

**ESCV** v2.4.4

for Windows<sup>®</sup> operating systems

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URL: [www.oipaz.net/ESCV.html](http://www.oipaz.net/ESCV.html)

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# 1. Introduction

ESCV (pronunciation: [ˈɛsku]) allows to:

- manage an archive of multiple choice questions, written in  $\text{\LaTeX}$  and arranged according to topic and level of difficulty;
- create different questionnaires, keeping the same level of difficulty, randomly mixing questions and answers;
- automatically acquire the answers through scanner or video camera or Android<sup>TM,1</sup> smartphone/tablet;
- assess the questionnaires, creating diagrams and statistics, considering the level of difficulty, bonuses, penalties and compensations/dispensations provided by customised educational plans;
- create summarising wrappers and full reports of the results of the questionnaires;
- compute (possibly weighted) averages, for single terms or for the whole year;
- collect the complete records of each student;
- publish on the Internet<sup>2</sup> all the data and files produced.

The demo version has the following limits (you are invited to actively contribute to the development of ESCV or to [donate](#) to get the full version):

questions in the archive	questions in the tests	tests for each course
$\leq 100$	$\leq 5$	1

Table 1: limits of the demo version.

<sup>1</sup> Android is a trademark of Google LLC.

<sup>2</sup> As in this example: <https://www.oipaz.net/REP/ESCVweb/EN/index.html>

To use ESCV it is enough to have a basic knowledge of Windows; to modify the archive of the questions a basic knowledge of the typographic language [L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>](#) is required; to fully exploit all the functions of ESCV you have to be able to use and modify CSV spreadsheets, HTML and CSS documents as well as organise a space on World Wide Web through FTP. Presentations and further insights into these topics, which are clearly beyond the aims of this short guide, are available on the web, often for free.

## 2. Licence

ESCV and all its support files (question's archives, L<sup>A</sup>T<sub>E</sub>X and HTML templates, logo) are distributed under the Creative Commons Attribution - Non-Commercial - ShareAlike 4.0 International licence (CC BY-NC-SA 4.0).<sup>3,4</sup>

ESCV is [donationware](#): if you like it and you wish to contribute to its development, please send a [donation](#) to the author through the [PayPal](#) account [OiPaz@oipaz.net](mailto:OiPaz@oipaz.net).<sup>5</sup>

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<sup>3</sup> <https://creativecommons.org/licenses/by-nc-sa/4.0/>

<sup>4</sup> Methods [5.2.1](#) and [5.2.2](#) on page [14](#) and marks' histogram (figure [6](#) on page [15](#)) use the [Emgu CV](#) library, distributed under the [GPLv3](#) licence (a copy of which is also available in the file "Emgu.CV.Licence.txt" contained in the ESCV distribution). Relevant sources files are available from the "Additional resources" section in <https://www.oipaz.net/ESCV.html>

<sup>5</sup> [https://www.paypal.com/cgi-bin/webscr?cmd=\\_donations&business=95V9M5CZJBYHE&currency\\_code=EUR&source=url](https://www.paypal.com/cgi-bin/webscr?cmd=_donations&business=95V9M5CZJBYHE&currency_code=EUR&source=url)

### 3. System requirements

	minimum	recommended
operating system	Windows (version 7 or later)	
video resolution	1024 × 768 pixels	1920 × 1080 pixels
L <sup>A</sup> T <sub>E</sub> X compiler	MiK <sub>T</sub> E <sub>X</sub> <sup>6</sup> (version 2.9 or later)	
L <sup>A</sup> T <sub>E</sub> X editor	Notepad	T <sub>E</sub> XnicCenter <sup>7</sup>
peripherals	Android smartphone or tablet	document scanner
others	PDF viewer	Sumatra PDF <sup>8</sup> PDFtk Server <sup>9</sup> LibreOffice Calc <sup>10</sup> FileZilla Server <sup>11</sup>

Table 2: system requirements.

### 4. Installation

ESCV requires no installation: it is enough to unzip it in a folder and launch the file “ESCV.exe”! Be careful not to overwrite the archive of questions (ESCVbase), if it has been modified.

If ESCV is used with an N or KN version of Windows, when started it could notify that the file “MFPlat.DDL” is missing. In this case you will need to download the “Media Feature Pack” from the official Microsoft® website for the version of Windows in use.

On obsolete versions of Windows it could be necessary to download and install the “Microsoft .NET Framework 4.8”<sup>12</sup>

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<sup>6</sup> <https://miktex.org/>

<sup>7</sup> <https://www.texniccenter.org/>

<sup>8</sup> <https://www.sumatrapdfreader.org/>

<sup>9</sup> <https://www.pdflabs.com/tools/pdftk-server/>

<sup>10</sup> <https://www.libreoffice.org/>

<sup>11</sup> <https://filezilla-project.org/>

<sup>12</sup> <https://dotnet.microsoft.com/en-us/download/dotnet-framework/net48>

## 5. Instructions for use

For each of the three main sections in which ESCV is divided (“manage archive and tests”, “assess questionnaires” and “averages and records”, as you can see in figure 1 on page 9), the buttons and the items in the menu<sup>13</sup> specify the possible operations. Interact with the program through the usual conventions and methods of Windows programs.

Before launching the program, it is important to decide which folder will contain the data of each course. It is advisable to have a series of sub-folders in a single main folder, which could be named after the year of the course. Having done that, it will be possible to set up the course as the program starts (from the menu “Options / Working folders and files / Course...”) or, if there are several courses, to create links (as described in paragraph 5.4 on page 21) which automatically start the program set up on each course of the year, also selecting the subject.

The three following sections of this chapter explain the basic functions of the program, while the other three show the options for a more advanced use of ESCV.

### 5.1 Manage archive and tests

#### 5.1.1 Archive

ESCV archive of questions is a tree diagram ([1](#) in figure 2 on page 10). Generally, but not necessarily, the first branch starting from the root indicates the subject, followed by the hierarchical subdivision of the topics. Selecting a category it is possible to see the questions available, which can be divided into different levels (it is possible to activate a filtered view, with the menu “Archive / filter levels...”). The categories and the questions can be created, modified, moved, exported, imported etc, with the specific menu items. The

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<sup>13</sup> All the buttons of ESCV are duplicates of the most commonly used menu items; more menu items are duplicated in the context drop down menus that appear right-clicking on suitable controls. Hereafter almost only menu items will be referred to, implying that what is valid for them is valid as well for the duplicates.



