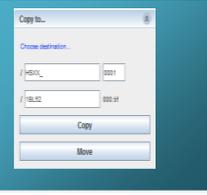
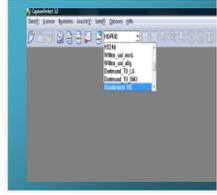
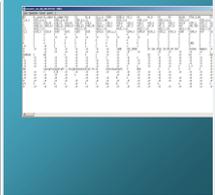
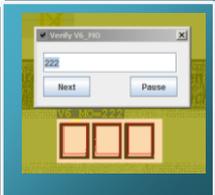


Handbook

for scanning, creation of the scan-mask and verification of paper questionnaires

International Center for Higher Education Research (INCHER)

Kassel-2011



This handbook attempts to provide introduction into the creation of the scan mask for and further verification of paper questionnaires for first-time users of the QTAFI-scanner. It intends to accompany the users in their first steps with the tool without going too deep into the background of the program.

The handbook was compiled and written by Tamara Arutyunyants mainly thanks to:



Harald Schomburg, a key researcher at the International Centre of Higher Education Research (INCHER) of the University of Kassel in areas of higher education and employment, survey methods and quantitative data analysis, who initially put forth the idea of creating a program for processing and working with paper questionnaires as well as the idea of writing a handbook.

AND



Martin Guist, who is responsible for the realization of online surveys in various national and international research projects conducted at the International Center of Higher Education Research (INCHER) of the University of Kassel. Martin Guist elaborated a QTAFI program: a tool to administrate and conduct large scale online surveys as well as to process paper questionnaires, beginning from the creation of a scan mask and proceeding with the verification of paper questionnaires.

Short history of the program creation:

In the year 2006 Harald Schomburg and Martin Guist had a discussion on how to process and work with a paper document. After some discourses on this issue, Martin Guist conducted initial trials approximately in 2007. The initial trials followed by a long break. The crash of the program Eyes & Hands, which was used for administering paper questionnaires, motivated Martin to continue developing a new program. In the spring 2009 Martin invested a lot of time and efforts on the Optical Number Recognition (ONR) structure which resulted with a moderate success. In 2009 a test phase was conducted in which a number of paper questionnaires were captured with the new program. In this period the program experiences a surge in its development. In the year 2010 the program was launched and thus replaced the previous program Eyes & Hands.

The handbook is also the result of constant support and valuable help of INCHER colleagues who assisted and contributed to the creation of this handbook, namely Pia Wagner, Lutz Heidemann, Rene Kooij, Florian Löwenstein, as well as student assistants Roman Schmidt and Vasileia Skrimpa.

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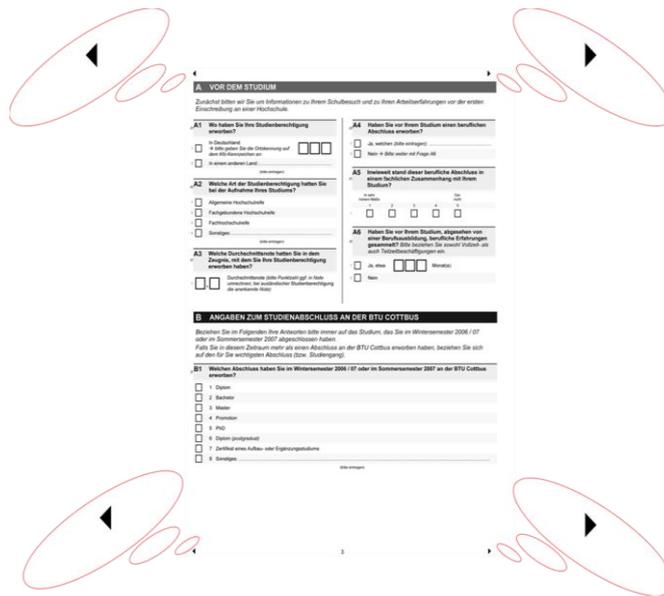
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Most important points to keep in mind when printing out paper questionnaires:

Automatic capture of paper questionnaires by a scanner:

1. Questionnaires are to be automatically captured by a scanner. This might cause some deformations within the print image. The deformations may not exceed **2 mm** from the original questionnaire; otherwise the problems may arise upon the adjustment of questionnaires by the QTAFI-scanner and their further verification.



This must be assured for you in the copy shop. If questionnaires cannot be captured by a scanner, the costs for additional manual work will be required;

2. It must not be stapled near the corner markers (adjusted fields);
3. It is recommended to print out questionnaires in a format ISO A3 with saddle-stitching (several sheets of paper are folded (the fold becomes the spine of the questionnaire) and two staples are placed in the fold).

Paper properties:

1. Paper density should be at least 90 g/m^2 ; much better is 100 g/m^2 ;
2. Type of paper: matte paper (no glossy paper).

Number of questionnaires and addressed envelops:

1. The number of graduates x 1,3 (+20 - 50 exemplars for the university printing out questionnaires).

It is recommended to have more questionnaires than graduates themselves as in some cases two questionnaires might have to be sent to the same person. As experience shows, to calculate the number of required questionnaires, the number of graduates is to be multiplied by 1,3 and to this number 20 more is to be added. From the total number 50 questionnaires should be left at the university printing out questionnaires.

- Contact sequence:
1. Standard letter (ISO long) regarding the survey
 2. C4-letter with questionnaires (advert to the survey in the cover letter)
 3. Standard letter (ISO long)
 4. C4-letter with questionnaires

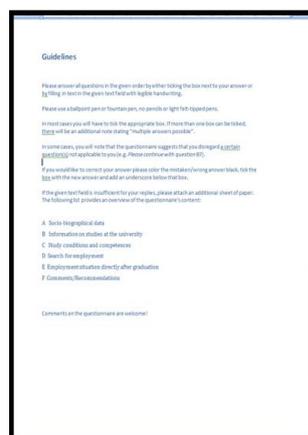
Number of colored pages by printing out questionnaires:

1. With the expression "2/1- color " the colorfulness is defined respectively for the front and back page of a sheet of paper; the colorful background of the paper is not counted. Example: **front page = 2 - color / back page = 1 - color.**

Example:



Front page: 2 colors - blue and black



Back page: 1 color - blue

2. Implemented scheme in actual print of questionnaires:

- 4/1 - color (front page 4- color, back page 1- color);
- 2/1 - color;
- 2/2 - color (front page 2- color, back page 2- color);
- 4/4 - color; 1/1 - color. For the printing of addressed envelopes: 1/0-color.

1. Introduction to the questionnaire structure

1.1 Questionnaire structure

The design of a questionnaire can be determined by a university itself; however, there is a particular structure that is to be followed upon the creation of any questionnaire. A questionnaire consists of the cover page, the guidelines for filling out a questionnaire, the content of a questionnaire and at the end the expression of gratitude for cooperation. Three main parts with regard to the questionnaire structure, namely a cover page, guidelines and the content of a questionnaire will be considered in this handbook.

1.1.1 Cover page

A cover page provides general information about a university conducting a survey, a cohort of graduates to be surveyed and some essential points regarding the questionnaire itself. In order to have complete information on a cover page, the following important elements are to be indicated:

- ✚ the logo of a university from which the questionnaires are;
- ✚ the title - Graduate survey of the University XXX;
- ✚ cohort of graduates to be surveyed - indication of the semester and year;
- ✚ explanation of the type of the prepared questionnaire - paper and/or online questionnaire;
- ✚ clarification regarding the access code - PIN;
- ✚ time-span for completing a questionnaire and clarification on its return to a respective university;
- ✚ contact information.

1.1.2 PIN of a questionnaire

PIN is a **Personal Identification Number** that is sent to each participant of a survey. It serves as an access code for filling out online questionnaires. It is essential to create PINs for online questionnaires in order to protect your questionnaire, e.g. to be sure that only the target population has an access to it and fills out a questionnaire and not any other person who is not of interest for a survey.

Availability of PINs for online questionnaires provides also an opportunity for the target population to have a multiple access to a questionnaire. In case when a person could not fill out the whole questionnaire at one go, he/she has a possibility to continue answering questions another time.

In case of paper questionnaires PINs are essential only for controlling the response behavior. A reminder to complete a questionnaire should not be sent to the respondents who already filled out a questionnaire.

In case when a survey includes both online and paper questionnaires, PINs are important for combination of paper and online questionnaires. Here respondents have a choice what type of questionnaire to fill out. Entering a PIN to one type of questionnaires allows considering another type as filled out.

1.1.3 ID of a questionnaire

ID is a sequence number of a questionnaire. The ID number is indicated in the upper right corner of a cover page of a questionnaire upon receiving filled out questionnaires from graduates. The ID is also important for further work with a questionnaire, as it serves later on as a file name.

1.1.4 Guidelines to a questionnaire

The second page of a questionnaire provides guidelines on how to fill out a questionnaire correctly as well as gives introduction into the content of a questionnaire by listing all the sections included into the questionnaire.

It is important to state explicitly in the guidelines how to respond to different types of questions, how to correct the given wrong answers, what pen is better to use and what to do if there is not enough space for providing a complete answer.

Sample questionnaire, included in this handbook, contains the description of all aspects mentioned above.

1.1.5 The content of a questionnaire

A questionnaire comprises several sections which are entitled with letters in alphabetical order, e.g. **A, B, C** etc. and titles of various sections (see the sample questionnaire below). Within the section the questions are numbered in a sequential order followed by a letter of a particular section. For example, within the section A the questions will be numbered A1, A2, A3, etc.

In general the sections within a questionnaire are distributed in a chronological order, beginning from the information prior to study, continuing with information during study, situation after study with regard to the job search period, employment right after graduation as well as current employment situation and conditions, and finishing with socio-biographical data as well as comments and recommendations.

Every page of a questionnaire with the exception of a cover page and guidelines should be numbered.

Sample questionnaire considered in this handbook has a bit different structure. It was adjusted especially for this handbook with the purpose to use as an example a simple and clear questionnaire that at the same time contains various question structures to which different elements should be applied to create a scan mask.

Sections of a sample questionnaire:

- A** - socio-biographical data
- B** - Information on studies at the university
- C** - Study conditions and competences
- D** - Search for employment
- E** - Employment situation directly after graduation
- F** - Comments/Recommendations

1.2 Sample questionnaire

Presented below sample paper questionnaire will be used in this handbook for the explanation of all steps necessary to perform for processing paper questionnaires.

Insert logo of the university XXX

Graduate Survey of the University XXX

Survey of graduates of the winter semester
xxx (year) and summer semester xxx (year)

We have prepared two versions of this questionnaire for you to choose from:
an online version and this paper version.

If you want to fill in the paper questionnaire, please enter the access code from
the cover letter in the box below so that we can delete it from the online survey.

On the next page you will find the instructions on how to fill in this questionnaire.
If possible, please complete the questionnaire in the following two weeks, and send
it back to us using the addressed envelope included in the package you received.

Contact:
Higher Education Institution XXX
Project Graduate Survey
Address
Internet homepage

Guidelines

Please answer all questions in the given order by either ticking the box next to your answer or by filling in text in the given text field with legible handwriting.

Please use a ballpoint pen or fountain pen, no pencils or light felt-tipped pens.

In most cases you will have to tick the appropriate box. If more than one box can be ticked, there will be an additional note stating "multiple answers possible".

In some cases, you will note that the questionnaire suggests that you disregard a certain question(s) not applicable to you (e.g. *Please continue with question B7*).

If you would like to correct your answer please color the mistaken/wrong answer black, tick the box with the new answer and add an underscore below that box.

If the given text field is insufficient for your replies, please attach an additional sheet of paper. The following list provides an overview of the questionnaire's content:

- A Socio-biographical data
- B Information on studies at the university
- C Study conditions and competences
- D Search for employment
- E Employment situation directly after graduation
- F Comments/Recommendations

Comments on the questionnaire are welcome!

