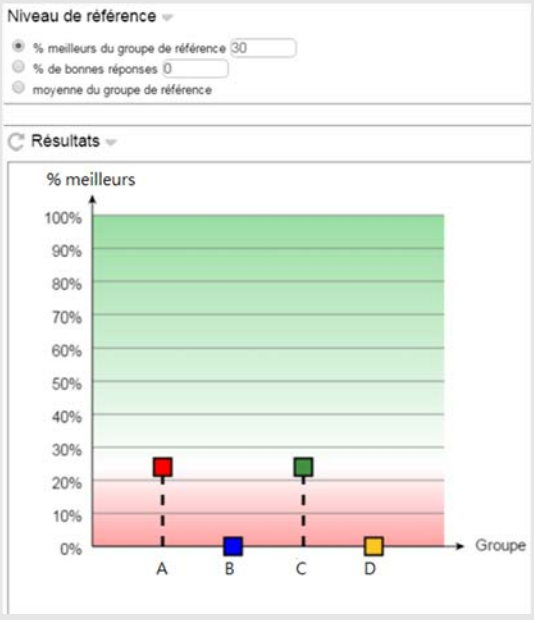


% of correct answers

In the graph opposite, the reference level was determined at 30% of correct answers. Each group is therefore positioned according to this level of correct answers.

About 25% of groups A and B have a result equal to or greater than 30% of correct answers.

No students in groups B and D had a result equal to or greater than 30% of correct answers.



The % of the best in a reference group

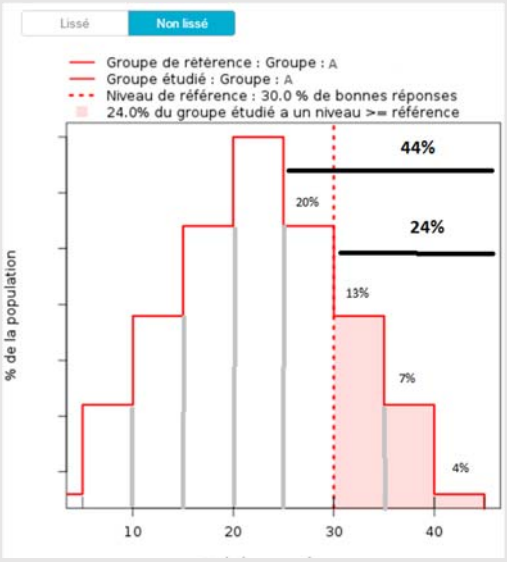
In the graph opposite, the reference level was determined at 30% of the best of the reference group. It can be noted that no student in group B and D reaches the level of the 30% of the best of the reference group.

Note:

In the graph opposite, one would expect that, on the ordinate axis, the reference group (group A) is exactly at 30%, whereas it is below. It is necessary to interpret the value "30%" as "30% at most".

For an explanation, see the box below.

Non smoothed graph for group A



Why was my reference level that I determined at 30% of the best of the reference group reduced to 24% on both my graphs?

This is because the population is divided in tiers. These tiers are determined by intervals of correct answers (Eg: *x students* had between 10 and 15% of correct answers). But the percentage of the best of a group that you determine to calculate your reference level does not necessarily coincide with the limits of the different tiers.

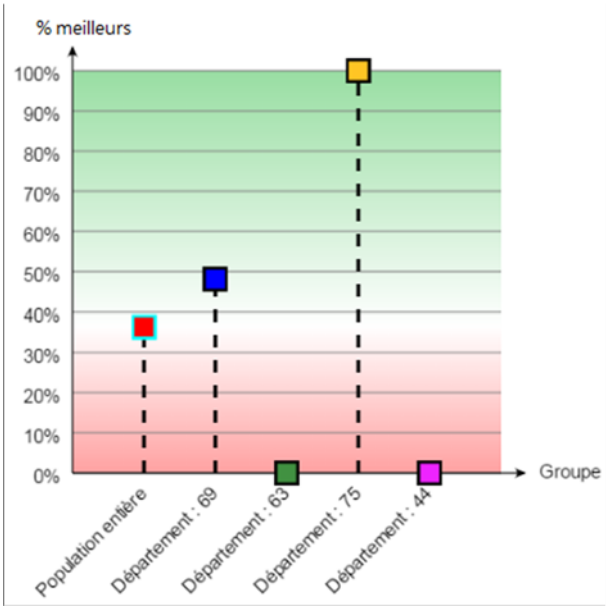
The percentage of the reference group studied will therefore be set at the limit of a tier that will not exceed 30% of students.

In the annotated graph opposite, each tier corresponds to a percentage of students. The last three tiers gather 24% of students. If I took into account the 4th tier, I would exceed 30% of the best requested by taking into account the 44% of the best. The reference level will therefore default to the lower level (here 24% of the best).

1.4. Level assessment graphs

1.4.1. First graph: comparison between groups

To generate the results, click  .



On the abscissa axis, the various groups selected are displayed. Your reference group will be displayed 1st (the population surveyed if you did not select one).

If one or more of the groups selected for the study are not displayed on the graph, it is because no one in this group has responded to the selected quizzes.

The different groups rise less and less in height on the ordinate axis which represents the percentage of each group that has a result above the reference level which you have determined.

For example, if your reference level is the average of the reference group, each group will be positioned according to the percentage of their group that scored above or below that average.

On the graph above, the average of the reference group was chosen as the reference level. We learn from this graph that a little less than 40% of the reference group is above its average, that no one from counties 63 and 44 had above the average of the reference group, that 100% of county 75 is above the reference group average and just under 50% of county 69 has above average results.

What do we call "% best"?

The best x% gives the percentage of people whose results are above a reference level.

Why use the "% best"?