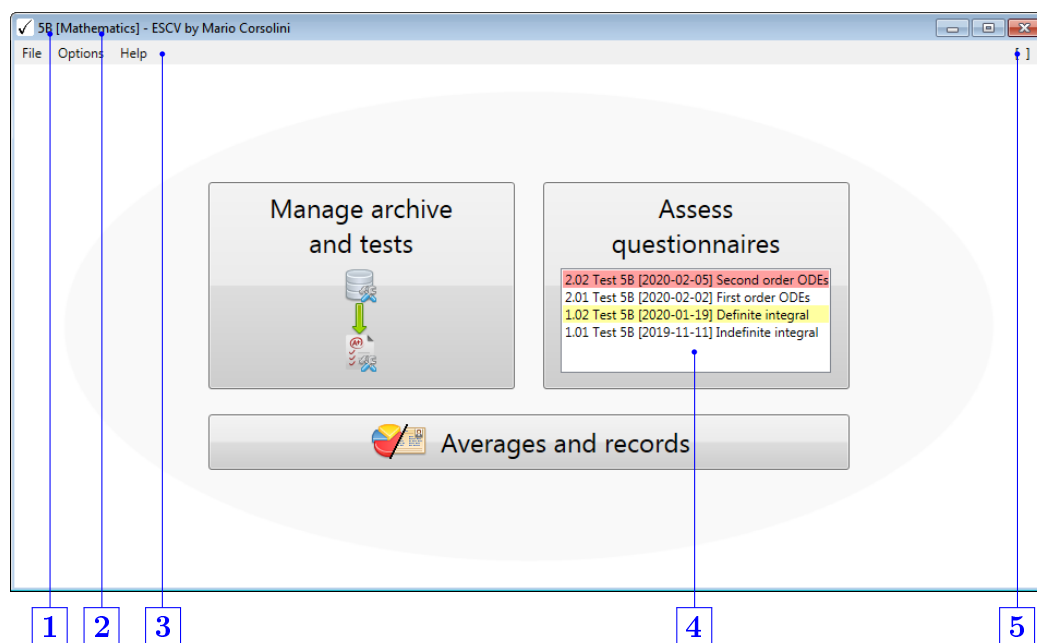


Figure 1: main window.

- 1 Selected course.
- 2 Selected subject.
- 3 Menu bar (the items shown here are common among all the sections of the program).
- 4 List of the tests of the course (those highlighted in red have no assessment so far; those highlighted in yellow contain not yet imported data sent by an Android device; if both the last circumstances exist, the highlighting will be orange; right clicking on a test will show a selection of its details).
- 5 Warnings area (click to show the most recent ones or the whole archive).

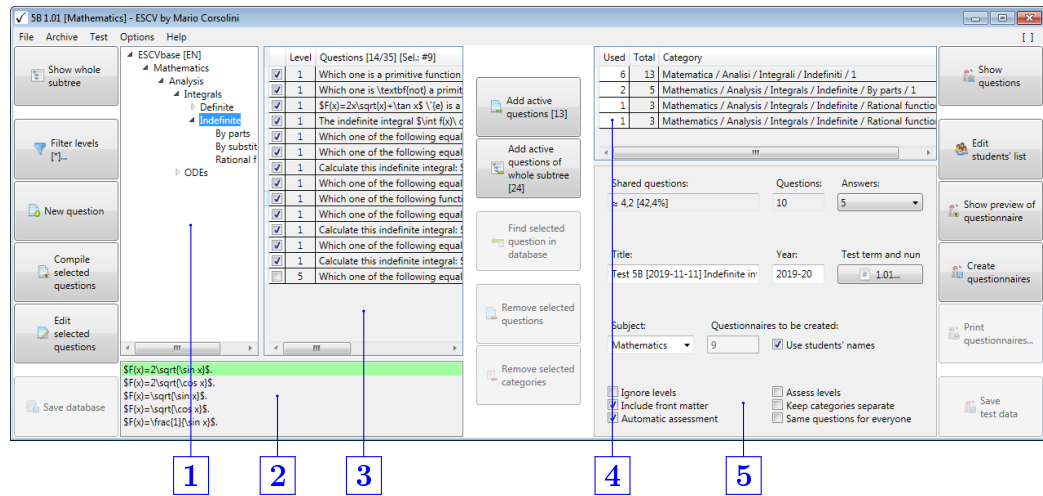


Figure 2: manage archive and tests (showing test's options).

- 1 Tree of the categories.
- 2 Answers of the last selected question.
- 3 Questions in the selected category.
- 4 Questions used in questionnaires for each category.
- 5 Test's options.

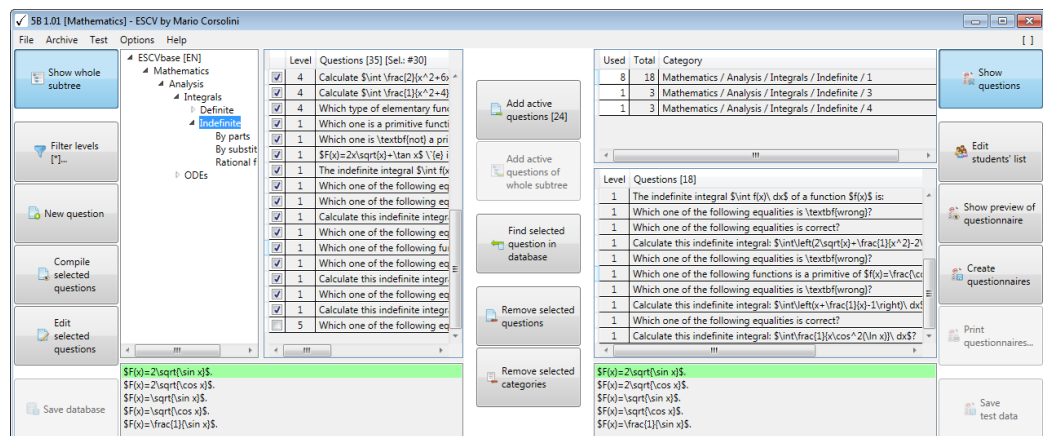


Figure 3: manage archive and tests (showing all the questions in the selected subtree of the archive and the list of questions added to the test).

changes will be saved only if asked for by the user (the same applies to the changes to the data in the questionnaires).

When you select one or more questions, it is possible to see them in a PDF file or to modify them with the default L<sup>A</sup>T<sub>E</sub>X editor. Each “question” is made up of the question itself, the numeric value (integer number) of the level assigned and a list (`itemize`) of answers. The first answer has to be the correct one, while the others have to be wrong. As shown in [2](#), figure 2, the answers of the last question selected in table [3](#) are listed in the bottom part of the ESCV window, with the right answer highlighted in green. Problematic questions<sup>14</sup> are highlighted in red. Click on the question with the left button of your mouse to see the details of the problems identified.

When you modify a question, it is necessary to verify the correctness of the L<sup>A</sup>T<sub>E</sub>X syntax because potential mistakes in compiling it would probably be difficult to manage within ESCV. In fact in this case the program will probably show a time-out of the compiler and it will be possible to investigate the causes by opening the files which have caused problems. They are to be found in the system folder of the temporary file (usually “C:\Users\<Windows user name>\AppData\Local\Temp”) with names beginning with “ESCV”.

It is also possible to view the outputs of the compilations started by ESCV (as well as personalise other aspects) through the menu “Options / LaTeX settings...”.

### 5.1.2 Test

First of all set the term and the test number. Then use the buttons in the central column (visible in figures 2 and 3 on page 10) to add or remove some categories of questions from the test you are preparing. Only the active questions (e.g. with a tick) are added. If you select “Show whole subtree” (as in figure 3), the questions are added ignoring possible subdivisions into subcategories. After choosing the categories, select the number of answers that each question in each questionnaire is to have.

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<sup>14</sup> I.e.: duplicated questions, questions with duplicated answers or questions with a number of answers not included between 2 and 26

In the list of the categories (table 4 in figure 2) the questions added to the test are also subdivided according to their level, unless you ticked the option “Ignore levels” (in 5). This affects the way the questions in each questionnaire are chosen and mixed. The option “Assess levels” only influences the score given to each question, multiplying the value of a single question by its assigned level (otherwise a question which is answered correctly is worth as many points as the number of possible answers and one point if it is left unanswered).