A SOCIO-BIOGRAPHICAL DATA

A1 What is your gender?

- 1 Male
2 Female

A2 Where do you currently live?

- 1 In Germany → Please enter the place identifier of the licence plate:
2 In another country → Please enter the name of the country:
(please specify)

A3 What is your current marital status?

- 1 Single (incl. single parent)
2 With a partner
3 Married
4 Other:
(please specify)

B INFORMATION ON YOUR STUDIES AT THE UNIVERSITY

B1 Overall, how many semesters did you study this subject? (do not include semesters that you took off (leaves of absence), but do include semesters spent at a different university studying the same subject)

Overall number of course-semester

B2 Did you complete your studies in the standard period of time?

- 1 Yes
2 No

B3 Which final or average grade did you obtain in this study? Please recalculate points to grades if necessary

Final or average grade

B4 On average, how many hours per week did you spend on the following activities during the course of your study?

- | | During semesters | During semester breaks | |
|---|---|---|---|
| 1 | <input type="text"/> <input type="text"/> | <input type="text"/> <input type="text"/> | Attending courses / classes |
| 2 | <input type="text"/> <input type="text"/> | <input type="text"/> <input type="text"/> | Study activities outside of courses / classes |
| 3 | <input type="text"/> <input type="text"/> | <input type="text"/> <input type="text"/> | Preparation for exams |
| 4 | <input type="text"/> <input type="text"/> | <input type="text"/> <input type="text"/> | Working (no internships) |
| 5 | <input type="text"/> <input type="text"/> | <input type="text"/> <input type="text"/> | Family-related duties |
| 6 | <input type="text"/> <input type="text"/> | <input type="text"/> <input type="text"/> | Other: |
- (please specify)

B5 What was your main source of income during the course of your study? Only one answer possible

- 1 Financial support from parents and / or other relatives
- 2 Financial support from partner / spouse
- 3 Financial support according to the Federal Education and Trainings Assistance Act
- 4 Own income from working during semesters and/or during semesters breaks
- 5 Credit / loan (e.g. special education credit, credit from a bank or private person)
- 6 Scholarship
- 7 Own funds, earned / saved before study
- 8 Other source(s) of income:

(please specify)

B6 Did you do any internships during your course of studies (this does not refer to team projects, practical courses etc.)? Multiple answers possible

- 1 Yes, mandatory internship(s)
- 2 Yes, voluntary internship(s)
- 3 No internships — Please continue with question B8

B7 How many internships did you do in total?

Number of mandatory internships

Number of voluntary internships

B8 During the course of your study, were you active as a tutor, student assistant and / or scientific assistant?

- 1 Yes, for approx. months
- 2 No

C STUDY CONDITIONS AND COMPETENCIES

C1 To what extent were the following aspects of teaching and learning emphasized in your studies?

	To a very high extent						Not at all				
	1	2	3	4	5		1	2	3	4	5
1	<input type="checkbox"/>	Lectures	<input type="checkbox"/>								
2	<input type="checkbox"/>	Group work	<input type="checkbox"/>								
3	<input type="checkbox"/>	Participation in research projects	<input type="checkbox"/>								
4	<input type="checkbox"/>	Internships and practical training	<input type="checkbox"/>								
5	<input type="checkbox"/>	Fact-oriented and practical knowledge	<input type="checkbox"/>								
6	<input type="checkbox"/>	Theories and paradigms	<input type="checkbox"/>								
7	<input type="checkbox"/>	Teaching staff as main source of information	<input type="checkbox"/>								
8	<input type="checkbox"/>	Project and / or problem oriented learning	<input type="checkbox"/>								
9	<input type="checkbox"/>	Written work	<input type="checkbox"/>								
10	<input type="checkbox"/>	Oral presentations by students	<input type="checkbox"/>								
11	<input type="checkbox"/>	E-Learning	<input type="checkbox"/>								
12	<input type="checkbox"/>	Self-study	<input type="checkbox"/>								

C2 In retrospective, how satisfied are you with your studies in general?

Very satisfied Very dissatisfied

1 2 3 4 5

D SEARCH FOR EMPLOYMENT

D1 How did you search for a job? *Multiple answers possible*

- | | |
|--|--|
| 1 <input type="checkbox"/> Replied to job ads/announcements (e.g. newspaper, internet, notice) | 11 <input type="checkbox"/> Through internet (social) networks (e.g. XING) |
| 2 <input type="checkbox"/> Speculative application – independent contact to employers | 12 <input type="checkbox"/> Through private job agencies |
| 3 <input type="checkbox"/> Job fair | 13 <input type="checkbox"/> Through the career center of the higher education institution etc. |
| 4 <input type="checkbox"/> I was contacted by an employer | 14 <input type="checkbox"/> Through teaching staff at the higher education institution |
| 5 <input type="checkbox"/> Through internships during my course of studies | 15 <input type="checkbox"/> Writing your final thesis in a company |
| 6 <input type="checkbox"/> Through internships after graduation | 16 <input type="checkbox"/> With help of personal contacts (friends, fellow students etc.) |
| 7 <input type="checkbox"/> Through (side) jobs during the study | 17 <input type="checkbox"/> With the help of family contacts (parents, relatives) |
| 8 <input type="checkbox"/> Through (side) jobs during after graduation | 18 <input type="checkbox"/> Other: |
| 9 <input type="checkbox"/> Application for teaching traineeship | <p style="text-align: right;"><small>(please specify)</small></p> |
| 10 <input type="checkbox"/> Through the public job centre | 19 <input type="checkbox"/> Not applicable, I have not searched for employment. → Please continue with question E1 |

D2 When have you started searching for a job? *Please exclude temporary non-study related jobbing.*

- 1 Prior to graduation
- 2 Around the time of graduation
- 3 After graduation

D3 How many employers did you approximately contact? *(applications etc.)*

 Number of contacted employers

D4 How many months did you search for a first job in total? *If you have not found a job yet, how many months has your search taken so far? Please exclude temporary non-study related jobbing.*

 Month(s) of search for first job

E EMPLOYMENT SITUATION DIRECTLY AFTER GRADUATION

E1 When did you start your first job after graduation?

 Month Year

- I haven't been employed since graduation. → Please continue with part F

E2 What type of contract did you have in your first employment after graduation?

- 1 Unlimited term
- 2 Fixed term

E3 What was the job title of your first employment after graduation? *if possible, please choose the appropriate option or fill in the exact job description, e.g. trainee teacher, development engineer, social worker, assistant to management etc.*

Job title

(please specify)

E4 To what extent were your knowledge and skills that you acquired during study utilized in this work?

To a very high extent		Not at all		
1	2	3	4	5
<input type="checkbox"/>				

F COMMENTS / RECOMMENDATIONS

F1 What did you especially like about your study?

.....

.....

.....

.....

.....

F2 What did you not like at all about your study?

.....

.....

.....

.....

.....

F3 What would you recommend for the improvement of your study program?

.....

.....

.....

.....

.....

2. Scanning paper questionnaires

2.1 Preparation for scanning

Before starting working with blank and filled-out paper questionnaires, they should be scanned.

Every filled-out paper questionnaire has its ordinal number (ID), which is indicated in the upper right corner. It is recommended to scan the questionnaires in the order they are following.

2.1.1 Cutting paper questionnaires

The binding part of paper questionnaires should be cut with the help of a cutter in order to bring it in the right format and be able to scan all the pages automatically. The cutter is set on A4 format. After cutting the questionnaire and before scanning it, the last pages containing no data relevant for the analysis are to be removed. To such pages refer, if applicable: *page with gratitude for cooperation, list with fields of study, etc.*

2.1.2 Opening the relevant file

Before scanning questionnaires the relevant folder is to be opened where the blank questionnaire as well as filled-out questionnaires of all universities are going to be saved. The name of the folder is optional. Below is the example of the folder name used in INCHER. This folder is named with the year of the surveyed cohort. Under this folder another folder is created with the name "**_PAPER**". Within the folder "**_PAPER**", new folders are opened with the names of universities from which the questionnaires are. In these folders all respective scanned filled-out questionnaires are to be saved.

Within a folder of a particular university another sub-folder is created with the name "**_blank**". In the sub-folder "**_blank**" a blank questionnaire, the created scan mask and verified data are saved.

2.2 Scanning paper questionnaires

To scan paper questionnaires there is no need for a special scanner that is used primarily in copy shops. For example, a scanner Canon DR-4010C, which is shown on the picture, is used at INCHER for scanning paper questionnaires.



2.2.1 Settings of a scanner

Before scanning paper questionnaires it is important to do some basic scanning settings such as: resolution, scan color mode, brightness, contrast and scanning sides.

Resolution determines image quality; it should be set on 200 dots per inch (dpi). 300 dpi is also possible and even better; however it increases the size of the files to a high extent.

What is very important is that you do not change the resolution during the whole process, i.e. during the scanning both blank and filled out questionnaires.

Scan color mode - black and white.

Brightness and contrast depend on the paper that is used for questionnaires, whether it is a bit dark or bright. When setting the brightness and contrast make sure that the given by respondents answers are visible upon scanning.

It is advised to scan multiple images to separate files. For this choose the option "**multiple pages to a single file**" and indicate the **number of pages per questionnaire** in the settings. This will allow a scanner to scan files and allocate the given number of pages to one file. It is important to place the questionnaire pages on a scanner in a correct order so that the file with a questionnaire contains all relevant pages of a questionnaire in a sequential order.

As questionnaires are printed out as double-sided they should be scanned as double-sided as well. In the option "scanning sides" choose a **duplex (double-sided) scanning**.

2.2.2 Tiff file - save type file

Scanned files should be saved as tiff files (*.tif) - Tag Image File Format, a widely used format for storing image data. Each scan represents a different image (or tiff file); however, the images can be concatenated to create one large image (file) with multiple pages (a multi-page tiff file). In this case all pages together form a single document.

For facilitation of the work and preventing the loss of scanned questionnaire pages it is recommended to save images as multi tiff files, e.g. store all pages of a questionnaire in one file. This can be done with the help of the option of a scanner "multiple pages to a single file" described above in the section settings of a scanner.

2.2.3 Name of a tiff file

The name of a file of a filled-out questionnaire should comprise the **code of a university** from which the questionnaires are, if relevant the **code of a course degree** as well as the **ID of a questionnaire**.

Code of a university: The institution which is responsible for receiving all the questionnaires and working with them should create a code for each particular university. A code can consist of an ordinal number or a short version of a university name.

If there are variations between the questionnaires with regard to the course degree, a code should be created for different course degrees. A code can consist of an ordinal number. Below is an example of the codes for some degree courses applied in INCHER. The codes below range from 1 to 5.

1 - General subjects and Bachelor and Master degrees; 2 - Law;
3 - Teaching degree; 4 - Medicine; 5 - PhD.

Underline is followed by the code of a university and if relevant, code of a course degree.

Besides the codes of a university and a course degree, it is advised to provide the ID number of a scanned questionnaire. The number should consist of four digits. If the ID of a questionnaire is 1, the number 1 is to be followed by three zeros, e.g. 0001, 0002..., 0015..., 0143, etc.

Thus, the tiff file of the sample questionnaire in this handbook is named: **Uni XXX_0001**, where Uni XXX is the code of a university and 0001 is the ID of the first questionnaire.

3. QTAFI-Scanner / Introduction to the Scan-Mask

3.1 Definition

What is the QTAFI-Scanner?

The QTAFI-Scanner¹ is a tool for computer-aided detection of paper questionnaires. The QTAFI-Scanner recognizes the relevant data from the scanned filled-out questionnaires and adds them together to a record. Before, however, the QTAFI scanner can fulfill this function the users must create appropriate scan masks.

What is the Scan-Mask?