The x % best is a better notion than the average to objectively compare the level of several populations. When the average is only concerned by the value of the level, the % of best is concerned by the distribution of the levels of a group.

With the average, it is enough, indeed, for some people obtaining an excellent grade to draw the average upwards and to hide the information according to which a majority is in difficulty. The average therefore has a strong chance of giving a distorted view of the actual level of a class. Thus, a class with an average of 12 is not necessarily better than a class with an average of 11, if only 30% of this first class have an average equal to or greater than 12, while 60% of the other class has an average equal to or greater than 11.

On the contrary, the percentage of best is concerned by the distribution of the population in relation to a reference level informed by the percentage of students having a result equal to or higher than this reference level. The percentage of better thus makes it possible to detect exceptions and anomalies with respect to the established reference level. If only 10% of the members of a group are above the reference level, while 50% of the surveyed population are above, it would be good to look at why this group has results. that are so low, to identify the discriminating criteria. Similarly, if 50% of the members of a group are above the reference level, when only 10% of the surveyed population are above, it would be interesting to understand what criteria influence these good results (a particular teaching method for example or sociological criteria).

Concrete case to illustrate the interest of the % best compared to the average

Here is the concrete case of two classes which each have an average of 10. If we rely solely on this average, we might think that these two classes have an equivalent level. On the other hand, if we look at the grades of each student (below), we realise that class 1 has, admittedly, 3 students with excellent results, but a majority of students (70%) below average and in great difficulty. Class 2, on the other hand, has a generally better level, as 60% of students have a result equal to or above average.

Class 1 grades:

20
20
20
9
8
7
6
5
3
2

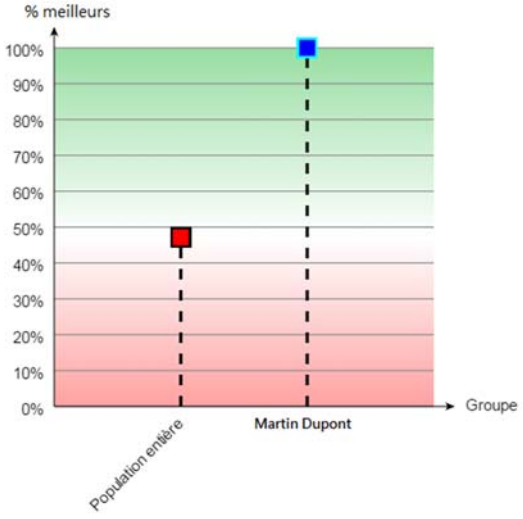
30% of students have an average or above average grade.

Class 2 grades:

12
12
11
10
10
10
9
9
9
8

60% of students have an average or above average grade.

Comparison of a group and a student



When a student compares them-self with a group, they will necessarily be on the ordinate axis at 100% or 0%.

Let's take a concrete example, shown in the graph below and assume that the reference level is an average of 30% of correct answers. Two scenarios can arise:

Scenario n°1: Martin has a level ≥ 30% of correct answers with 60% correct answers: he will be at 100% on the ordinate axis.

Scenario n°2: Martin has a level< 30% of correct answers with 20% of correct answers: he will be at 0% on the ordinate axis.

See the tables below to understand.

Grades of the surveyed population		
	Grades out of 20	% of correct answers
Student 1	12	60%
Student 2	11	55%
Student 3	4	20%
Student 4	2	10%

The reference level is set at 30% of correct answers.

50% of the surveyed population has a result ≥ reference level.

Grades of Martin Dupont's group		
	Grade out of 20	% of correct answers
Martin Dupont	12	60% of correct answers

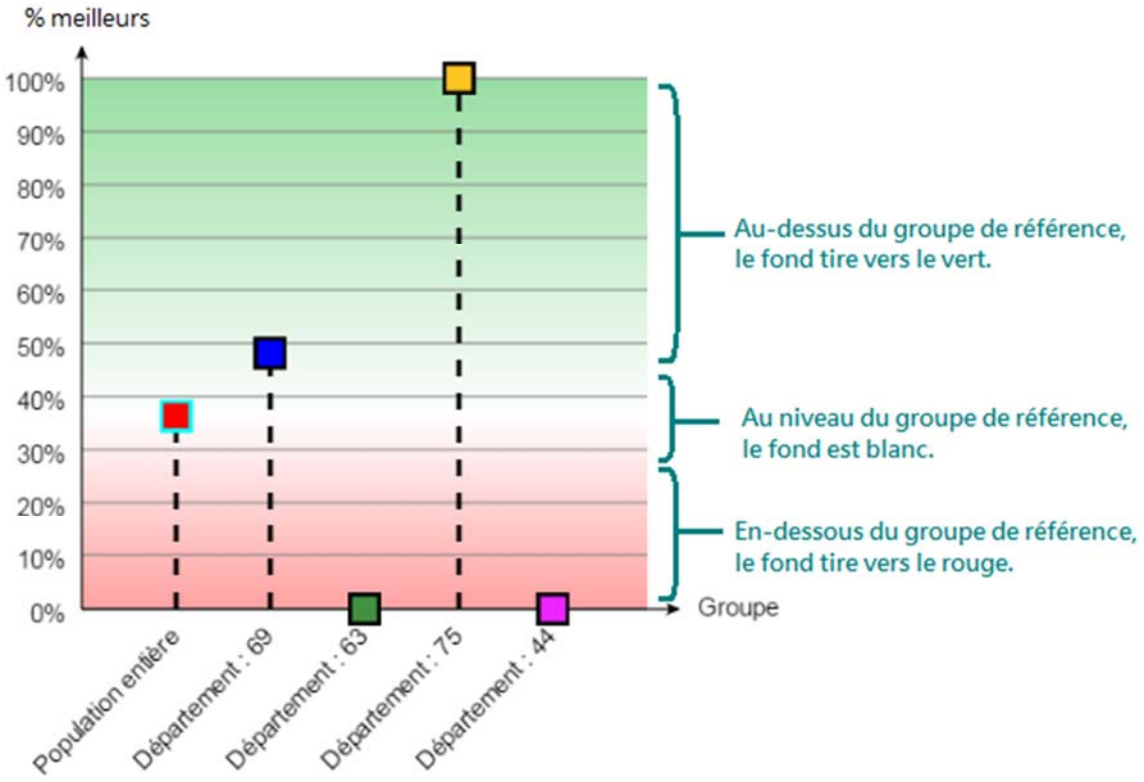
Scenario n°1: Martin has 60% of correct answers. He is above the reference level. 100% of his group therefore has a result ≥ reference level.