After choosing the categories of questions to use you need to set the number of questions which will be chosen from each category to form each questionnaire (column “Used” in table 4, figure 2). If the number of questions selected is smaller than the overall number of questions available, the choice will be at random (and it will be different for each questionnaire, unless you tick the box “Same questions for everyone”).

The text boxes to set the title of the test, the school/academic year (automatic, if you correctly set the first day in the “Options” menu) and the subject can be modified keeping in mind to use, when necessary, the L<sup>A</sup>T<sub>E</sub>X syntax.

The other available options for the test (5 in figure 2) are used to include or not the front matter in the questionnaires and, in case it is included, it is possible to choose whether to print the grid for automatic assessment; it is also possible to keep together all the questions belonging to the same category, otherwise they will be mixed randomly.

In any moment it is possible to preview the questionnaires to be created, with or without compensation.

Once the questionnaires have been created, all the settings will be frozen. It will be possible only to: create of a copy of the questionnaires with students’ names (if existing) inside the name of the PDF files, completely remove the test (and of all its related data) or, through the menu item “Test / Questionnaires / Print questionnaires...”, select the questionnaires to be printed or to be merged in a single PDF file, paged for two-sided printing. Automatic

printing requires to download the “Portable version” of Sumatra PDF<sup>15</sup> and unzip its contents into the “Assets” folder of ESCV. Merging the files requires to download PDFtk Server<sup>16</sup> and install it, making sure not to rename its destination location and to check the option “Add application directory to your environmental path” (then, if it is running, close and restart ESCV).

### 5.1.3 Students’ list

W.	Family name	Given name	Comp. (%)	Alt. font
<input type="checkbox"/>	Cartan	Henri	0	<input type="checkbox"/>
<input type="checkbox"/>	Chevalley	Claude	0	<input type="checkbox"/>
<input type="checkbox"/>	Coulomb	Jean	10	<input checked="" type="checkbox"/>
<input type="checkbox"/>	de Possel	René	10	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Delsarte	Jean	0	<input type="checkbox"/>
<input type="checkbox"/>	Dieudonné	Jean	0	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Dubreil	Paul	0	<input type="checkbox"/>
<input type="checkbox"/>	Ehresmann	Charles	10	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Leray	Jean	0	<input type="checkbox"/>
<input type="checkbox"/>	Mandelbrojt	Szolem	10	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Weil	André	0	<input type="checkbox"/>

Copy Paste Swap names Add Remove

OK (11-2=9) Cancel

Figure 4: students’ list.

For each course it is possible to include the students’ data, through the menu item “Test / Edit students’ list...”. The data will be contained in a CSV file having the same name as the course file and saved in the same folder. The following five fields are available for each student:

W. — (withdrawn) if this box is checked, the student is marked as withdrawn and s/he won’t appear in the following tests or computations of averages.

Family name | Given name — those are the only mandatory fields. If some students have the same family and given names (or if the fields are

<sup>15</sup> <https://www.sumatrapdfreader.org/download-free-pdf-viewer>

<sup>16</sup> <https://www.pdflabs.com/tools/pdftk-server/>

empty) they will be highlighted in red and it will not be possible to confirm any change.

**Comp. (%)** — in case of a customised educational plan, providing compensations and/or dispensations, the prescribed percentage has to be put here. For example, 10 means that the student will be granted 10% additional time to complete the questionnaire or, as an alternative, they will have a dispensation of about 9% of the questions (so that they will have about 10% more time for each of the remaining questions<sup>17</sup>).

**Alt. font** — (alternative font) if the box is checked the questions will be printed with a larger sans serif font, changeable by the parameter `IfUseAlternativeFont` in the file “Template.Questionnaire.LaTeX”.

If the students’ data are not inserted, it will be only possible to create nameless tests (and the automatic computation of average marks will not be available). In that case, it will be necessary to specify how many questionnaires to create and how many of them will need a compensation.

## 5.2 Assess questionnaires

Student’s answers may be acquired through four different methods (the first two ones may be used only for questionnaires created with the option “Automatic assessment” checked):

1. through automatic recognition of images available on the computer (e.g. digitally scanned images<sup>18</sup>);
2. through automatic recognition of images acquired with a video camera<sup>19</sup> (the rectangle surrounding the answers of each sheet must be

<sup>17</sup> Generally, a compensation of  $C\%$  of time should correspond to a dispensation of  $\frac{100C}{100+C}\%$  of the questions, yet this value may be edited during assessment.

<sup>18</sup> Suggested settings: 200 PPI, 256 grey levels. Recognised images will be saved in the folder of the test; original scans may be automatically deleted by checking the menu item “Assessment / Trash local raw scans of answers’ sheets”.

<sup>19</sup> Answers’ sheet must be entirely visible, well lit, not bent. In case of poor image quality recognition could be made easier by applying any of the filters available in the menu “Assessment / Camera filters”. Data acquisition may be interrupted by means of the command “Stop camera” that replaces “Import answers”.

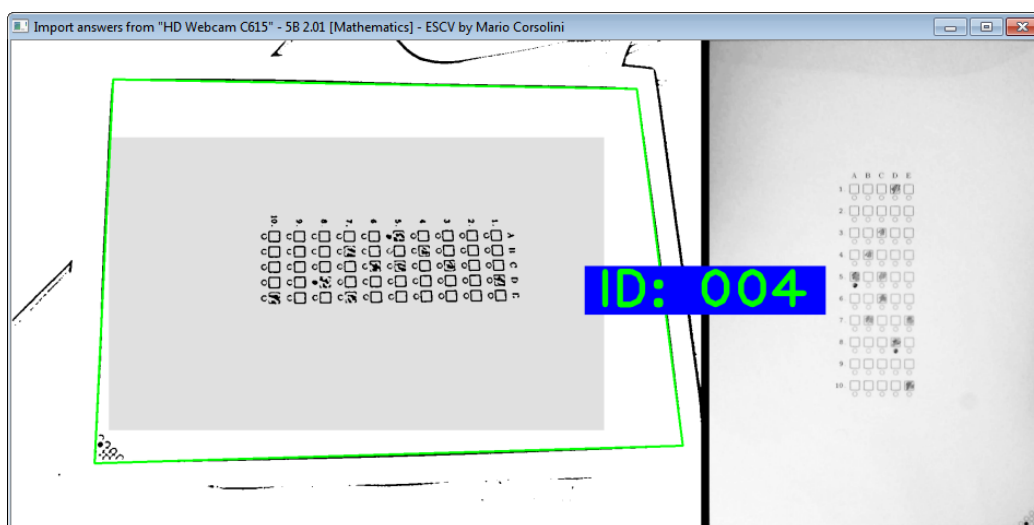


Figure 5: acquisition of answers via video camera.