A scan mask defines the fields from which the QTAFI scanner extracts its data. The mask defines - on the simple principle of a template - page by page, which sections of a paper questionnaire should be tested for relevant answers.

The QTAFI scanner does not certainly automatically recognize which characters from the questionnaires were preprinted and which characters were handwritten by the respondents. It can only determine the proportion of pixels in a given field, infer from the (non-) presence of characters and translate this information into numbers. Therefore it rests on the user to detect the relevant responses in the scan masks.

Conditions

The QTAFI scanner can be installed on your own computer by running the application "Install scanner.exe".

The definition of scan masks must in each case be carried out at the blank questionnaire. As it was mentioned above, the tiff files of questionnaires are to be stored in the subfolder `_blank` of each university. In addition, each of these sub-folders should contain a specific for a higher education

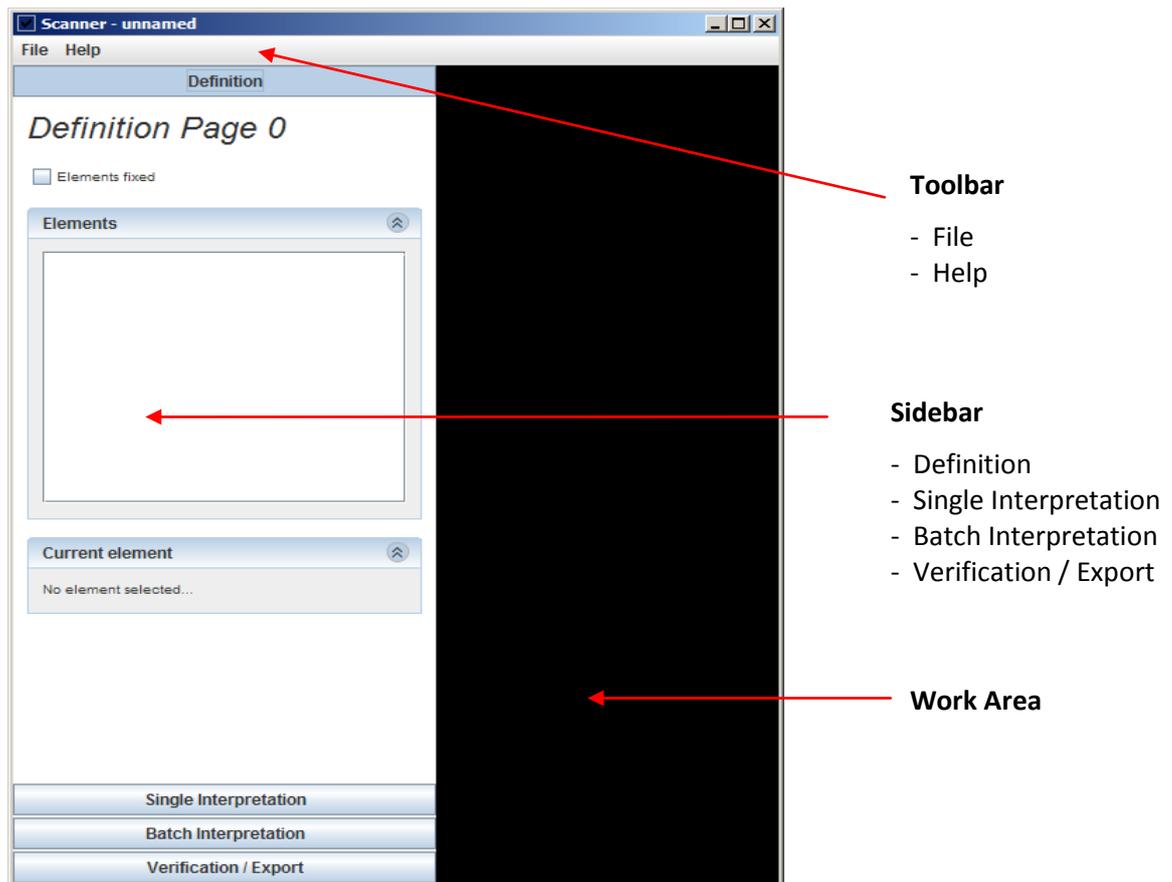
¹ QTAFI ("Questions, Tables and Figures") is a computer-aided system for the management of surveys. Refer also to <http://www.uni-kassel.de/wz1/proj/edwork/Welcome.ghk>.

institution file "Code Book" in the xml format² as well as a WORD version of the questionnaires that provide the orientation in the definition process.

If these conditions are met, the definition of the scan masks can be started.

3.2 Opening the QTAFI scanner

The opened QTAFI scanner - firstly without the data - is composed of three elements: (1) a toolbar, (2) a sidebar with a number of tabs and (3) a black work area.

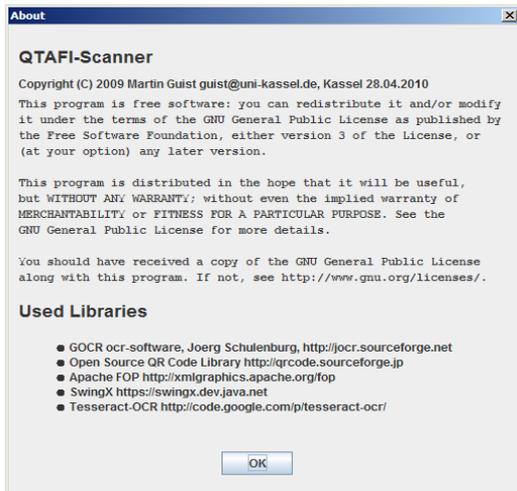


(1) The toolbar contains two commands:

Under the **File** the edited scan-masks can be saved, previously created masks can be opened and closed. When closing a project, the tool always asks whether to save the changes.

The **Help** command provides information about the author, copyright and sources.

² The xml-Format (extensible markup language) is a markup language for representing hierarchically structured data in the form of text data. One way of view offers excel.



(2) The sidebar includes first and foremost the four tabs **Definition**, **Single Interpretation**, **Batch Interpretation** und **Verification / Export**. For the definition of scan-masks a tab **Definition** is of interest; that is why the other tabs are not considered in details here.

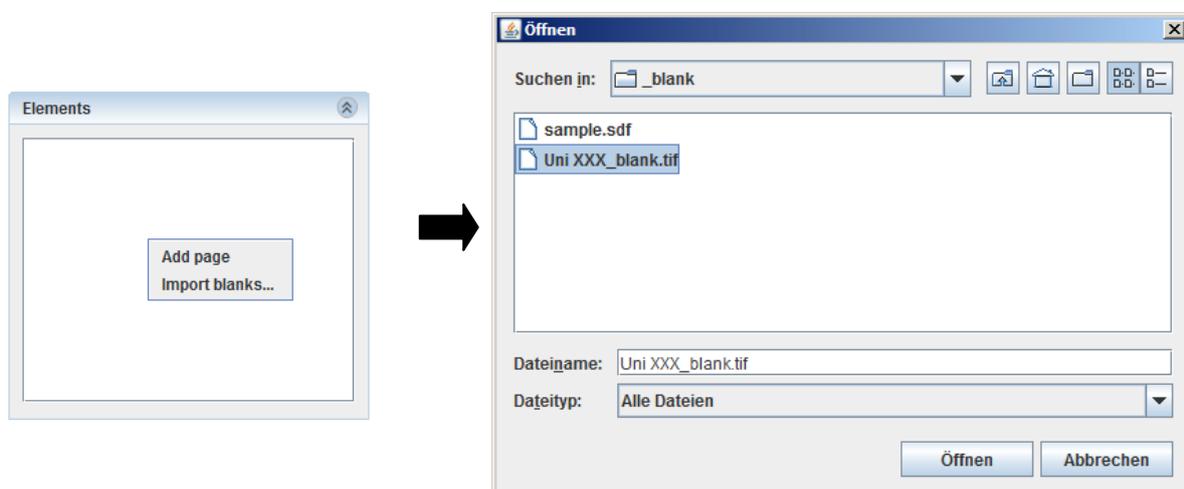
Within the frameworks of the first tab the window **Elements** is of importance, because tif-files with the questionnaires are imported there.

The window **Current element** - without data input is inactive - will allow for a later more precise definition of the designated scan fields.

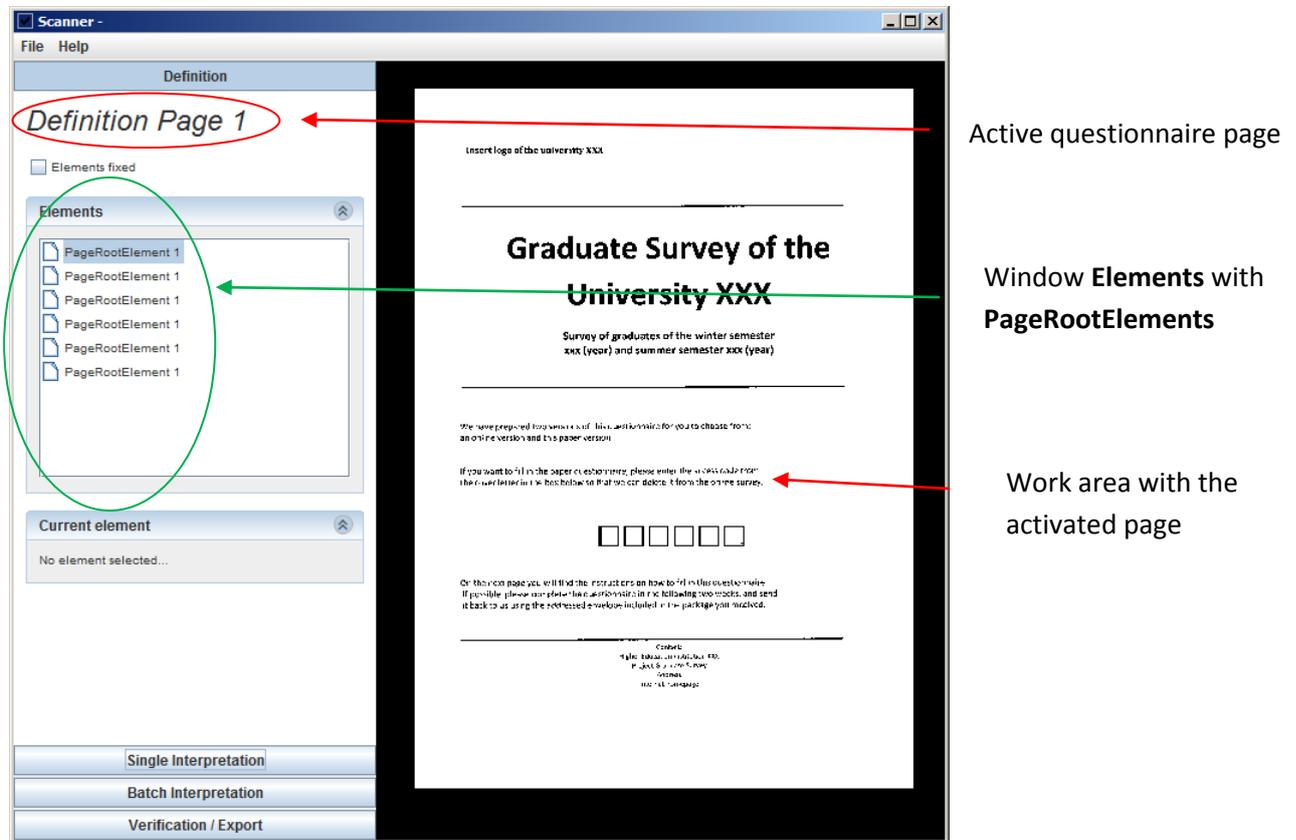
(3) The work area displays the edited questionnaire pages: the relevant sections of the questionnaires are manually set here.