Grades of Martin Dupont's group		
	Grade out of 20	% of correct answers
Martin Dupont	4	20% of correct answers

Scenario n°2: Martin has 20% of correct answers. 0% of his group therefore has a result ≥ reference level.

The background of the comparison graph

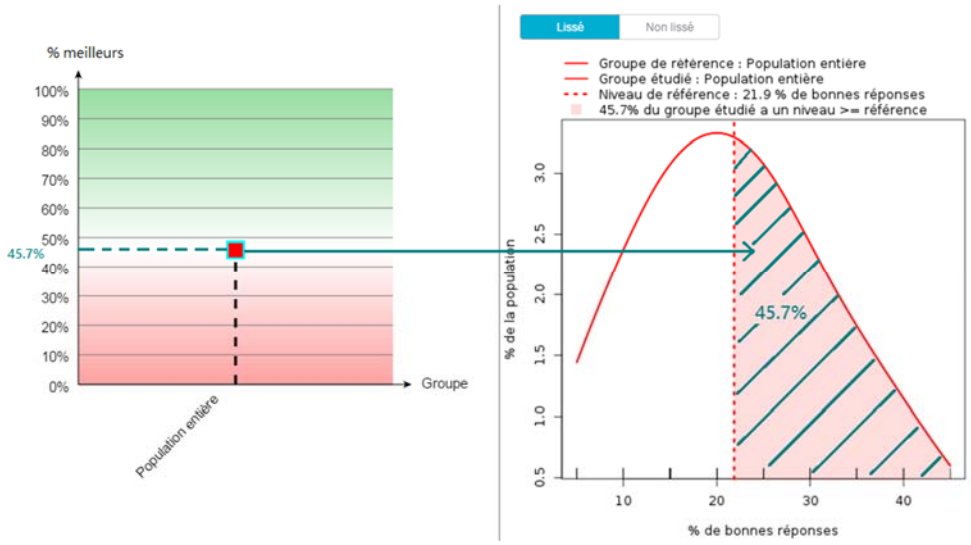
The background of the comparison graph is coloured according to whether the groups are above or below the best x % of the reference group.



1.4.2. The distribution graph

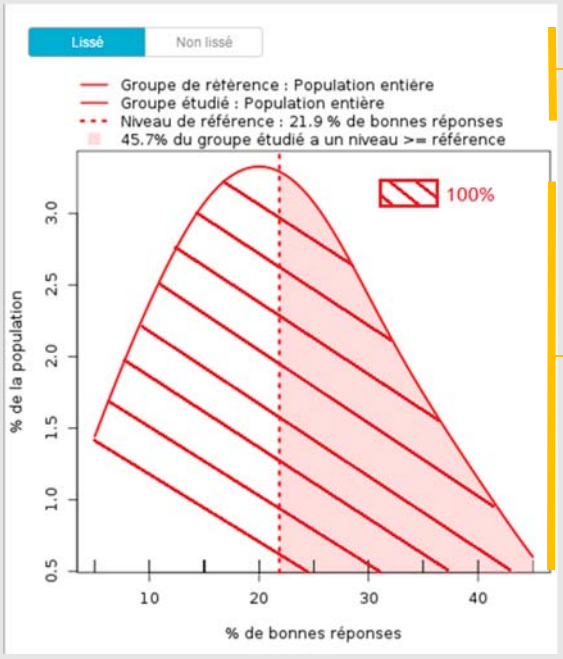
What is a distribution graph?

The distribution graph allows you to observe the distribution of students in each group.
Click on one of the groups shown on the comparison graph to generate the distribution graph.



Comparison Graph **Distribution Graph**

In the distribution graph, the best x % are materialised by areas. In the figure above, the% of area coloured in red corresponds to the ordinate of the red square of the comparison graph.