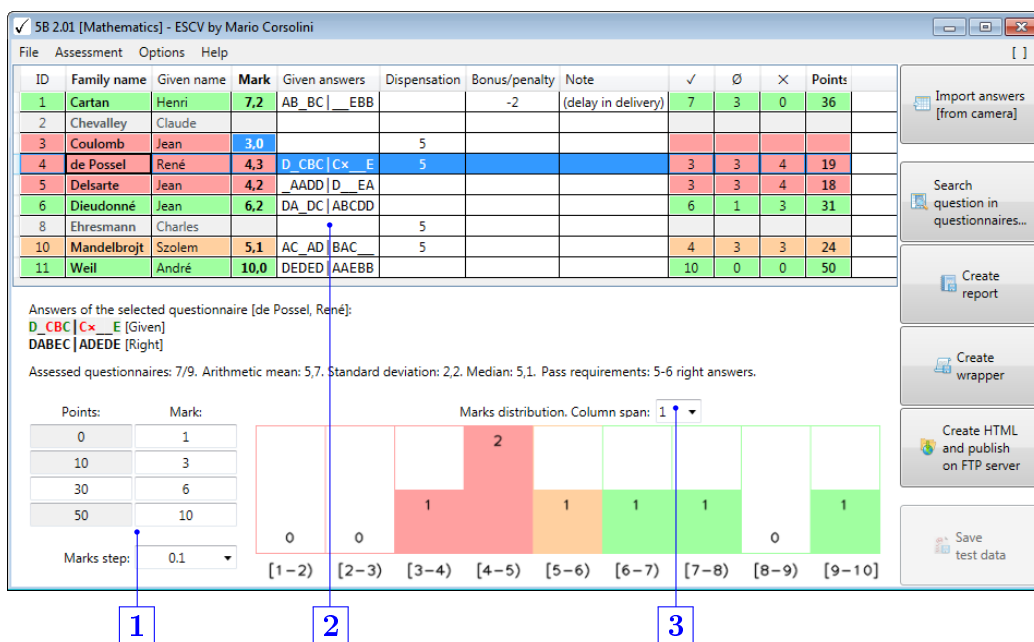


Figure 6: assess questionnaires.

- 1 Reference values for the automatic computation of marks.
- 2 Assessment table.
- 3 Width of the frequency classes (but the last one, which could be narrower) depicted in the histogram.

entirely kept inside the unshaded zone of the frame, as seen in the left part of figure 5 on page 15; the image is acquired<sup>20</sup> when such rectangle and the number of the questionnaire are steadily recognised for a few consecutive frames, so that they become green as in the figure);

3. importing data acquired with a smartphone or a tablet where the app “[ESCV \(client\) for Android](#)” has been installed;
4. by manually inputting data in the column “Given answers” ([2](#) in figure 6 on page 15). Accepted keys are: alphabetical characters, either capital or small letters; numbers between one and nine, with ⟨1⟩=A, ⟨2⟩=B, ⟨3⟩=C, etc.; space bar or ⟨\⟩ or ⟨\_⟩ for unanswered questions; ⟨0⟩ for invalid answers.

If needed it is possible to set a forced mark, overriding actual points, by using the menu item “Assessment / Manual mark...”. In this case the mark will be shown in the table highlighted as in the line of the third student in figure 6 and it will be possible to provide a reason as well.

When a questionnaire is selected, some additional menu items may be activated, depending on which file is actually available: the one to show the questionnaire itself and the one to show the grid for automatic assessment of the answers filled out by the student, as in figure 7 on page 17. Right answers have a green frame, wrong answers have a red frame and questions without answers have a blue rectangular frame. It is possible to manually amend wrongly recognised answers by touching the squares on the image (if a framed square is touched the question will be marked as without answers, a touch on the number on the left of the squares of the the answers will nullify the question).

Referring to figure 6, there are other cells manually editable in addition to the ones for given answers (they all share a light background, whereas read-only cells have a darker background).

- It could be necessary to bring up to date the value of the column “Dispensation” for students with a customised educational plan.<sup>17</sup> The

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<sup>20</sup> Rectified, as shown in the right part of figure 5.



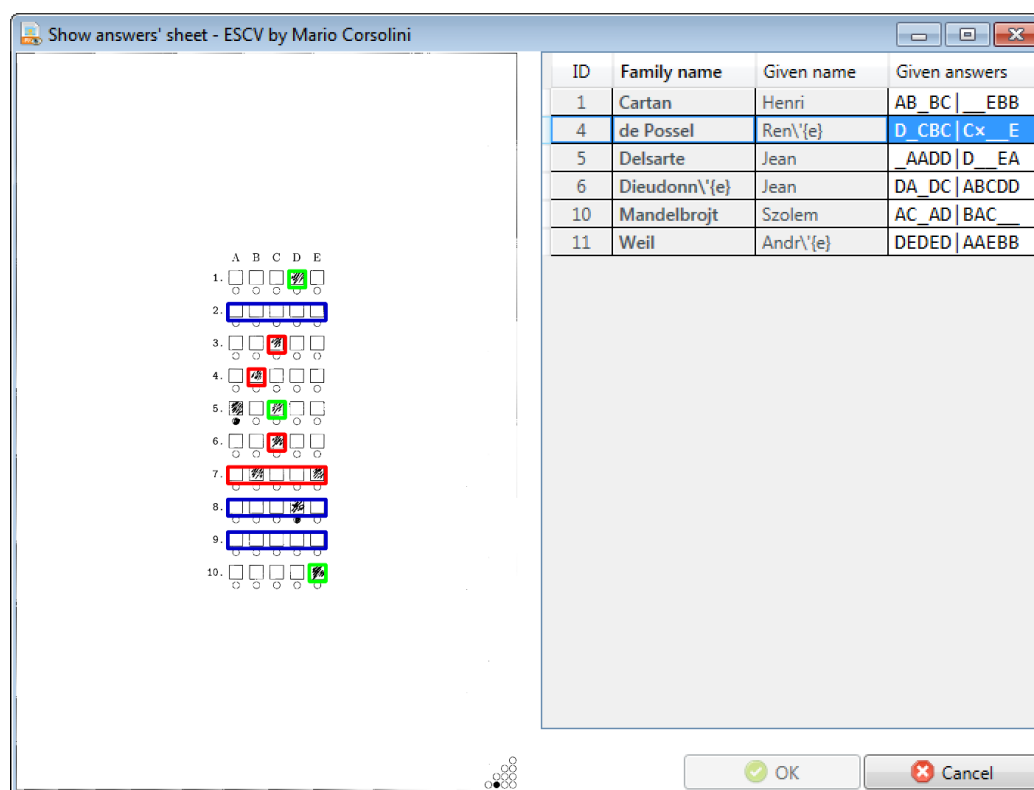


Figure 7: interactive proofreading of recognised answers.

cell must contain the actual total value of all the questions for which the student has been exempted (value that is often not equal to the ideal default one). In this way total points will be correctly restandardised.

- It is possible to assign, providing a reason, (positive) bonus or (negative) penalty points.
- The group of cells [1](#) defines the conversion of points into marks. In the left column there are listed the points assigned to questionnaires, respectively: whose answers are all wrong; whose questions are all unanswered ( $U$ ); that meet pass<sup>21</sup> requirements; whose answers are all right

<sup>21</sup> This is the only editable cell of the column, by inputting a numerical value or by using the arrow keys.

( $M$ ). For each one of those reference points the corresponding mark<sup>22</sup> has to be set in the right column. Intermediate values will be computed by linear interpolation, with approximation equal to the “Marks step” set in the bottom cell. A dispensation of  $D$  points will be applied by replacing the achieved points  $p$  with the value  $\frac{pM-DU}{M-D}$  (rounded off and clipped between 0 and  $M$ ).

- Finally, cell [3](#) has no influence on marks assignment: it only define the aspect of the histogram below, which summarises marks distribution.

Rows of table [2](#) belonging to questionnaires yet to be assessed are grey. When an assessment has been assigned, each row is highlighted with the same colours used in the histogram: green if pass requirements are met, orange if the mark is in the immediately previous band,<sup>23</sup> red otherwise.