3.3 Import of questionnaires

To import blank questionnaires to the QTAFI-Scanner, just click the right mouse button within the window **Elements**. This will bring up a context menu, whose command **Import blanks...** allows the selection of files.



Now the window **Elements** shows single questionnaire pages as **PageRootElements**. By clicking the left mouse button, it is possible to activate one page at a time: it appears in the work area. The headline in the working area - here **Definition Page 1** - shows which side is being activated.



It is advised, first of all, to check the sequence of **PageRootElements**. By holding down the left mouse button, the elements can be if applicable displaced in the window **Elements**, i. e. replaced according to the ranking place in the questionnaire.

3.4 Definition of the scan fields

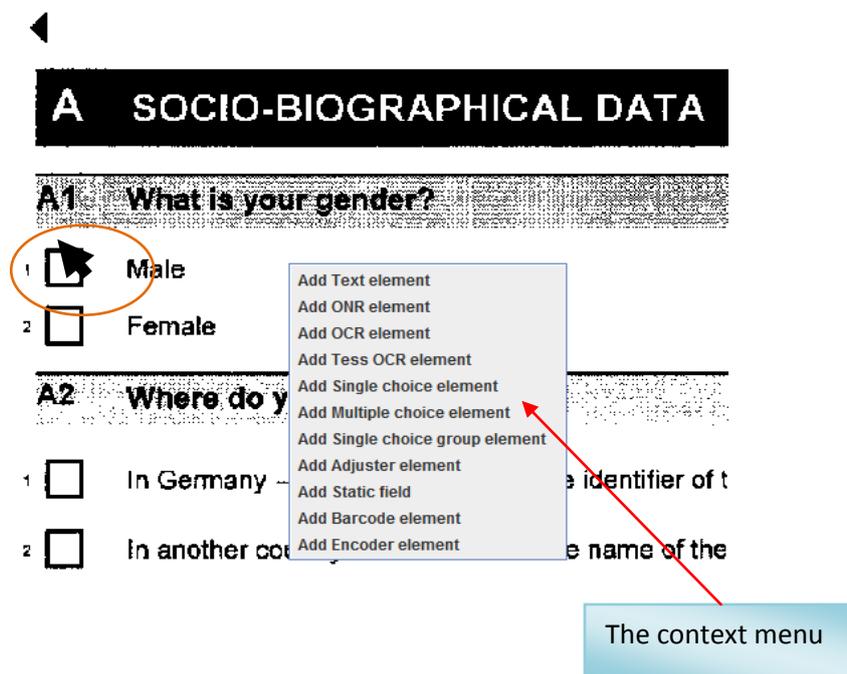
Definition of the scan fields is carried out in two steps: their options within the work area as well as their labeling in the window **Current element** at the sidebar.

3.4.1 Options of scan fields within the work area

The work area can be easily handled with just a few mouse clicks and function keys of a keyboard:

- Scroll with the mouse wheel – the size of the displayed page questionnaire varies.
Function key F1 - the size of the displayed page decreases;
Function key F2 - the size of the displayed page increases;
- Press and hold the left mouse button - the page moves in any direction.
Function key F3 - the page moves upwards; Function key F4 - the page moves downwards;
Function key F5 - the page moves to the left; Function key F6 - the page moves to the right.

- Click the right mouse button - a menu of options for selecting a scan field opens:



To mark a certain section of the questionnaire page as a scan field (for example, the two boxes "Male" and "Female" in the figure above), the cursor should be set above the area on the left side and the right mouse button should be clicked. The context menu will appear where the nature of the desired scan field must be determined.

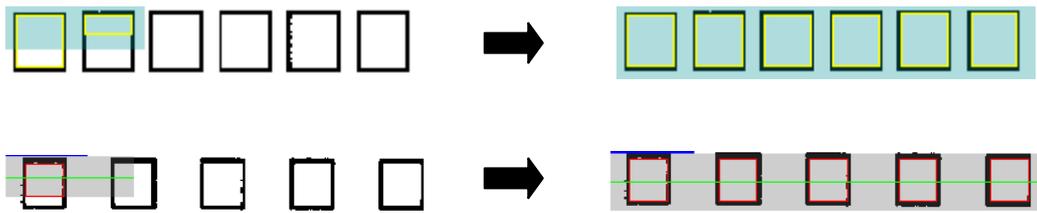
For identification of the scan fields the following options are available: Add Text element; Add ONR element; Add OCR element; Add Tess OCR element; Add Single choice element; Add Multiple choice element; Add Single choice group element; Add Adjuster element; Add Barcode element; Add Encoder element. Below the definition and function of these elements are considered in details.

If you click the right mouse button on the already existing scan field, the context menu appears which contains in addition the option **Remove element**. It allows the deletion of scan fields.

When the cursor is set on the left side above the desired section, the context menu is opened with the click of the right mouse button and the nature of the scan field is determined, a light blue or light gray background field appears: the scan field. It can...

- be moved by simply holding down a left mouse button;
- vary in size by pressing and holding a mouse button + SHIFT.

Whenever boxes are marked - be it in the capture of checkmarks or by series of digits and letters - a special feature unfolds: the scan field is pulled over several boxes; the QTAFI scanner detects their frames and marks them in color. Unlike plain fields of text, here the program automatically detects which areas it should review on the (non-) existence of information.



3.4.2 Variable labeling at the sidebar

Whenever a scan field is marked in the work area, the window **Current element** activates in the sidebar. Here the properties of the selected questionnaire sections should be specified.

Depending on the nature of the scan field (Text element, ONR element, etc.) the options differ. Sections **Element** and **Variable** are common to all; the section **Element** specifies again the nature of the scan field and in the section **Variable** the relevant variable name for the data record is entered. The variable name is also displayed in the work area.

Element indicates the element used for the creation of a scan mask and the nature of the selected question

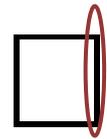
Under **Variable** the data record of the relevant variable name is given

The data record of relevant variables is to be found in the questionnaire documentation with determined variables for each question, i.e. codebooks, which should be available for each particular university.

3.4.3 Important options of the window Current element

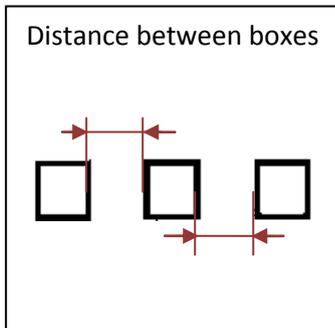
Some options within the window **Current element** are specific to particular definitions of scan fields (ONR and OCR elements, Single choice elements, etc.). To these options refer **Box detection**, **threshold** and **BP**.

Box detection window - shows the measurement of the scan fields:

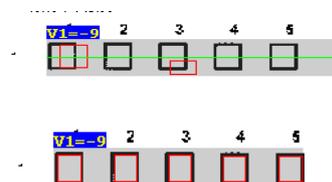


Border in the **Box detection** window implies the border lines of a box. Normally it is set to 1.

Spacing in the **Box detection** window implies the distance between the boxes:



Normally the program sets automatically the spacing on 30. It should be corrected and set manually in order to detect the scan fields properly - the red boxes should be adjusted exactly to the boxes of the questionnaire. See the examples:



Min width in the **Box detection** window implies the width of a box itself.

Max width in the **Box detection** window implies the maximum width within which the scanner should search for a box where an answer is to be given:

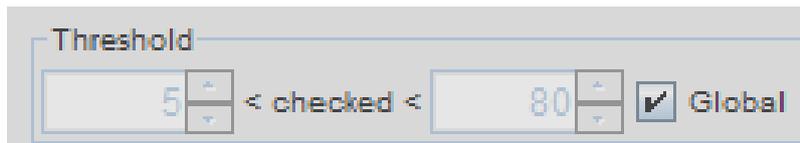


. The indication of a max width (a red box in the visual example) should be a bit higher than the box itself, but not too high. If it is too high the scanner will be searching in a too broad area and will not be able to detect the correct box.

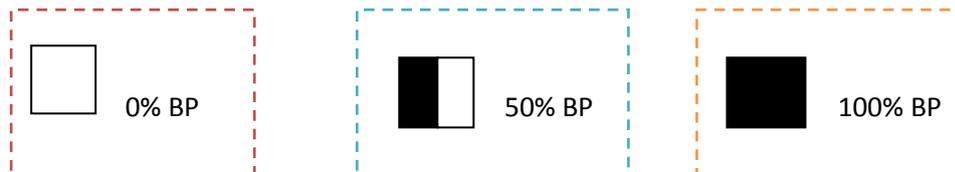
Threshold - a border value that measures the value of blackness of a particular area. Threshold is expressed in percentage.

If the blackness of a particular area is below the given value, it gets ignored and marked as empty; if the blackness of a particular area is above the value, it counts. If the background is dirty, the higher value should be set. In cases when the background is clean, 5% is a good value to be set for measuring the value of blackness.

Thus, if the **border value (threshold) is too high** and an answer is marked just slightly, there is a danger that the answer will not be recognized. If the **border value (threshold) is too low** and the background is dirty, the program can consider the dirty background as an answer.



BP - stands for **black percentage**. It is a black level that measures the blackness value. The program detects an answer by identifying the pixels (black spots) within the answer area.



3.4.4 Options of scan fields within the work area

3.4.4.1 Add ONR element

Add ONR element – defines scan fields by numeric character string (e.g. zip codes). ONR stands for Optical Number Recognition.

To put it simple, a scan field is to be defined with the **ONR element** when the answers in the form of numbers are to be provided. To define a scan field with the ONR element, set the cursor above the scan field to be defined, click the right mouse button - a menu of options for selecting a scan field opens: choose the option Add ONR element. When a scan field with the variable name appears it is set right above the field to be defined and the scan field is pulled over several boxes by pressing SHIFT and pulling with the mouse; the QTAFI scanner detects their frames and marks them in red color.

In case when a scan field is defined with the help of **Add ONR element** through numerical strings, the option **Numbers in boxes** under the **ONR-Options** is to be activated. Only then the QTAFI scanner reads the content of the answer boxes. It also indicates the number of detected boxes. Moreover, the **Exponents** are to be numbered. The first exponent is always to be numbered with 0, each additional point with 1, 2, 3, etc. respectively.

In the sample questionnaire the following questions are to be defined with the ONR element: B1, B3, B4, B7, B8, D3, D4 and E1.