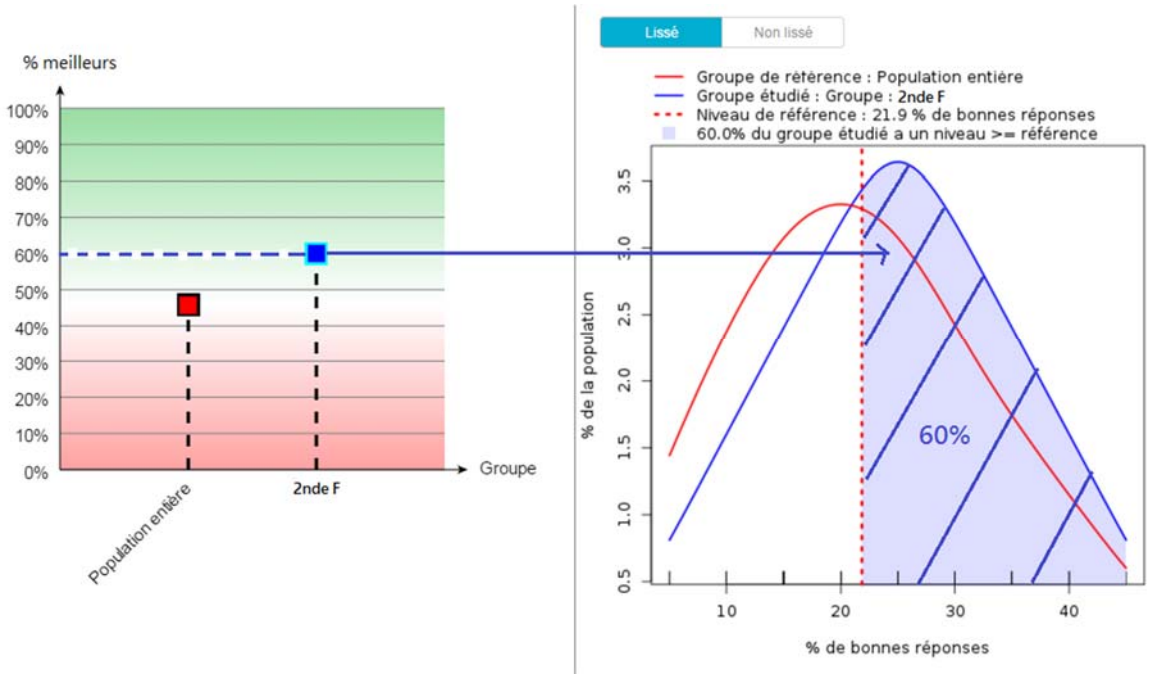


The legend above the graph tells you the exact reference level and the percentage of the group being studied that is at or above this reference level.

The entire area under the curve represents 100% of the population. The coloured part of the area under the curve represents the section of the population above the reference level represented by the dotted line. The percentage of this coloured area corresponds to the best x % of the comparison graph.

The larger the area of the curve to the right of the reference level, the higher the % of best.

Interest of the distribution graph

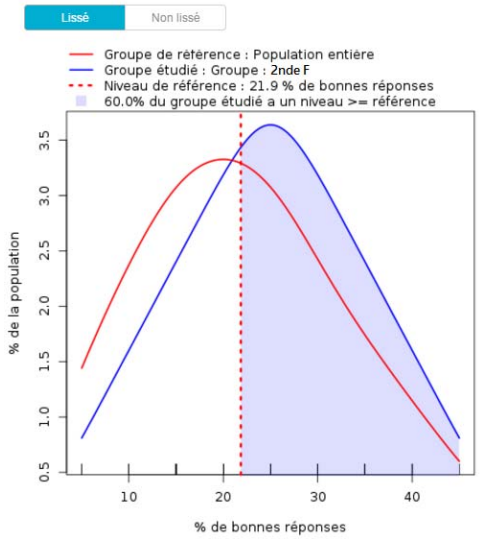


Comparison graph

The comparison graph is only synthetic information from the distribution graph, as it only gives the percentage of the blue coloured area of the distribution graph.

Distribution graph

The distribution graph gives a better understanding of the results of the comparison graph by informing us about the distribution of students according to their percentage of correct answers.



On the abscissa axis, the percentage of correct answers is shown. On the ordinate axis, the percentage of the population*.

The dotted line represents the reference level you determined previously (average of the reference group, average of a section of the reference group, a % of correct answers).

The red curve represents the reference group.

The other colour curve represents the group you selected. The coloured part of this curve gives you the percentage of the group with a result greater than or equal to the reference level.

* The percentage makes it possible to erase the differences related to the number of questions of several quizzes and to the number of members of different groups compared.