Below table [2](#) are shown given answers and right answers of the selected student. Besides, other data are shown: the number of assessed questionnaires, the total number of created questionnaires, a few statistical indexes and how many answers must be right in order to get a pass mark (there are two values: the former is the number of right answers needed in the hypothesis that all the other questions are unanswered, the latter is in the hypothesis that all the other answers are wrong).

Once all the questionnaires are assessed it will be possible to create the report of the test (in colour or b/w, according to the menu item “Assessment / Report / Use colours”) and a summarising wrapper.

Finally, the menu item “Assessment / Search question in questionnaires...” allows to list all the questionnaires containing a specific question (this may be useful if the option “Same questions for everyone” has not been checked).

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<sup>22</sup> All the values must be non-negative, strictly increasing and spaced by one “Marks step” at least.

<sup>23</sup> This band in the histogram may be the one containing the pass mark in its interior, in case it does not belong to a border between classes. In the label of each class the bounds adjacent to square brackets belongs to that class, while bounds adjacent to round brackets are excluded.

### 5.3 Averages and records

This section is active only if the selected course contains at least one assessed test with students' names.

As shown in figures 8 and 9 on page 20, students without assessments are in grey, the others are highlighted in red if their average is below the pass mark,<sup>24</sup> otherwise in green.

Inside the menu item “Averages” it is possible to choose whether the averages must be computed directly from the marks of the tests or grouping them by term. Averages are evaluated on the base of the marks in the non-coloured rows in the figures on page 20. It is possible as well to add arithmetic mean, standard deviation and median to each column. In the header of marks' columns is shown, between square brackets, the weight used in the computation of the averages (the default value is 1 but it can be modified, as in figure 8).

In figure 9 two different kind of data columns are observed. If the header of the column contains a single digit (followed by a a point), the column displays the averages of the tests in that term; if after the point there is a double-digit number, the column displays the marks of that test. Selecting a cell in a column of the latter type activates the item in the menu “Average” that allows you to manually overwrite or delete the corresponding mark.<sup>25</sup>

Through the menu item “Averages” it is also possible to import a column of marks from a CSV file or to remove<sup>26</sup> one. To import, each line of the CSV file must have one of these three formats: either marks only, one for line,<sup>27</sup> or the current ID number of the student and the mark, separated by a semicolon, or the triplet **Family name;Given name;mark**. A comma may be

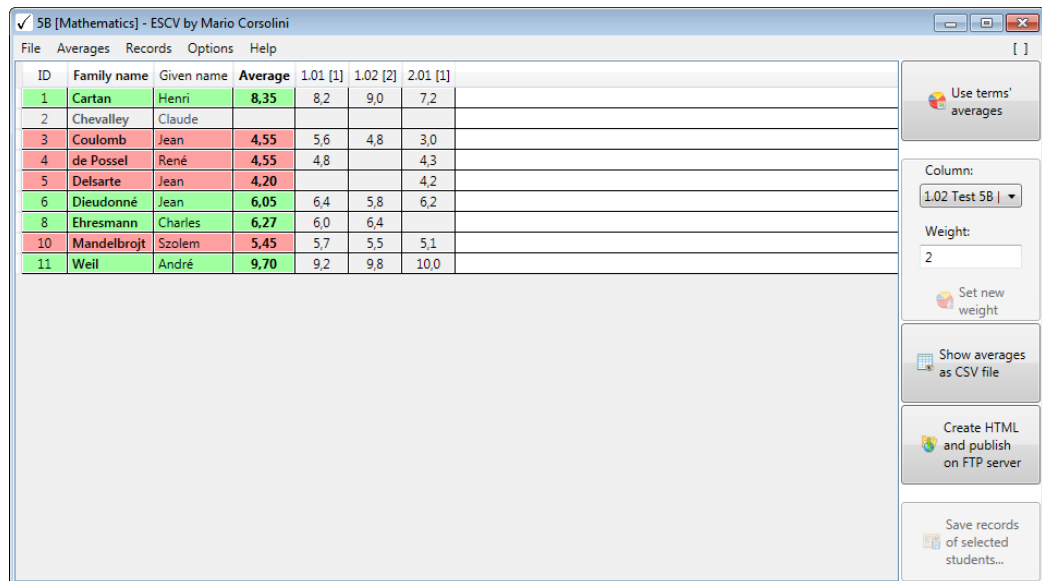
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<sup>24</sup> The pass mark of reference is the default one or the one of the latest loaded test. Obviously the averages make sense only if that mark (and more generally all the reference marks) does not change in all the tests of the course.

<sup>25</sup> Changes are volatile and they will be lost if the related questionnaire is reopened and modified in the “assess questionnaires” section.

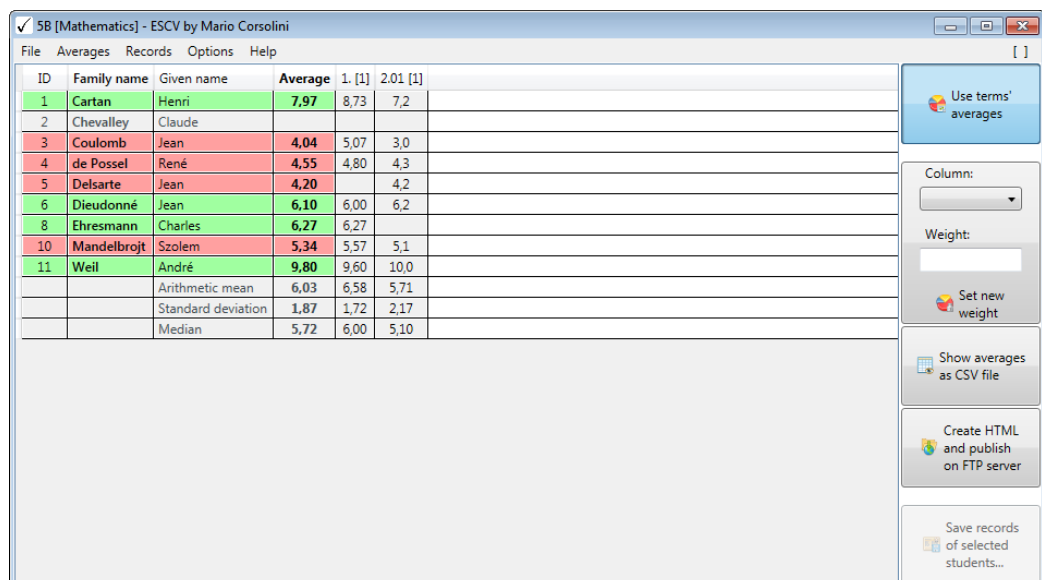
<sup>26</sup> At first select the column in the combo box on the right.

<sup>27</sup> The i-th mark will be assigned to the current i-th student.



ID	Family name	Given name	Average	1.01 [1]	1.02 [2]	2.01 [1]
1	Cartan	Henri	8,35	8,2	9,0	7,2
2	Chevalley	Claude				
3	Coulomb	Jean	4,55	5,6	4,8	3,0
4	de Possel	René	4,55	4,8		4,3
5	Delsarte	Jean	4,20			4,2
6	Dieudonné	Jean	6,05	6,4	5,8	6,2
8	Ehresmann	Charles	6,27	6,0	6,4	
10	Mandelbrojt	Szolem	5,45	5,7	5,5	5,1
11	Weil	André	9,70	9,2	9,8	10,0

Figure 8: averages and records (with neither terms' nor statistical indexes).