Current element

Element
ONRElement (B1)
X:158 Y:1148 W:118 H:67

Variable
B1

ONR-Options

Numbers in boxes found 2 boxes

1 Exponent: 0

2 Exponent: 1

BP offsets: 0% / 0% /

Contains number thresh... 5

B1 Overall, how many semesters did you study this subject? (absence) but do include semesters spent at a different univers

B1--9

Overall number of course-semester

Current element

Element
ONRElement (B8_1)
X:428 Y:1208 W:175 H:60

Variable
B8_1

ONR-Options

Numbers in boxes found 3 boxes

1 Exponent: 0

2 Exponent: 1

3 Exponent: 2

BP offsets: 0% / 0% / 0% /

Contains number thresh... 5

B8 During the course of your study, were you active as a tutor

B8--9

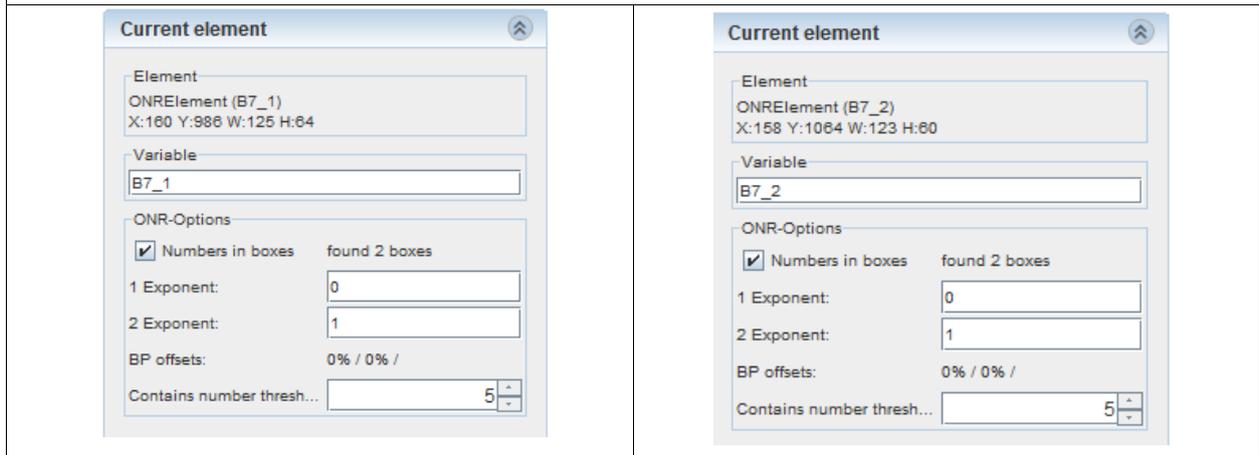
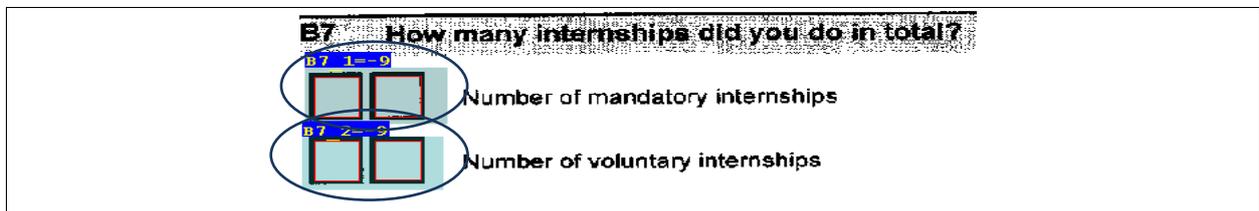
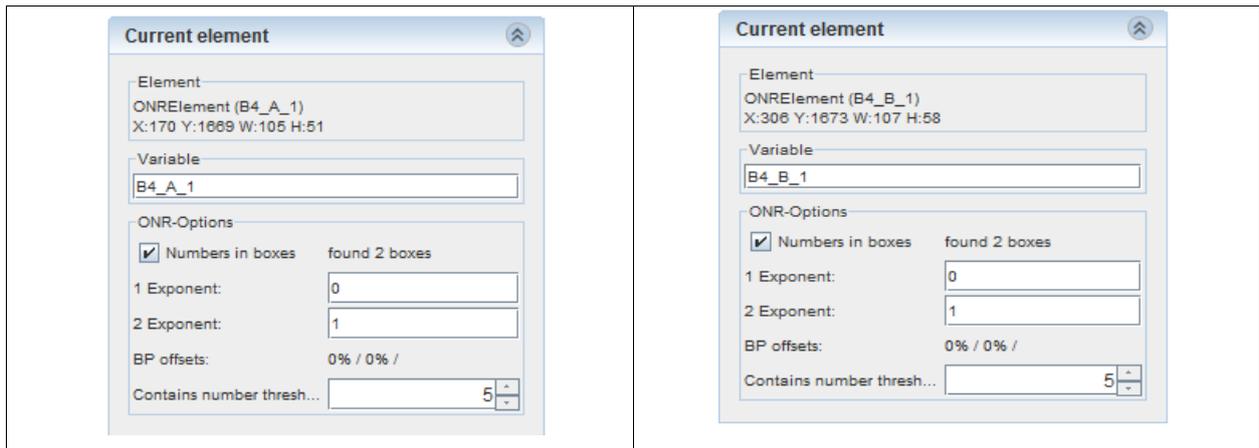
1 Yes, for approx. **B8_1--9** months

2 No

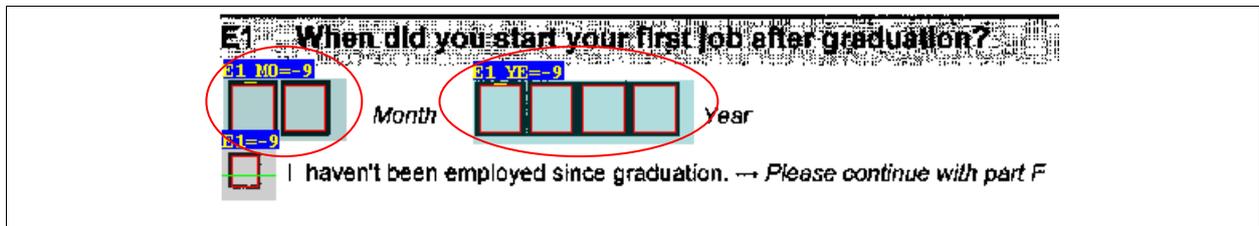
In case when there is more than one item set in a column and more than one column with the answer boxes that should be defined with the ONR element (see the example below), the creation of the scan mask is proceeded in the following way: the mask is to be created for each item set and for each column separately. The name of the variable for each item set and each column should correspond to the number of a question (e.g. B4), the columns should be distinguished as they measure different aspects (like in the example below, the columns are labelled with A and B) and the single response options must be provided with variable labels (e.g. 1, 2, 3, etc.).

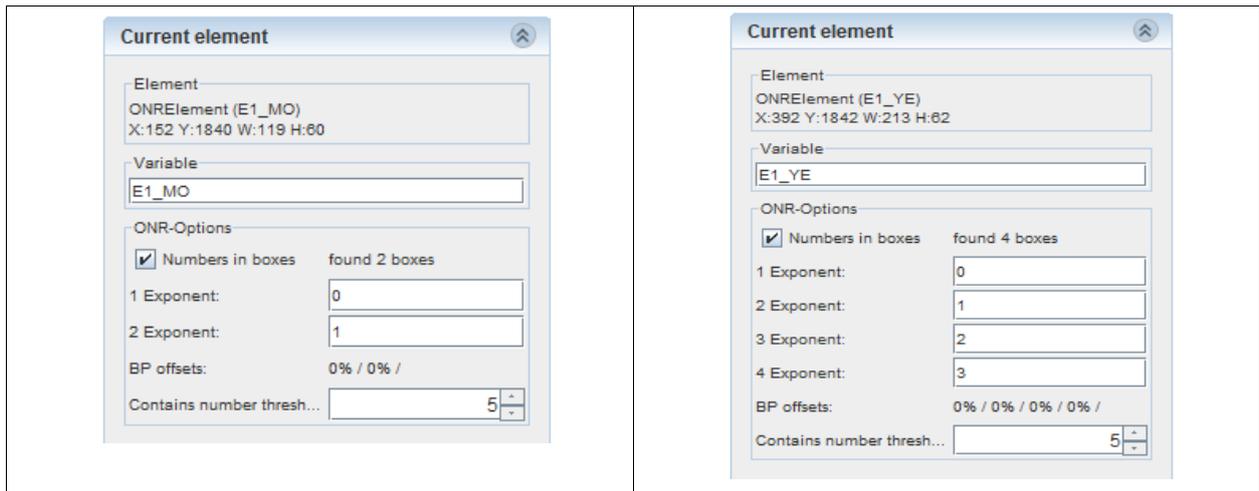
B4 On average, how many hours per week did you spend on the following activities during the course of your study?

	During semester		
	A	B	
1 Attending courses / classes	<input type="text"/>	<input type="text"/>	
2 Study activities outside of courses / classes	<input type="text"/>	<input type="text"/>	
3 Preparation for exams	<input type="text"/>	<input type="text"/>	
4 Working (no internships)	<input type="text"/>	<input type="text"/>	
5 Family related duties	<input type="text"/>	<input type="text"/>	
6 Other:	<input type="text"/>	<input type="text"/>	<input type="text"/>

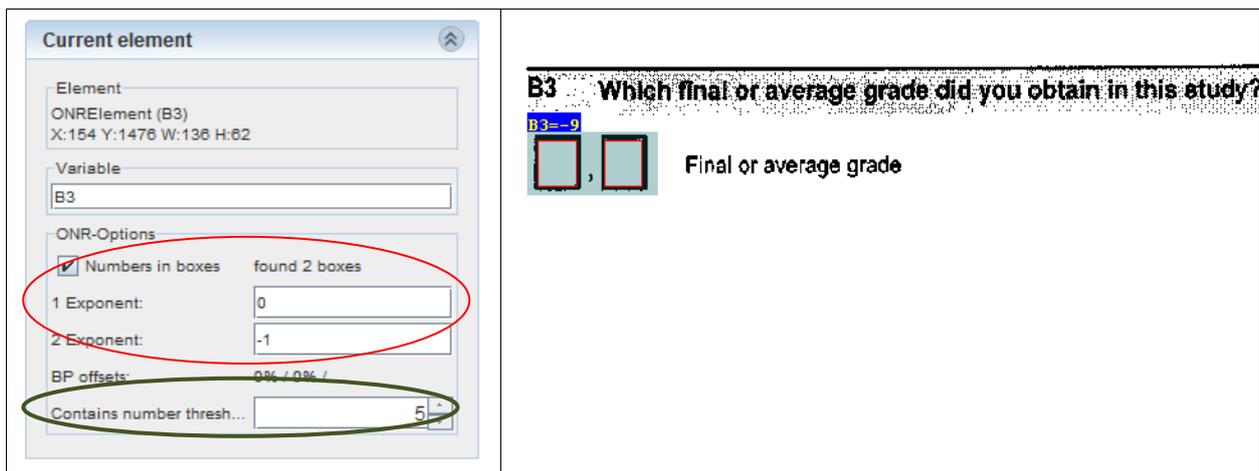


The name of the variables in the item sets can include not only numbers but also short indication of what an item set measures, for instance, MO - for "month" and Ye - for "year" in the example below:





When the numbers are separated with the comma the following numbering of exponents is applied: the first point before the comma, i.e. the first exponent is always to be numbered with 0, each additional point before the comma with 1, 2, 3, etc. respectively. The first point behind the comma is to be numbered with -1, the second with -2 and so on.



3.4.4.2 Add OCR element/Add Tess OCR element

Add OCR element –defines scan fields by non-numeric character string (e.g. region codes). OCR stands for **Optical Character Recognition**, conversion of images of text into characters. A scan field is to be defined with the **Tess OCR element** when the answers in the form of letters or words are to be provided. Tess OCR element works under the GOCR engine.

GOCR (or **JOCR**) is a free optical character recognition program initially written by Jörg Schulenburg and developed under the GNU Public License. It can be used to convert scanned image files into text files. More detailed information is available on the GOCR website: jocr.sourceforge.net

Add Tess OCR element –defines scan fields by non-numeric character string (e.g. region codes). In general, it fulfills the same function as an OCR element, but works under another engine named Tesseract that offers slightly advanced recognition of non-numeric character string. Nowadays the preference is given to the use of the Tess OCR element rather than to the OCR element.

Tesseract is a free optical character recognition engine that is currently developed by Google and released under the Apache License. The **Tesseract OCR** engine is one of the most accurate open source OCR engines available. The source code will read a binary, gray or color image and output text. Tesseract handles image files in Tiff format and only with the .tif filename extension, from which it creates text. Other file formats must be converted to TIFF before being submitted to Tesseract. The core developer on the project is Ray Smith.

Further information is available on Tesseract website: <http://code.google.com/p/tesseract-ocr/>

In case when a scan field is defined with the help of **Add Tess OCR element** through non-numerical strings and the data record should contain the content of the answer-boxes, the option **Chars in boxes** under **Tess-Options** is to be activated.

In the sample questionnaire the following questions are to be defined with the Tess OCR element: A2, A3, B4, B5, B8, D1, E3, F1, F2 and F3.