The smoothed graph and the non-smoothed graph

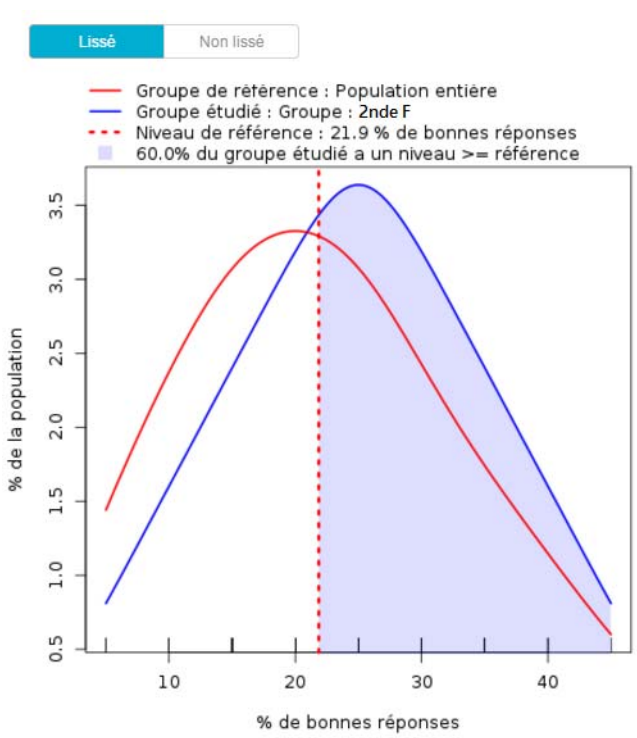


Figure 1 - Smoothed Graph

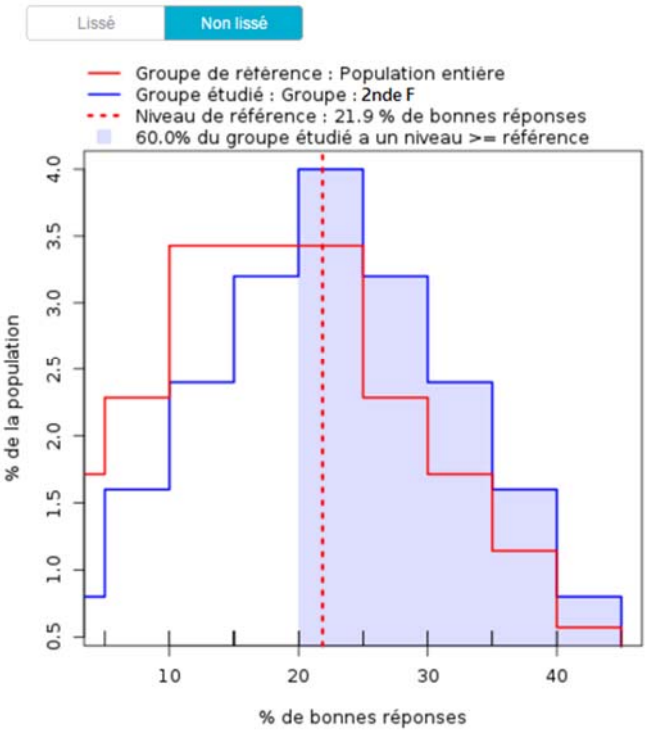
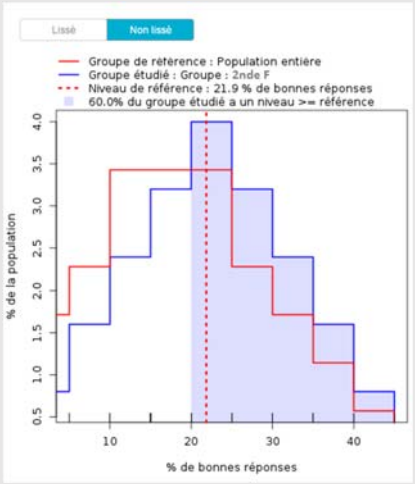


Figure 2 - Non Smoothed Graph

The smoothed graph (Fig. 1) is an approximation of the non-smoothed graph and allows a glance at the trends in the distribution of the two groups. It gives an idealised view of the data to which we would tend with very large groups.

The non-smoothed graph (fig.2) is a histogram that accurately provides the distribution of the population according to the percentage of correct answers. This is the "raw" data.



Why, on the majority of un-smoothed graphs, is there a difference between the reference level and the percentage of the group studied having a level equal to or greater than the reference level? In other words, why does the dotted line not coincide with the colour area boundary that is supposed to represent the part of the group with a level equal to or greater than this line?

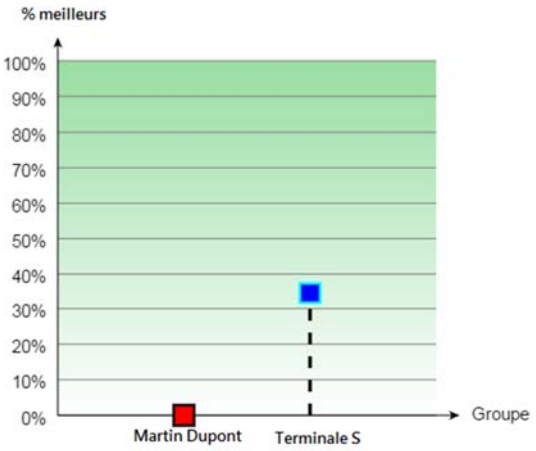
This is because the population is staggered and the reference level, which does not take into account these tiers, is fixed at the value you gave it.

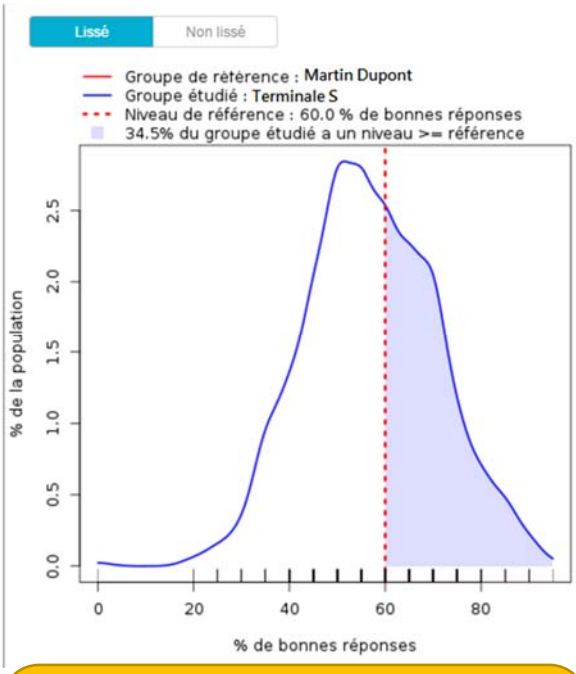
In the graph opposite, the reference level is 21.9% of correct answers and cuts the tier bringing together students who had between 20 and 25% of correct answers. This reference level does not correspond to any grade really obtained by the students and does not coincide with the determined tiers.

The graph, which can not take into account a part of the tier, will therefore take into account the whole tier or stop at the previous tier (the tier bringing together students who had between 25% and 30% of correct answers).

Comparison of a group and a student on the distribution graph

By choosing them-self as a reference group, the student will see the% of their group having done better than them-self.





Comparison graph

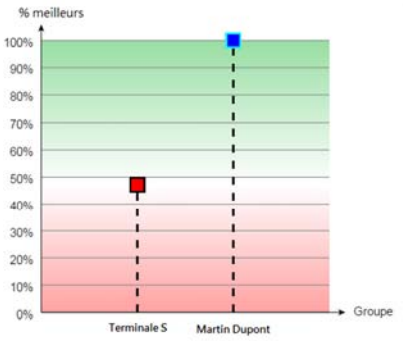
The coloured background of the comparison graph tells us that Martin Dupont is the reference level of the study (white background).