ID	Family name	Given name	Average	1. [1]	2.01 [1]
1	Cartan	Henri	7,97	8,73	7,2
2	Chevalley	Claude			
3	Coulomb	Jean	4,04	5,07	3,0
4	de Possel	René	4,55	4,80	4,3
5	Delsarte	Jean	4,20		4,2
6	Dieudonné	Jean	6,10	6,00	6,2
8	Ehresmann	Charles	6,27	6,27	
10	Mandelbrojt	Szolem	5,34	5,57	5,1
11	Weil	André	9,80	9,60	10,0
		Arithmetic mean	6,03	6,58	5,71
		Standard deviation	1,87	1,72	2,17
		Median	5,72	6,00	5,10

Figure 9: averages and records (with terms' and statistical indexes).

used instead of the decimal point in the marks, while the separator character between fields must always be a semicolon.

The print feature is provided only for a rapid non-customisable check and it has to be used when there are few data columns: more complex and customised prints may be obtained by opening the averages as a CSV file with a spreadsheet,<sup>28</sup> setting there all the formattings.

Lastly, using the menu item “Records” it is possible to set up and collect all the records of the selected students for the current course.

## 5.4 Startup parameters

ESCV accepts these parameters (from the command line or, preferably, adding them to properly created links):

use the parameter	to set
<code>/Assets:<i>dirpath</i></code>	assets' folder
<code>/Course:<i>dirpath</i></code>	the course
<code>/Language:EN IT</code>	the language
<code>/Marks:<i>value</i>;<i>value</i>;<i>value</i>;<i>value</i></code>	default reference marks
<code>/MarksStep:<i>value</i></code>	default marks step
<code>/Subject:<i>string</i></code>	the subject

Table 3: startup parameters.

More parameters may be used at the same time and they are case insensitive. Unknown parameters will be ignored.

Paths (*dirpath*) may be either absolute or relative to the folder of the executable file of ESCV.

Numerical values (*value*) must be non-negative and may have decimals, separated by either a point or a comma. The four values to list in the parameter `/Marks` are, in strictly increasing order: minimum mark (for a questionnaire that scored 0 points), the mark for an entirely unanswered questionnaire, the pass mark and the maximum mark; default values are:

---

<sup>28</sup> As [LibreOffice Calc](#).

1; 3; 6; 10. The differences among the four reference marks must be a multiple of the marks step (whose default value is 0.1).

## 5.5 L<sup>A</sup>T<sub>E</sub>X templates

ESCV creates the PDF files of questionnaires, reports, wrappers and records on the base of L<sup>A</sup>T<sub>E</sub>X templates. In the “Assets” folder of ESCV distribution there are fully customisable examples that show how to use the available options: they are, respectively, the files “Template.Questionnaire.LaTeX”, “Template.Report.LaTeX”, “Template Wrapper.LaTeX” and “Template.Records.LaTeX”.

In addition to all the standard L<sup>A</sup>T<sub>E</sub>X commands, inside the templates it is possible to use some metacommands that are managed by the program or, in few cases, by other commands of the template itself.

The most important metacommand is managed by the program and it has this syntax:

$$\backslash\text{ESCV}\{parameter\}$$

It is appropriate to repeat that it is fundamental to check the syntactical correctness of each and every L<sup>A</sup>T<sub>E</sub>X source file provided to the program: templates are no exception. In order to do that, if there are compiling errors caused by the presence of a metacommand, it can be replaced with this alternate syntax (that avoids its compilation):

$$\% \text{ESCV}\{parameter\}$$

Each parameter may be used in suitable templates only, as listed in tables 4 and 5 on pages 23 and 24. All the PDF files will be created dynamically replacing the metacommand  $\backslash\text{ESCV}\{parameter\}$  with the appropriate contents, according to the parameter. In particular:

- AnswersGrid, QuestionsAndAnswers, Assessments, AssessmentsAndStatistics, CategoriesStatistics, MarksDistribution, PointsAndMarksSettings, PointsToMarksGraph, QuestionsStatistics,

<i>parameter</i>	quest.	report	wrapper
AnswersGrid	✓		
BeginFrontMatter EndFrontMatter	✓		
Compensation	✓		
IfAutomaticGrid IfManualGrid	✓		
IfCompensation IfNoCompensation	✓		
IfConstantAnswers IfVariableAnswers	✓		
IfFrontMatter IfNoFrontMatter	✓		
IfLevelAssessed IfLevelNotAssessed	✓		
IfNames IfNoNames	✓		
IfUseAlternativeFont	✓		
NumberOfQuestions NumberOfAnswers	✓		
QuestionnaireID	✓		
QuestionsAndAnswers	✓		
StudentsName	✓		
Assessments AssessmentsAndStatistics		✓	
CategoriesStatistics		✓	
MarksDistribution		✓	
PointsAndMarksSettings		✓	
PointsToMarksGraph		✓	
QuestionsStatistics		✓	
TestOptions		✓	
Absentees		✓	✓
MarksList MarksListWithAbsentees		✓	✓
Course Year	✓	✓	✓
EN IT	✓	✓	✓
Subject TestTitle	✓	✓	✓
Version	✓	✓	✓

Table 4: parameters of the metacommand `\ESCV{parameter}` and their use in the templates of questionnaires, reports and wrappers.

<i>parameter</i>	main body	test details
BeginTestDetails EndTestDetails	✓	
Compensation	✓	
Assessments AssessmentsAndStatistics		✓
Dispensation		✓
IfDispensation IfNoDispensation		✓
IfTestTaken IfTestNotTaken		✓
PointsAndMarksSettings		✓
PointsToMarksGraph		✓
StudentsAnswers [ <i>width</i> ]		✓
TestLabel		✓
TestOptions		✓
TestTitle		✓
Course Year	✓	✓
EN IT	✓	✓
IfCompensation IfNoCompensation	✓	✓
StudentsName	✓	✓
Subject	✓	✓
TakenTests TotalTests	✓	✓
Version	✓	✓

Table 5: other parameters of the metacommand `\ESCV{parameter}` usable in the records template.



`StudentsAnswers[width]`,<sup>29</sup> `TestOptions`, `Absentees`, `MarksList` and `MarksListWithAbsentees` must be used in lines containing nothing else; they will be replaced (preserving the indentation) by lists or data tables as specified by the name of the parameter.

- `BeginFrontMatter`, `EndFrontMatter`, `BeginTestDetails` and `EndTestDetails` have no visible output. The former two define the front matter of the document, which can or cannot be included in the produced PDF files; the latter two define the sub-template to show the data of each test.
- `Compensation`,<sup>30</sup> `Dispensation`,<sup>31</sup> `NumberOfQuestions`, `NumberOfAnswers`, `QuestionnaireID`, `StudentsName`, `Course`, `Subject`, `TakenTests`, `TestLabel`, `TestTitle`, `TotalTests`, `Version` and `Year` will be replaced by the value of the property named in the parameter.
- `IfAutomaticGrid`, `IfManualGrid`, `IfConstantAnswers`,<sup>32</sup> `IfVariableAnswers`,<sup>32</sup> `IfFrontMatter`, `IfNoFrontMatter`, `IfLevelAssessed`, `IfLevelNotAssessed`, `IfNames`, `IfNoNames`, `IfTestTaken` and `IfTestNotTaken` are used to show the content of the whole line in which they appear if and only if the clause is fulfilled.
- `IfCompensation`,<sup>30</sup> `IfNoCompensation`,<sup>30</sup> `IfDispensation`,<sup>31</sup> `IfNoDispensation`<sup>31</sup> and `IfUseAlternativeFont`<sup>33</sup> allow the remaining part of the line in which they appear to be shown if and only if the clause is fulfilled.