The image shows a software configuration window on the left and a questionnaire question on the right. The configuration window, titled "Current element", shows the following settings:

- Element: TesseractElement (A2_1)
- X: 1085 Y: 479 W: 185 H: 83
- Variable: A2_1
- Tess-Options:
 - If text, set to
 - Chars in boxes found 3 boxes
 - Contains text threshold: 5
 - BP offset: 0% / 0% / 0%

The questionnaire question on the right is:

A2 Where do you currently live?

1 In Germany → Please enter the place identifier of the licence plate:

2 In another country → Please enter the name of the country:

(please specify)

In cases of defining an open question with text answers, the following two options are available: Should the data record (by means of text recognition) contain the possibly available text answers? In this case in the section **Tess Options** NOTHING is to be marked with a tick.

Current element

Element
TesseractElement (A2_TE)
X:819 Y:544 W:749 H:29

Variable
A2_TE

Tess-Options

If text, set to 1

Chars in boxes found 0 boxes

Contains text threshold 3

BP offset 0%

A2 Where do you currently live?

1 In Germany → Please enter the place identifier of the licence plate:

2 In another country → Please enter the name of the country:

(please specify)

Current element

Element
TesseractElement (E3)
X:194 Y:272 W:1348 H:40

Variable
E3

Tess-Options

If text, set to 1

Chars in boxes found 0 boxes

Contains text threshold 3

BP offset 0,18%

E3 What was the job title of your first employment after graduation?
fill in the exact job description, e.g. trainee teacher, development engi

Job title

(please specify)

Current element

Element
TesseractElement (F3)
X:204 Y:1627 W:1053 H:222

Variable
F3

Tess-Options

If text, set to 1

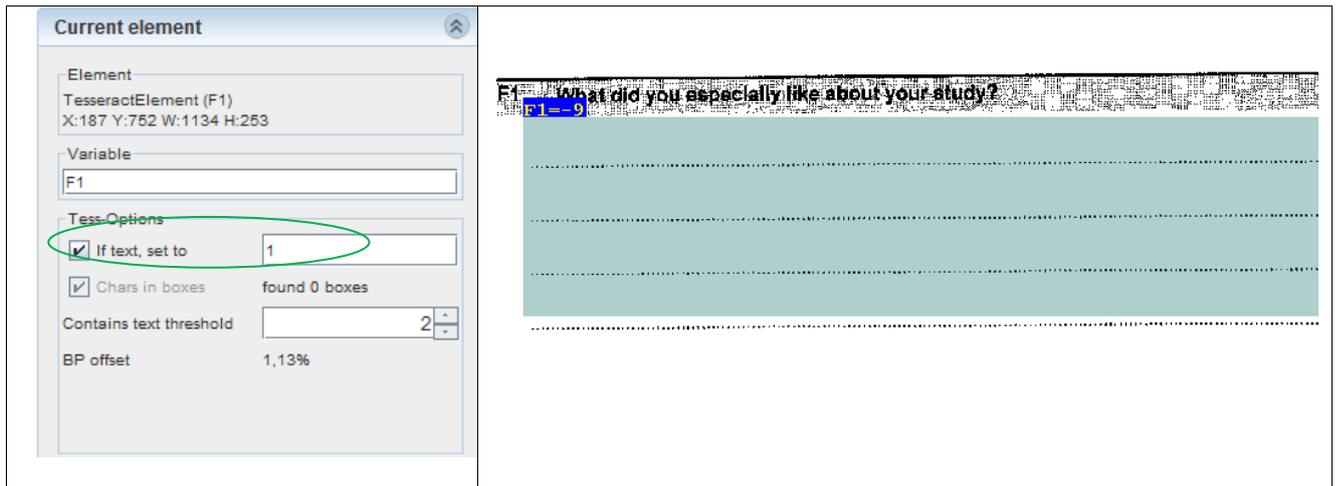
Chars in boxes found 0 boxes

Contains text threshold 2

BP offset 1,33%

F3 What would you recommend for the improvement of your study program?

In case when it is enough to have the information in the data record "Answer is (not) available", **If text, set to** is to be marked with a tick and set on **1**.



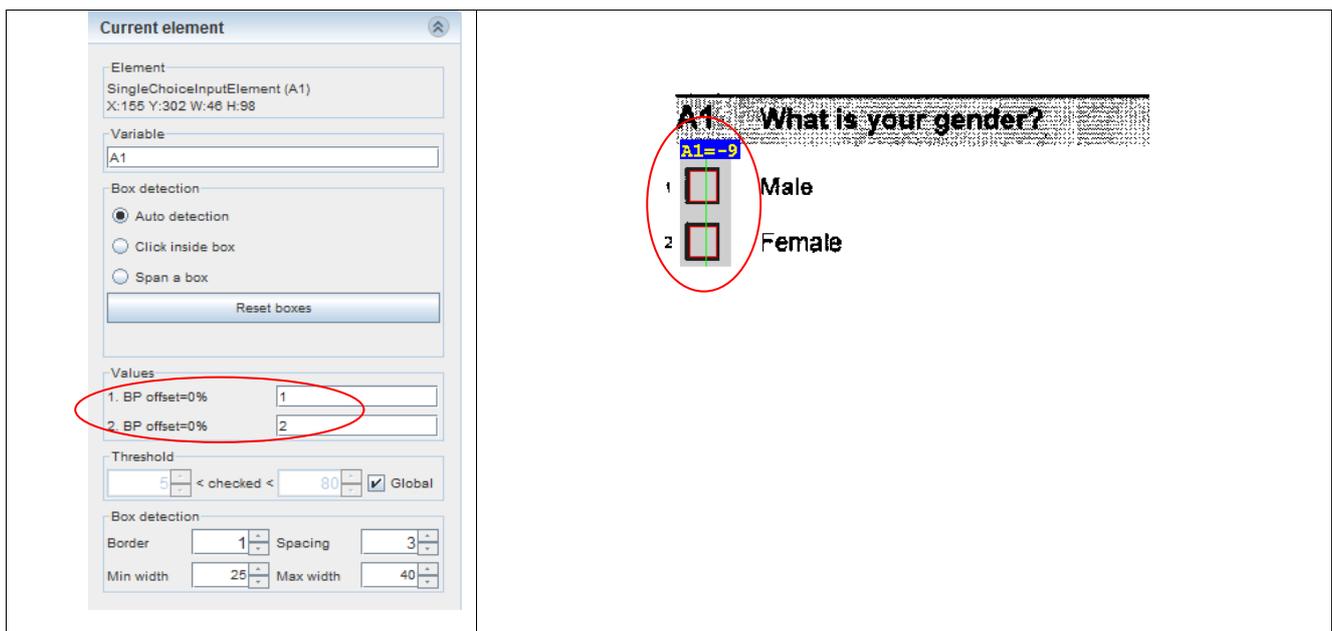
3.4.4.3 Add Single choice element

Add Single choice element – defines scan fields through dichotomous variables, ordinal scales, item sets without multiple answers and single response option. Dichotomous variables are variables that categorize data into two mutually exclusive or contradictory categories such as "male" and "female".

When a scan field on dichotomous variable, ordinal scale, item sets without multiple answers or single response option is defined with the **Add Single choice element**, it is important to number the respective **Values**. The data are to be read in the questionnaires or to be proposed by the QTAFI scanner itself.

In the sample questionnaire the following questions are to be defined with the Single choice element: A1, A3, B2, B5, B8, C1, C2, D2, E1, E2 and E4.

Dichotomous variables:



Item sets without multiple answers:

Current element

Element: SingleChoiceInputElement (A3)
X:154 Y:708 W:44 H:209

Variable: A3

Box detection: Auto detection, Click inside box, Span a box

Reset boxes

Values:

1. BP offset=0%	1
2. BP offset=0%	2
3. BP offset=0%	3
4. BP offset=0%	4

Threshold: 5 < checked < 80 Global

Box detection: Border 1 Spacing 3 Min width 25 Max width 40

A3 What is your current marital status?

A3 TE=-9

1 Single (incl. single parent)

2 With a partner

3 Married

4 Other: _____

Ordinal scale:

Current element

Element: SingleChoiceInputElement (C2)
X:183 Y:302 W:295 H:37

Variable: C2

Box detection: Auto detection, Click inside box, Span a box

Reset boxes

Values:

1. BP offset=0%	1
2. BP offset=0%	2
3. BP offset=0%	3
4. BP offset=0%	4
5. BP offset=0%	5

Threshold: 5 < checked < 80 Global

Box detection: Border 1 Spacing 3 Min width 25 Max width 40

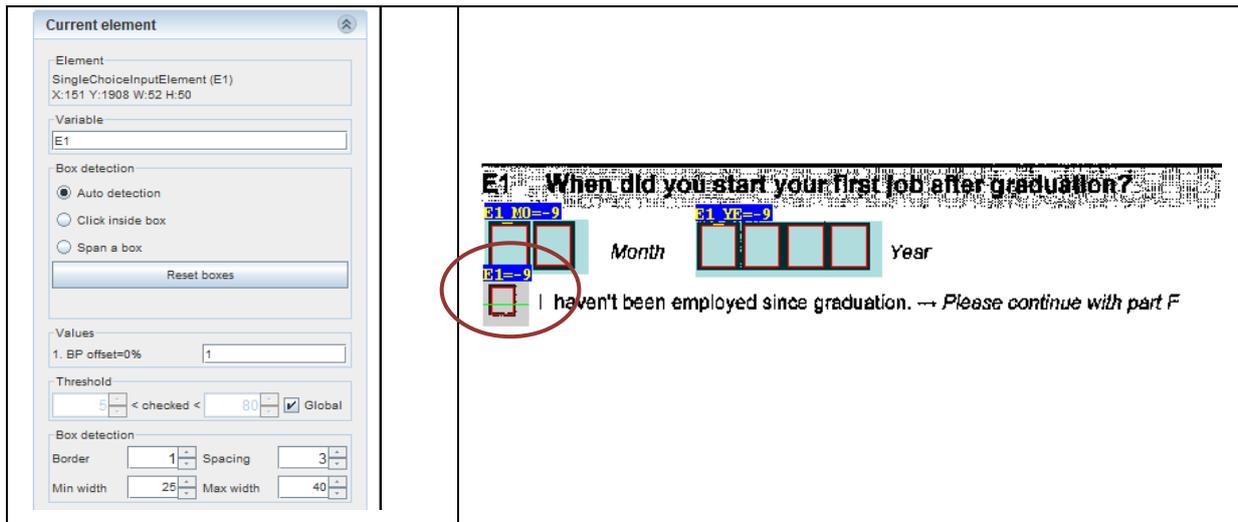
C2 In retrospective, how satisfied are you with your studies in general?