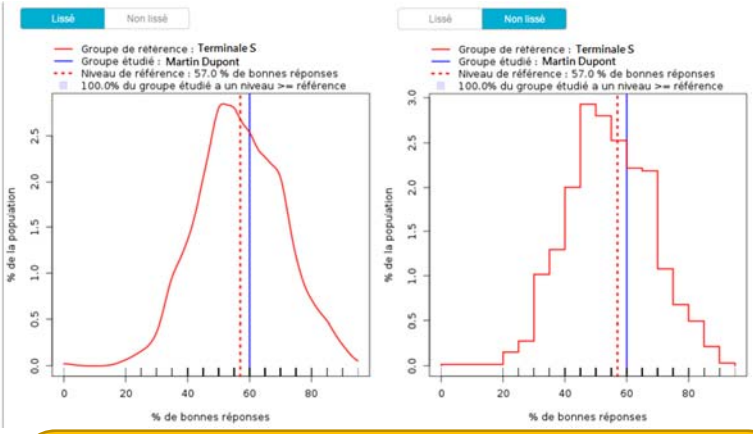
Distribution graph

In the distribution graph, the reference group of Martin Dupont merges with the reference level *. We learn that 34.5% of final year Science students has a level equal to or greater than his.

* As Martin Dupont is the only individual in his group, the red curve that is supposed to represent him is of zero width and will be represented in the form of a line. That's why, on the comparison graph, the % of best associated with Martin is 0%.

By choosing final year Science students as the reference group, Martin will see where he is relative to the average of his class. As seen previously, his position will be 0% or 100% best.





Comparison graph

Martin Dupont is 100% on the ordinate axis. To understand the reason, go to section 1.4.1.

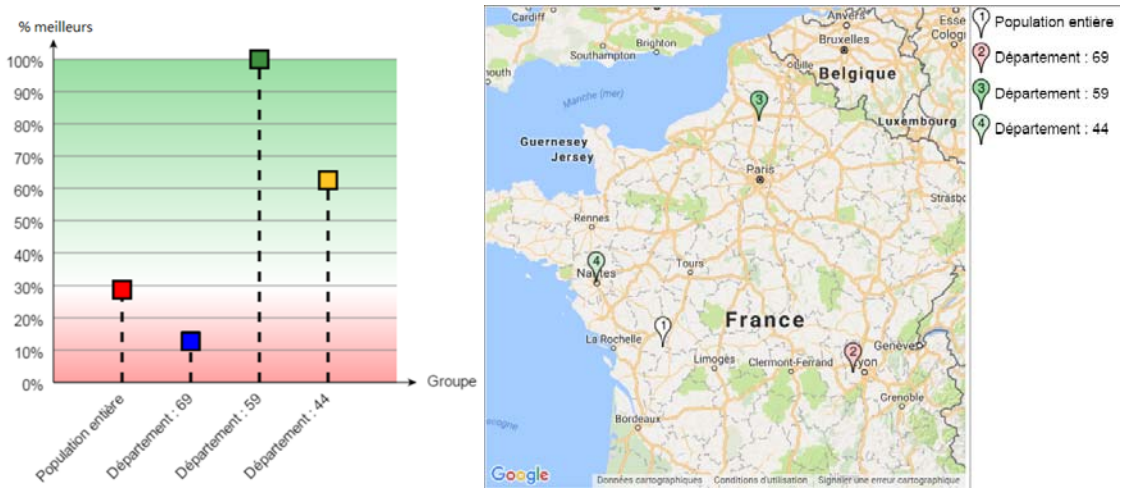
Smooth and un-smoothed distribution graph

By making the final year Science students the reference group, the student can know the average of the reference group (57% of correct answers) and place them-self in relation to this average.

1.4.3. Cartography: geographical comparison

Find on Google Maps the location of your different groups. The location of a group does not necessarily correspond to the location of its county, as it is based on the location of the people who connect to Je Leve La Main. The position of a group therefore corresponds to the average position of the people in the group.

The markers show the colour codes of the 1st graph: the marker of the reference group is white, while the others are more or less green or red depending on whether they are above or below the reference group level.

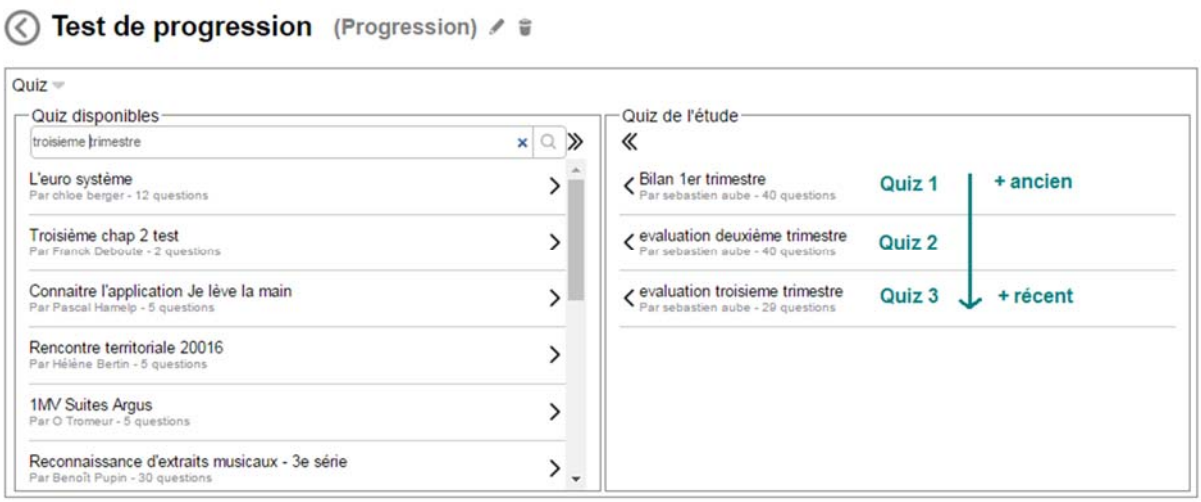


2. The progress study

The progress study consists in comparing the evolution of the results of several groups on several of the same quizzes. To do this, create a new experiment for which you have selected as type of study “Progress”.