---

<sup>29</sup> *width* is the ratio between the width of the image (of answers' sheet) and the total width of text lines, so it should be  $0 < width \leq 1$ .

<sup>30</sup> Compensation provided by the customised educational plan and recorded in the students' list (as explained in paragraph 5.1.3 on page 13).

<sup>31</sup> Dispensation actually applied for the assessment of the single test.

<sup>32</sup> The clause `IfConstantAnswers` is fulfilled when all the questions in the test have the same number of answers, while `IfVariableAnswers` is fulfilled when the test may contain questions with a different number of answers.

<sup>33</sup> The clause is fulfilled if in the student's list the related box is checked (as explained in paragraph 5.1.3 on page 13).

- EN and IT allow the whole line in which they appear to be shown if and only if ESCV is used in the language specified by the parameter.

All the other L<sup>A</sup>T<sub>E</sub>X items managed by ESCV may be used in the file “Template.Questionnaire.LaTeX” only and they are defined inside the template itself, in order to allow a fine customisation of the look of the questionnaires. The complete list is shown in the following table:

metacommands	lengths	colours
<code>\ESCVBEGINQUESTION</code>	<code>\ESCVMargin</code>	ESCVGrey
<code>\ESCVENQUESTION</code>	<code>\ESCVMarginLeftMargin</code>	
<code>\ESCVPATHASSETS</code>	<code>\ESCVMarginWidth</code>	

Table 6: other manually customisable L<sup>A</sup>T<sub>E</sub>X items, usable inside the file “Template.Questionnaire.LaTeX”.

The first two metacommands, together with the last two lengths, define the typesetting of the questions in the questionnaires; `\ESCVPATHASSETS` may actually be used in every template and it will be replaced by the absolute path (without ending “/”) of the folder containing the assets used by the program; the colour `ESCVGrey` is used in the answers’ grid for automatic assessment; moreover, a length `\ESCVMargin` is defined as well, representing the thickness of the empty space between the printable area and the total area of the paper sheet, nevertheless, as it is strictly related to the paper geometry internally managed by the program,<sup>34</sup> at the moment it is not changeable by the user.

## 5.6 Internet publishing

All the data of the tests (reports, wrappers, questionnaires and given answers), as well as students’ averages, may be published on a web page, by means of the specific menu items in the program sections “assess questionnaires” and “averages and records”. First it will be necessary to set, upon request, the complete absolute path of the folder where the files will be put

<sup>34</sup> The current version of ESCV only manages A4 format (standard ISO 216).

on the FTP server (that folder must be manually created or preexisting), also providing user name and password to log into the server.

It will be appropriate to manage file access permissions, in order to protect the private nature of the published data, creating for instance in the root folder of each course the files “`<Course>.htaccess`” and “`<Course>.htpasswd`”. If they both exist, they will be automatically sent on the FTP server, properly renamed.

The index of the courses and the pages containing tests data and averages are created on the base of HTML templates. In the “Assets” folder of ESCV distribution there are fully customisable examples that show how to use the available options: they are, respectively, the files “`Template.index.html`”, “`Template.Course.html`” and “`Template.Averages.html`”. CSS styles are embedded into the HTML templates (obviously in case of need they may be separated and centralised).

In addition to all the standard HTML commands, inside the templates it is possible to use a metacommand that is managed by the program. It has this syntax:

```
<!-- ESCV parameter -->
```

Similarly to L<sup>A</sup>T<sub>E</sub>X metacommands, each parameter of the HTML metacommand may be used in suitable templates only, as summarised in table 7 on page 28.

These are their effects:

- **Begin List of Courses** and **End List of Courses** have no visible output, yet they must be used to define the boundaries of the list of the courses (which will contain all the courses contained in the parent folder of the latest loaded course).
- **Index Name** [*filename*] defines a new file name for the main index instead of the default one (“`index.html`”).
- **List of Courses LineTemplate**: the line in which it appears must contain the HTML code that will be used to typeset the items of the list of the courses.

<i>parameter</i>	index	course	aver.	ex
Begin List of Courses	✓			✓
End List of Courses	✓			✓
Index Name [ <i>filename</i> ]	✓			
List of Courses LineTemplate	✓			✓
Course Contents		✓		✓
Index Name		✓	✓	
Course Averages			✓	✓
Course Year	✓	✓	✓	
EN IT	✓	✓	✓	
Version	✓	✓	✓	

Table 7: parameters of the metacommand `<!-- ESCV parameter -->` and their use. Those with a checkmark in “ex” column must be used in lines containing nothing else (they will be replaced by appropriate contents, preserving the indentation).

- **Course Contents** and **Course Averages** will be replaced by the contents named in the parameter.
- **Index Name**, **Course**, **Version** and **Year** will be replaced by the value of the property named in the parameter.
- **EN** and **IT** allow the whole line in which they appear to be shown if and only if ESCV is used in the language specified by the parameter.

## 6. How to uninstall

Close ESCV (if needed), delete its folder and any file created during its use. That will completely uninstall ESCV. :-(

If you had to install [.NET Framework 4.8](#) or the “Media Feature Pack”, you may remove them through the usual “Add/Remove” applet of the Windows Control Panel (be careful: they may be shared with other applications).

## 7. Feedback, suggestions, bug-reports

Any comments, suggestions and (most of all) bug-reports are welcome. Please use the eMail address [mario@corsolini.net](mailto:mario@corsolini.net)

While submitting an error it is advisable to report the version of both the program<sup>35</sup> and the operating system. It is also advisable to attach, if available, the files “ESCV.log” (from the same folder of the executable file of ESCV), “TestData.xml” (from the folder of the test that raised the error) and/or anything useful to reproduce and analyse the problem.

ESCV is a multilingual application: contact me if you are willing to translate it into another language!

## 8. Release history

- Version **2.4.4** — May 20<sup>th</sup>, 2025
  - Improved “Averages.html” file: now it shows both averages with and without terms.
  - Minor amendments and cosmetic changes.
- Version **2.4.3** — May 1<sup>st</sup>, 2025
  - Improved management of students’ list: an external program is not needed anymore.
  - Removed: L<sup>A</sup>T<sub>E</sub>X parameters “TestCompensation”, “IfTestCompensation”, “IfNoTestCompensation” and “IfUseSans” (replaced by “Dispensation”, “IfDispensation”, “IfNoDispensation” and “IfUseAlternativeFont”).
  - Minor amendments and cosmetic changes.
- Version **2.4.2** — March 20<sup>th</sup>, 2025
  - Added: menu item “Averages / Edit selected mark...”.
  - Added: LaTeX parameter “IfUseSans”.

---

<sup>35</sup> Check whether it is the most updated one, through the menu items “Help / Check on updates” or “Help / WWW homepage”. In case it is not, please update ESCV and check whether the issue is still occurring.