Very satisfied 1 2 3 4 5 Very dissatisfied

C2 TE=-9

1

Single response option:

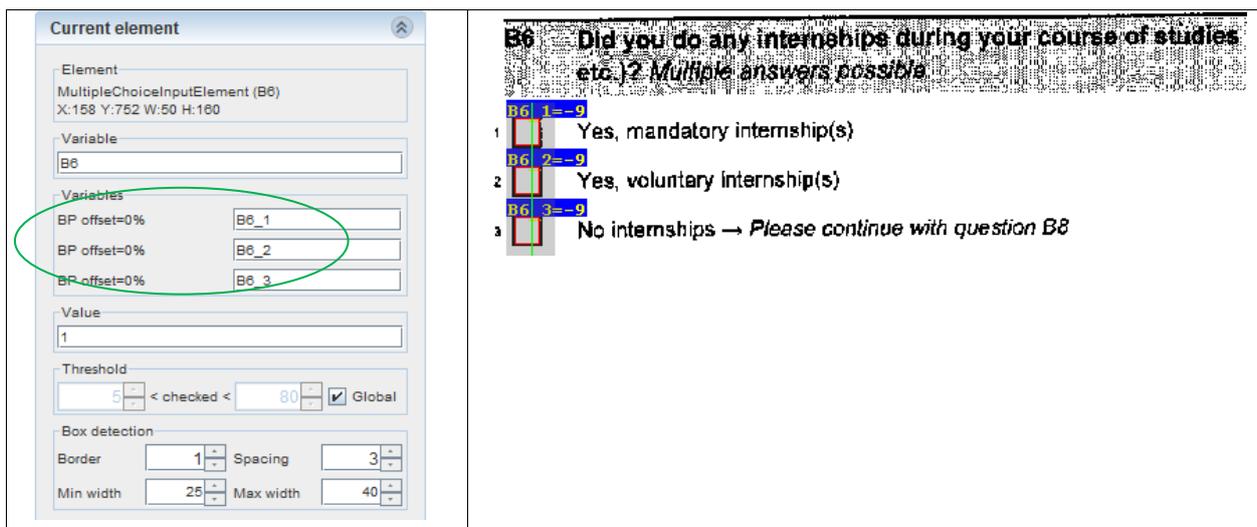


3.4.4.4 Add Multiple choice element

Add Multiple choice element – defines scan fields through item sets with multiple answers. To create a mask with the use of Multiple choice element, the usual procedure is applied, however, in this case the scan field is pulled over all the available boxes in one row by pressing SHIFT and pulling with the mouse; the QTAFI scanner detects their frames and marks them in red color.

When a scan field on item sets with multiple answers is defined with the Add Multiple choice element, next to the parent variable (e.g. B6) the single response options must be provided with variable labels (e.g. B6_1 to B6_3).

In the sample questionnaire the following questions are to be defined with the multiple choice element: B6 and D1.



In case when a question with multiple answers is divided into two columns the process of the creation of the scan mask is the following: the first column is to be defined with the Add multiple

choice element and all the variables will be labeled automatically by a scanner. Then the mask for a second column is to be created by clicking again the right mouse button and choosing Add multiple choice element. The program will name the variables automatically, but it will start the numbering again from 1, whereas numbering should be proceeded not started again. The name of the variable labels should be corrected manually within the sidebar in the window Current element under the option Variables.

D1 How did you search for a job? Multiple answers possible

- Replied to job ads/announcements (e.g. newspaper, internet, notice)
- Speculative application – independent contact to employers
- Job fair
- I was contacted by an employer
- Through internships during my course of studies
- Through internships after graduation
- Through (side) jobs during the study
- Through (side) jobs during after graduation
- Application for teaching traineeship
- Through the public job centre
- Through internet (social) networks (e.g. XING)
- Through private job agencies
- Through the career center of the higher education Institution etc.
- Through teaching staff at the higher education institution
- Writing your final thesis in a company
- With help of personal contacts (friends, fellow students etc.)
- With the help of family contacts (parents, relatives)
- Other. D1_19=-9
(please specify)
- Not applicable, I have not searched for employment. →
Please continue with question E1

Current element

Element
MultipleChoiceInputElement (D1)
X:153 Y:515 W:49 H:556

Variable
D1

Variables

BP offset=0%	D1_1
BP offset=0%	D1_2
BP offset=0%	D1_3
BP offset=0%	D1_4
BP offset=0%	D1_5
BP offset=0%	D1_6
BP offset=0%	D1_7
BP offset=0%	D1_8

Value
1

Threshold
5 < checked < 80 Global

Box detection
Border: 1 Spacing: 3
Min width: 25 Max width: 40

Current element

Element
MultipleChoiceInputElement (D1)
X:922 Y:525 W:50 H:544

Variable
D1

Variables

BP offset=0%	D1_11
BP offset=0%	D1_12
BP offset=0%	D1_13
BP offset=0%	D1_14
BP offset=0%	D1_15
BP offset=0%	D1_16
BP offset=0%	D1_17
BP offset=0%	D1_18
BP offset=0%	D1_19

Value
1

Threshold
5 < checked < 80 Global

Box detection
Border: 1 Spacing: 3
Min width: 25 Max width: 40

3.4.4.5 Add Single choice group element

Add Single choice group element – defines scan fields on batteries of ordinal scales. It replaces the elaborate definition of each scale as a "single choice element" in cases of ordinal scale item sets.

For batteries of ordinal scales - defined with **Add single choice group element** - first the ordinal scales are to be defined as secondary variable. Second, the appropriate **Values** are to be assigned to the whole scale.

To create a mask with the use of Single choice group element, the usual procedure is applied and the scan field is pulled over all the available boxes in one row by pressing SHIFT and pulling with the mouse; the QTAFI scanner detects their frames and marks them in red color.

In the sample questionnaire the question C1 is to be defined with the Single choice group element.

The screenshot shows the 'Current element' configuration window on the left and a questionnaire grid on the right. The configuration window includes fields for Element (SingleChoiceGroupElement (C1)), Variable (C1), a list of Variables (C1_1 to C1_8), Values (1 to 5), Threshold (5 < checked < 80), and Box detection settings (Border: 1, Spacing: 3, Min width: 25, Max width: 40). The questionnaire grid on the right is titled 'C1: To what extent were the following aspects of teaching and learning emphasized in your studies?' and has columns for 'To a very high extent' (1-5) and 'Not at all'. The grid contains 12 rows of questions with red boxes indicating the scan area for each row.

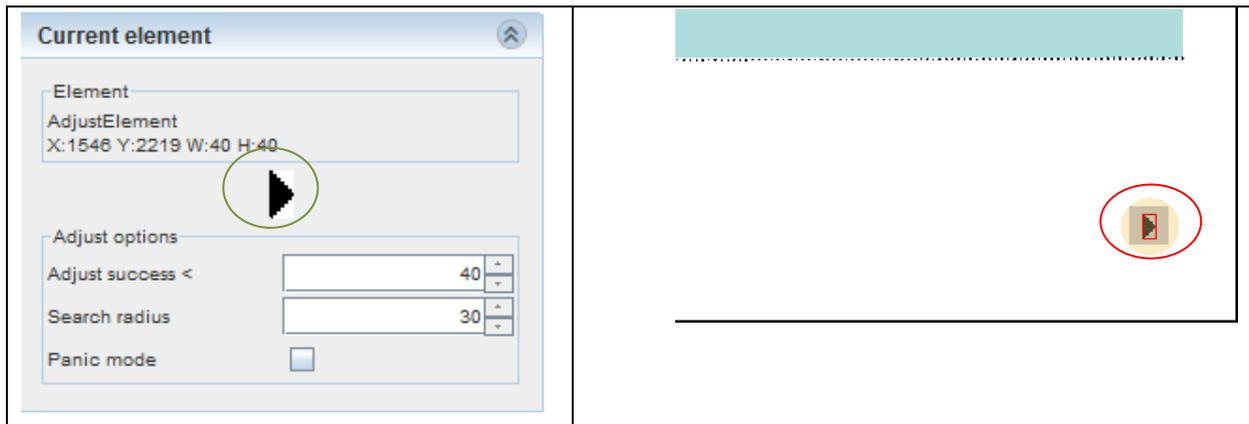
	1	2	3	4	5	
1	<input type="checkbox"/>	Lectures				
2	<input type="checkbox"/>	Group work				
3	<input type="checkbox"/>	Participation in research projects				
4	<input type="checkbox"/>	Internships and practical training				
5	<input type="checkbox"/>	Fact-oriented and practical knowledge				
6	<input type="checkbox"/>	Theories and paradigms				
7	<input type="checkbox"/>	Teaching staff as main source of information				
8	<input type="checkbox"/>	Project and / or problem oriented learning				
9	<input type="checkbox"/>	Written work				
10	<input type="checkbox"/>	Oral presentations by students				
11	<input type="checkbox"/>	E-Learning				
12	<input type="checkbox"/>	Self-study				

3.4.4.6 Add Adjuster element

Add Adjuster element – ensures that possibly wrong scanned pages can be nonetheless read: in case when two arbitrary elements defined as "Adjuster elements" at each side of the blank questionnaire, the QTAFI scanner can apply the scan mask also to the wrong scanned questionnaires.

Adjuster elements are to be marked on each side of the blank questionnaires: they are used for determining if the page is twisted or not. To the best two diagonally situated opposite to each other text elements (i.e., top left and bottom right, or vice versa) are marked. Appearance of a sign ◀ in the window **Current element** indicates the successful definition of adjuster elements.

The screenshot shows the 'Current element' configuration window on the left and a questionnaire page on the right. The configuration window includes fields for Element (AdjustElement), Adjust options (Adjust success < 40, Search radius 30, Panic mode), and a sign ◀. The questionnaire page on the right is titled 'A SOCIO-BIOGRAPHICAL DATA' and contains the question 'A1: What is your gender?' with two options: 1 Male and 2 Female. A red circle highlights a small icon in the top left corner of the questionnaire page.



3.4.4.7 Add Static field

Add Static field – allows the assignment of an element in relation to the complete questionnaire.

In the questionnaires specific elements such as case and date are assigned with **Add Static field**. Here, the **Variable** `@__case` is assigned to the **Value of variable** `__case`; the **Variable** `@__date` is assigned to the **Value of variable** `__date`.

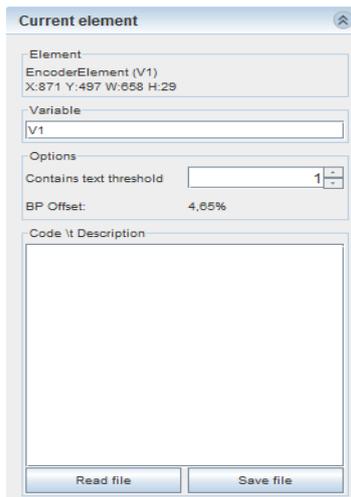
These elements can be placed together one under another. They do not have a specific position on the page as they do not depend on the questionnaire fields. CASE represents the name of a folder with a complete questionnaire; DATE represents always a current date of questionnaire verification.

<p>Current element</p> <p>Element StaticElement (@__case) X:211 Y:1193 W:351 H:81</p> <p>Variable <code>@__case</code></p> <p>Value Static value: <code>__case</code> Value of variable: <code>__case</code></p>	<p>We have prepared two versions of this an online version and this paper versio</p> <p><code>@__case=(__case)</code></p>
<p>Current element</p> <p>Element StaticElement (@__date) X:214 Y:1358 W:343 H:58</p> <p>Variable <code>@__date</code></p> <p>Value Static value: <code>__date</code> Value of variable: <code>__date</code></p>	<p>If you want to fill in the paper questionnaire the cover letter in the box below so that we</p> <p><code>@__date=(__date)</code></p>

3.4.4.8 Add Barcode and Encoder elements

Add Barcode element – allows the attachment of a specific code to questionnaires of a particular university.

Add Encoder element – allows answer encoding, primarily in open questions. Encoder element serves for converting information from one format to another - from a text to a code or value. In the process of creating the mask the list with values is to be created. As a result, during the verification process the program recognizes the answers according to the given in the list values.

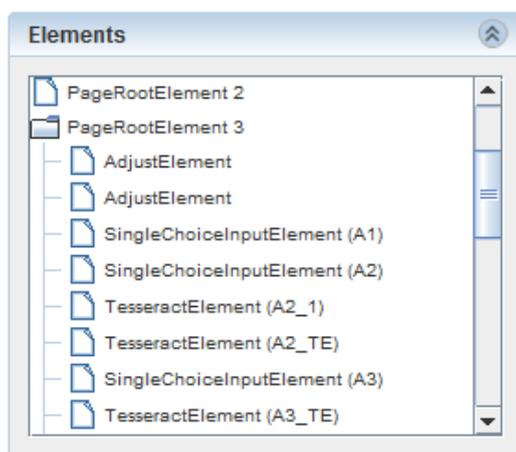


The list with variables is to be created within the window **Current element** under **Code\t Description**. For example, if an open question that requires an indication of a country is to be encoded, the following list may be created: 1 - Germany; 2 - Austria; 3 - Greece, 4 - Poland, etc. where Germany is encoded with the value 1, Austria with the value 2 and so on.