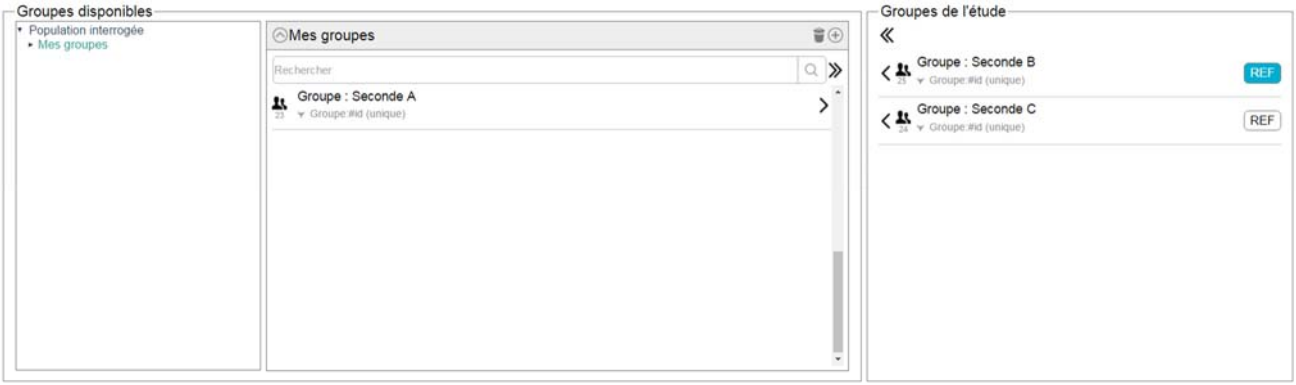
2.1. Select quizzes

Find and select the different quizzes on which you want to base your progress study. **Be sure to select them in the correct chronological order so that the graph gives you the evolution of the results over time.**



2.2. Select groups and reference level

To select your groups and other groups, proceed in the same manner as with the level assessment test (part 1.2.). Determine your reference group by clicking on “REF”.

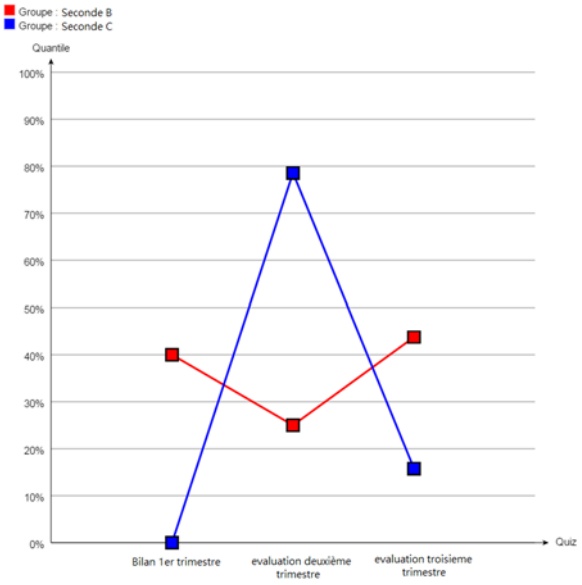


Find the reference level information in section 1.3.

2.3. Progress test graphs

2.3.1. First graph: progress comparison

To generate the results, click  .



The abscissa axis are shown the different quizzes selected in chronological order for the progress study.

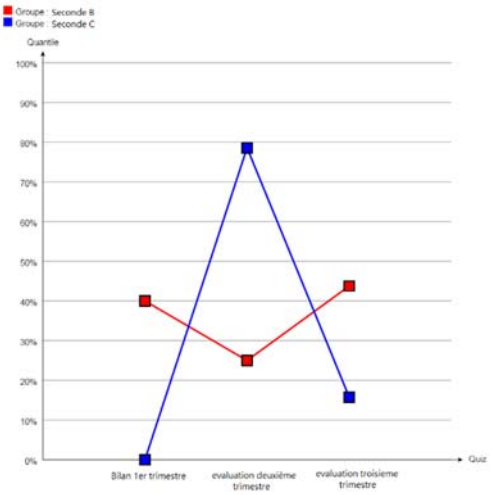
The different groups are positioned on the ordinate axis according to the percentage of people who had results above the reference level.

The red segments represent the results of the reference group. The other colour segments represent the other groups studied.

In the graph presented as an example, the group called “Yr11 B” is our reference group. We have already chosen the average of this group as our reference level.

Impact of the reference group

Once again, it is advisable to multiply the points of view by interchanging the reference groups. This will provide more information on how groups relate to each other.