- Bugfix: dispensation was poorly implemented to scores in the lowest ranges.
  - Bugfix: attempt to add a textual note to the assessment of a questionnaire without answers crashed ESCV.
  - Minor amendments and cosmetic changes.
- Version **2.4.1** — June 20<sup>th</sup> 2024
    - Improved “Averages.html” file: columns’ headers are now provided with the description of the contents.
    - Changed: the number of right answers needed to get a pass mark is now rounded up.
    - Minor cosmetic changes.
- Version **2.4.0** — January 5<sup>th</sup> 2024
    - Added: interactive proofreading of recognised answers by means of preexisting menu item “Assessment / Selected questionnaire / Show answers’ sheet”.
    - Added: info on selected test in the “Assess questionnaires” button of the main window, through right click.
    - Added: table of statistics (in reports providing it) even for questionnaires with manually overwritten marks.
    - Bugfix: loading a marks column from CSV file wrongly managed empty lines.
    - Bugfix: ESCV could not be able to run on obsolete versions of Windows.
    - Bugfix: HTML files can now be created even without setting up the FTP server.
    - Bugfix: menu item “Test / Questionnaires / Delete test” is always visible and it is enabled even right after the creation of a test now.
    - Minor amendments and cosmetic changes.
- Version **2.3.2** — January 21<sup>st</sup> 2023
    - Added: merging of questionnaires into a single two-sided PDF file, through PDFtk Server.

- Bugfix: enabling of menu item “Test / Categories / Paste copied categories” was not correctly managed.
- Bugfix: changing category of a question did not enable “Save archive” button.
- Bugfix: students’ list was not updated on the fly after applying changes with an application not started by ESCV.
- Removed: menu item “Test / Questionnaires / Frame automatic answers’ grid”.
- Removed: Sumatra PDF (which is still usable as plug-in).
- Removed: Newtonsoft Json.NET library.
- Version **2.3.1** — June 21<sup>st</sup> 2022
  - Added: menu item “Test / Questionnaires / Frame automatic answers’ grid”.
  - Added: menu item “[ -> LaTeX compiler time-out (click to show latest compiled file) ]”, visible only when appropriate.
  - Improved: “Paste copied categories” now works between different instances of ESCV.
  - Bugfix: disabled cut&paste of categories in formerly compiled tests.
  - Bugfix: opening a file not registered in Windows raised a fatal exception.
  - Minor amendments and cosmetic changes.
- Version **2.3.0** — January 21<sup>st</sup> 2022
  - Added: menu item “Records / Save records of selected students...”.
  - Added: menu item “Records / Edit records template”.
  - Added: menu item “Options / Set archive and test width ratio...”.
  - Added: management of averages independent from students’ ID number (averages computed with superseded versions of ESCV will need to be recomputed, after deleting the files “Averages.xml” in the folders of the courses).
  - Added: number of used questions in copy&paste of categories for new tests.

- Added: automatic sending of files “.htaccess” and “.htpasswd” on FTP server.
  - Bugfix: test data published on FTP server could be not updated.
  - Bugfix: swapping the right answer with a wrong one did not update the archive.
  - Bugfix: statistical indexes of assessments were not updated in real time.
  - Removed: combo boxes “Manage archives and tests / Term:” e “Manage archives and tests / Number:” (replaced by menu item “Test / Test term and number...”).
  - Removed: table column “Assess questionnaires / Reason” (replaced by “Note”, independent from “Bonus/penalty”).
  - Removed: L<sup>A</sup>T<sub>E</sub>X parameter “Title” (replaced by “TestTitle”).
  - Minor amendments and cosmetic changes.
- Version **2.2.1** — June 11<sup>th</sup> 2021
    - Bugfix: switching to a new test sometimes caused unexpected outcomes.
    - Bugfix: “Compile selected questions” always showed test questions, when available.
    - Bugfix: adding categories of questions to a test now updates any preexisting questions.
    - Bugfix: the list of questions included in the test was not shown accurately.
    - Bugfix: categories whose names are too long are now printed on several lines, in the report.
    - Bugfix: any warnings’ tooltip will be closed before opening the L<sup>A</sup>T<sub>E</sub>X editor.
    - Bugfix: maximum height of secondary windows is now around 600 points.
    - Bugfix: maximum length of category names is 72 characters from now on;  $\langle / \rangle$  will always be converted into  $\langle | \rangle$ .



- Version **2.2.0** — May 1<sup>st</sup> 2021
  - Added: menu item “Assessment / Publish only assessed questionnaires”.
  - Added: menu item “Averages / Load marks column from CSV file...”.
  - Added: menu item “Averages / Remove selected column”.
  - Bugfix: opening the window “Search question in questionnaires...” in an anonymous test raised a fatal exception.
  - Bugfix: now the window “Search question in questionnaires” is non modal.
  - Bugfix: marks are now rounded down in order to exactly fit the settings.
  - Bugfix: compensation was miscalculated for scores in the lowest range.
  - Bugfix: compensation now applies to students without a customised educational plan.
  - Bugfix: compensation can not be negative or greater than the theoretical maximum score any more.
  - Bugfix: assessing only one questionnaire did not update the status of the test.
  - Minor cosmetic changes.
  
- Version **2.1.0** — March 20<sup>th</sup> 2021
  - Added: importation of answers acquired through a smartphone or a tablet.
  - Added: menu item “Test / Questionnaire / Create a named copy of the questionnaires...”.
  - Added: menu item “Assessment / Selected questionnaire / Show questionnaire”.
  - Added: menu items “Assessment / Selected questionnaire / Show answers’ sheet” in all available formats.
  - Added: complete English translation of documentation and support files.

- Bugfix: showing a preview could corrupt the number of anonymous questionnaire with compensation to be created.
- Bugfix: the students' list was corrupted on changing language.
- Bugfix: weighted averages were sometimes wrongly computed. The entire module has been rewritten from scratch: any preexisting data will have to be regenerated.
- Bugfix: starting or stopping a nonexistent camera crashed ESCV.
- Bugfix: question's category, students' names and IDs were not shown in "Search question in questionnaires" window.
- Removed: menu item "Assessment / Set images' source / Remote images" (replaced by "Assessment / Set data source / Android device").
- Removed: automatic conversion of some special characters into L<sup>A</sup>T<sub>E</sub>X or HTML commands.
- Minor amendments and cosmetic changes.
- Version **2.0.0** — September 13<sup>th</sup> 2020
  - Rewritten from scratch as a WPF application. First version publicly released.
- Version **1.1.0** — April 25<sup>th</sup> 2015
  - Added: automatic recognition of answers in digitally scanned images.
- Version **1.0.0** — September 13<sup>th</sup> 2007
  - First working version (not distributed).

## 9. Acknowledgements

Thanks to the authors of MiKTeX,<sup>36</sup> TeXnicCenter,<sup>37</sup> OpenCV,<sup>38</sup> Emgu CV,<sup>39</sup> Sumatra PDF,<sup>40</sup> PDFtk Server,<sup>41</sup> LibreOffice<sup>42</sup> and FileZilla Server.<sup>43</sup>

Most of the icons used in ESCV belong to the collection Farm-Fresh by FatCow Web Hosting.<sup>44</sup>

The author wants to thank all the people who helped him with ideas and valuable suggestions, as well as the beta testers!

And, obviously, thanks to Laura!!

Well, that's all about it, happy playing!!!

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<sup>36</sup> <https://miktex.org/>

<sup>37</sup> <https://www.texniccenter.org/>

<sup>38</sup> <https://opencv.org/>

<sup>39</sup> <https://www.emgu.com/>

<sup>40</sup> <https://www.sumatrapdfreader.org/>

<sup>41</sup> <https://www.pdflabs.com/tools/pdftk-server/>

<sup>42</sup> <https://www.libreoffice.org/>

<sup>43</sup> <https://filezilla-project.org/>

<sup>44</sup> <https://www.fatcow.com/free-icons>

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