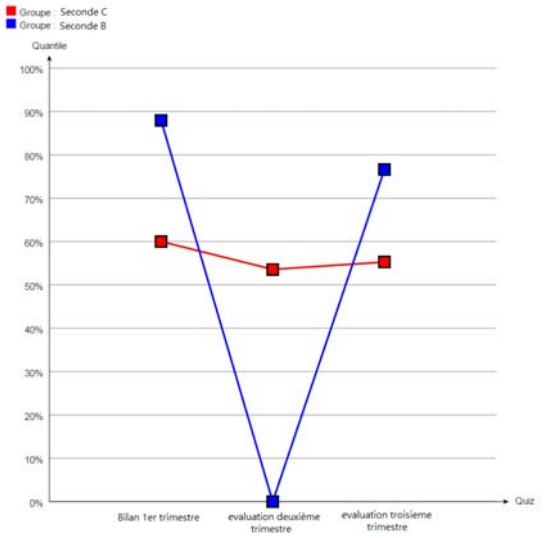


It is important to note that the curves of the groups studied are always calculated according to the red reference curve.

In this first graph, the blue curve that represents Yr11 C was calculated according to the red reference curve (Yr11 B).

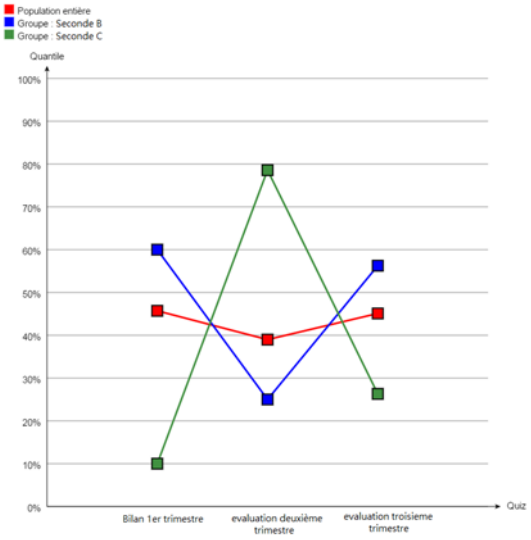
The 0% obtained by Yr11 C in the term 1 assessment does not mean that no student in this class had a correct answer, but that no student in this class scored equal or better than the reference level.

See the graph opposite.



In the graph above, Yr11 C became the reference group.

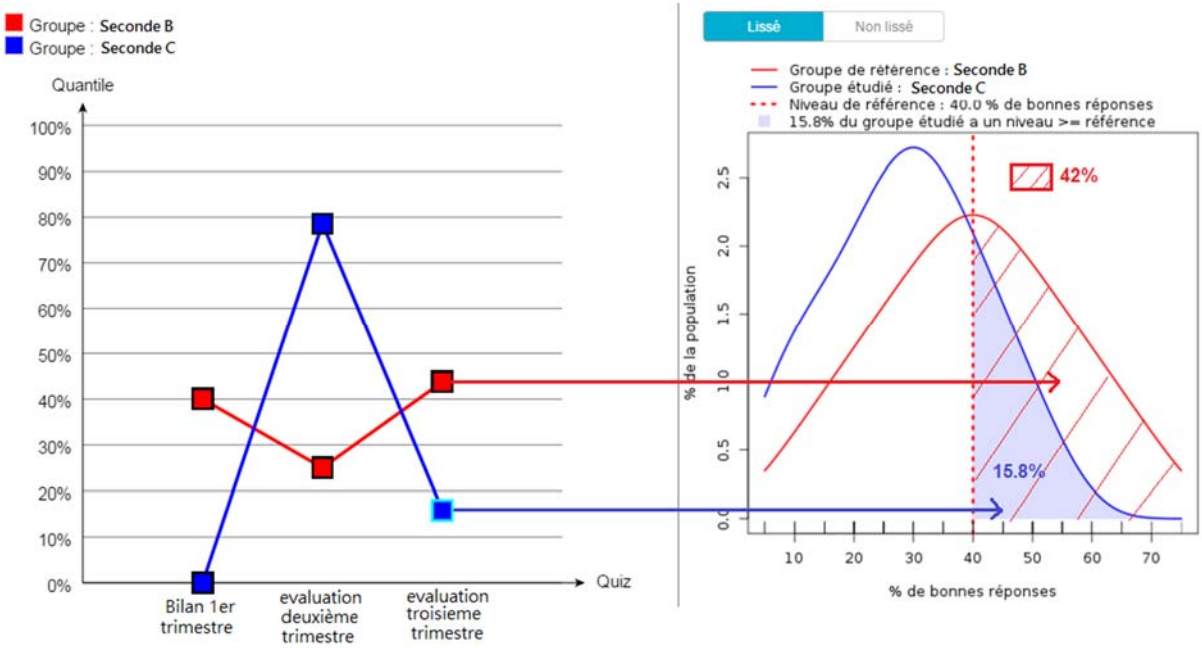
This time, the Yr11 B result curve was calculated based on the results of Yr11 C.



In the graph above, as no group was defined as a reference group, the surveyed population occupies this role by default. It is represented by the red curve.

2.3.2. Second graph: distribution curve for a quiz

As with the level assessment study, it is possible to compare in detail the distribution of students taking a quiz. To do this, click on one of the squares of the progress graph. The distribution graph appears on the right.



On the distribution graph above, the abscissa axis represents the percentage of correct answers and the ordinate axis represents the percentage of the population.

The red curve represents the reference group. The reference level represented by the dotted line is the average obtained by the reference group for this quiz.

For more information on distribution graphs, refer to section 1.4.2.

On the graphs above, the two groups are compared on a quiz taken during the term 3.

It is noted that only 15.8% of Yr11 C is above the average of Yr11 B, our reference group.

It would be interesting to determine the criteria responsible for this difference in level.

Soon, the statistical analysis tool and the Je Leve La Main software will offer you a functionality to choose or even create criteria and assign them to each of your students (travel time, socio-professional category of parents...) or your groups (syllabic reading method/ general reading...) in order to identify discriminating criteria or those favouring success.