Barcode and Encoder elements are used quite seldom. Here they are given mostly for providing with general information about these two elements.

3.4.4.9 PageRootElements

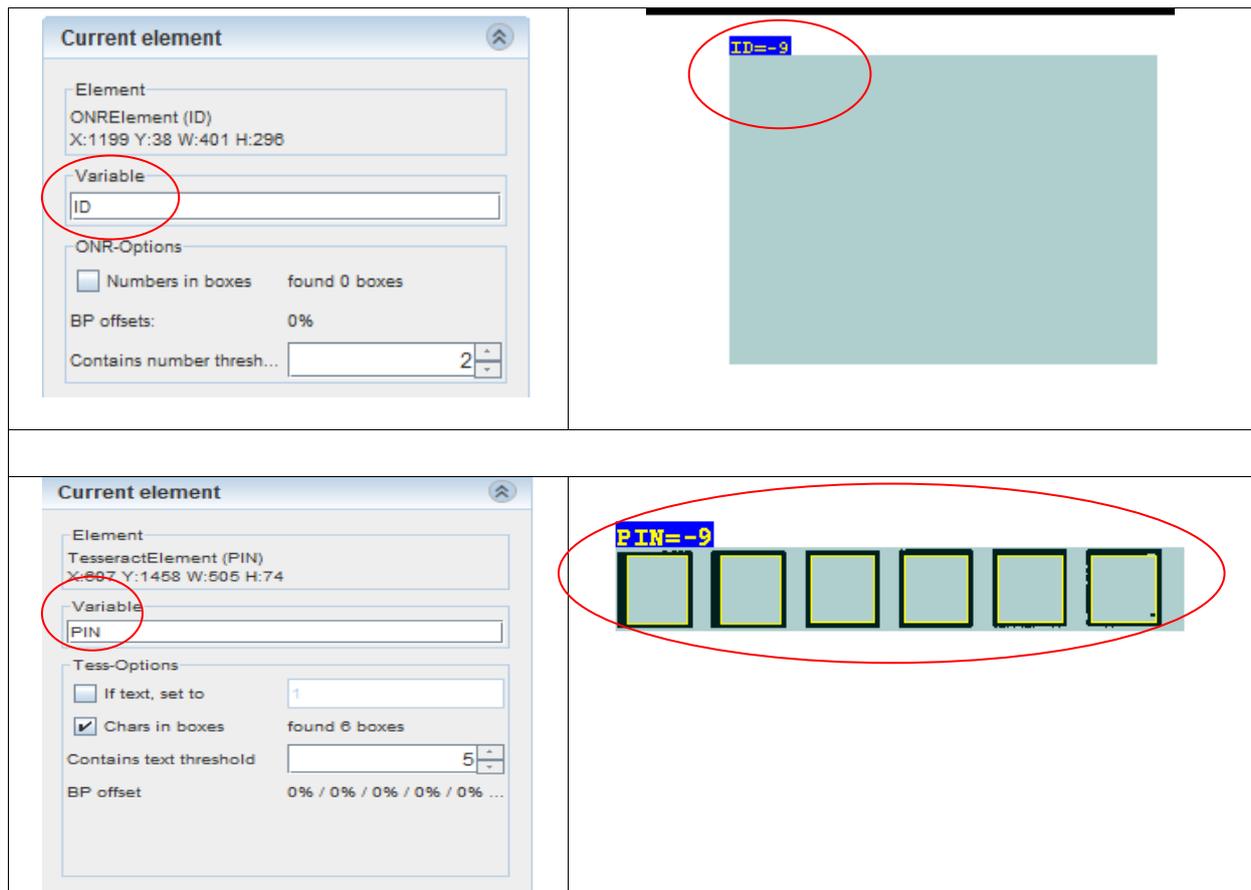
Having defined the different scan fields of a questionnaire page, the window **Elements** fills gradually with the defined variables. Each edited page (**PageRootElement**) is included to a folder that contains a list of related variables. Via double-click on a folder these lists can be opened and closed. Via double-click on a variable the work area will appear corresponding to a respective page. This allows switching from variable to variable across several pages.



3.4.4.10 The front page of a questionnaire

While by the definition of scan masks for questionnaires one generally proceeds according to the abovementioned principles, the front page represents an exception. The essential elements are listed and described below:

- an **ONR element** for "ID" top right;
- a **Static field** for "CASE" (see above);
- a **Static field** for "DATE" (see above);
- a **Tess OCR element** for "PIN" with the option **Chars in boxes**.



Upon finishing the creation of the scan mask, it should be saved by clicking the tab **File** in the menu bar and choosing the function "save as...". The questionnaire is to be saved under the folder **_blank**.

The definition process is completed. Now the newly created scan mask is ready for the application on the filled out paper questionnaires.

3.4.4.11 The whole questionnaire with the created mask:

Insert logo of the university XXX

Graduate Survey of the University XXX

Survey of graduates of the winter semester xxx (year) and summer semester xxx (year)

We have prepared two versions of this questionnaire for you to choose from: an online version and this paper version.

If you want to fill in the paper questionnaire, please enter the access code from the cover letter in the box below so that we can delete it from the online survey.

PTN=0

On the next page you will find the instructions on how to fill in this questionnaire. If possible, please complete the questionnaire in the following two weeks, and send it back to us using the addressed envelope included in the package you received.

Contact:
Higher Education Institution XXX
Project Graduate Survey
Address
Internet homepage



A SOCIO-BIOGRAPHICAL DATA

A1: What is your gender?

- Male
- Female

A2: Where do you currently live?

- In Germany → Please enter the place identifier of the license plate:
 - In another country → Please enter the name of the country:
- (please specify)

A3: What is your current marital status?

- Single (incl. single parent)
 - With a partner
 - Married
 - Other:
- (please specify)

B INFORMATION ON YOUR STUDIES AT THE UNIVERSITY

B1: Overall, how many semesters did you study this subject? (do not include semesters that you took off (leaves of absence), but do include semesters spent at a different university studying the same subject)

Overall number of course-semester

B2: Did you complete your studies in the standard period of time?

- Yes
- No

B3: Which final or average grade did you obtain in this study? Please recalculate points to grades if necessary

Final or average grade

B4: On average, how many hours per week did you spend on the following activities during the course of your study?

	During semester	During semester	
	B4 A 1=0	B4 B 1=0	
1	<input type="text"/>	<input type="text"/>	Attending courses / classes
2	<input type="text"/>	<input type="text"/>	Study activities outside of courses / classes
3	<input type="text"/>	<input type="text"/>	Preparation for exams
4	<input type="text"/>	<input type="text"/>	Working (no internships)
5	<input type="text"/>	<input type="text"/>	Family-related activities
6	<input type="text"/>	<input type="text"/>	Other: <input type="text"/>

(please specify)





B5 What was your main source of income during the course of your study? *Only one answer please*

- 1 Financial support from parents and / or other relatives
- 2 Financial support from partner / spouse
- 3 Financial support according to the Federal Education and Trainings Assistance Act
- 4 Own income from working during semesters and/or during semesters breaks
- 5 Credit / loan (e.g. special education credit, credit from a bank or private person)
- 6 Scholarship
- 7 Own funds, earned / saved
- 8 Other source(s) of income: _____
(please specify)

B6 Did you do any internships during your course of studies (this does not refer to team projects, didactical courses etc.)? *Multiple answers possible*

- 1 Yes, mandatory internship(s)
- 2 Yes, voluntary internship(s)
- 3 No internships -- Please continue with question B8

B7 How many internships did you do in total?

Number of mandatory internships

Number of voluntary internships

B8 During the course of your study, were you active as a tutor, student assistant and / or scientific assistant?

- 1 Yes, for approx. months
- 2 No

C STUDY CONDITIONS AND COMPETENCIES

C1 To what extent were the following aspects of teaching and learning realized in your studies?

	To a very high extent					Not at all					
	1	2	3	4	5	1	2	3	4	5	
1	<input type="checkbox"/>	Lectures									
2	<input type="checkbox"/>	Group work									
3	<input type="checkbox"/>	Participation in research projects									
4	<input type="checkbox"/>	Internships and practical training									
5	<input type="checkbox"/>	Fact-oriented and practical knowledge									
6	<input type="checkbox"/>	Theories and paradigms									
7	<input type="checkbox"/>	Teaching staff as main source of information									
8	<input type="checkbox"/>	Project and / or problem oriented learning									
9	<input type="checkbox"/>	Written work									
10	<input type="checkbox"/>	Oral presentations by students									
11	<input type="checkbox"/>	E-Learning									
12	<input type="checkbox"/>	Self-study									





C2: In retrospective, how satisfied are you with your studies in general?

Very satisfied Very dissatisfied

1 2 3 4 5

D SEARCH FOR EMPLOYMENT

D1: How did you search for a job? *Multiple answers possible*

<p>1 <input type="checkbox"/> Replied to job ads/announcements (e.g. newspaper, internet, notice)</p> <p>2 <input type="checkbox"/> Speculative application – independent: contact to employers</p> <p>3 <input type="checkbox"/> Job fair</p> <p>4 <input type="checkbox"/> I was contacted by an employer</p> <p>5 <input type="checkbox"/> Through internships during my course of studies</p> <p>6 <input type="checkbox"/> Through internships after graduation</p> <p>7 <input type="checkbox"/> Through (side) jobs during the study</p> <p>8 <input type="checkbox"/> Through (side) jobs during after graduation</p> <p>9 <input type="checkbox"/> Application for teaching traineeship</p> <p>10 <input type="checkbox"/> Through the public job centre</p>	<p>11 <input type="checkbox"/> Through internet (social) networks (e.g. XING)</p> <p>12 <input type="checkbox"/> Through private job agencies</p> <p>13 <input type="checkbox"/> Through the career center of the higher education institution etc.</p> <p>14 <input type="checkbox"/> Through teaching staff at the higher education institution</p> <p>15 <input type="checkbox"/> Writing your final thesis in a company</p> <p>16 <input type="checkbox"/> With help of personal contacts (friends, fellow students etc.)</p> <p>17 <input type="checkbox"/> With the help of family contacts (parents, relatives)</p> <p>18 <input type="checkbox"/> Other D1 TE--9 (please specify)</p> <p>19 <input type="checkbox"/> Not applicable, I have not searched for employment. → Please continue with question E1</p>
---	---

D2: When have you started searching for a job? *Please exclude temporary non-study-related jobbing.*

1 Prior to graduation

2 Around the time of graduation

3 After graduation

D3: How many employers did you approximately contact? *(applications etc.)*

Number of contacted employers

D4: How many months did you search for a first job in total? *If you have not found a job yet, how many months has your search taken so far? Please exclude temporary non-study-related jobbing.*

Months of search for first job

E EMPLOYMENT SITUATION DIRECTLY AFTER GRADUATION

E1: When did you start your first job after graduation?

Month Year

I haven't been employed since graduation. → Please continue with part F

E2: What type of contract did you have in your first employment after graduation?

1 Unlimited term

2 Fixed term





E3 What was the job title of your first employment after graduation? If possible, please choose the appropriate option or fill in the exact job description, e.g. *trained teacher, development engineer, social worker, assistant to management etc.*

job

(please see PDF)

E4 To what extent were your knowledge and skills that you acquired during study utilized in this work?

To a very high extent Not at all

1 2 3 4 5

F COMMENTS / RECOMMENDATIONS

F1 What did you especially like about your study?

F2 What did you not like at all about your study?

F3 What would you recommend for the improvement of your study program?

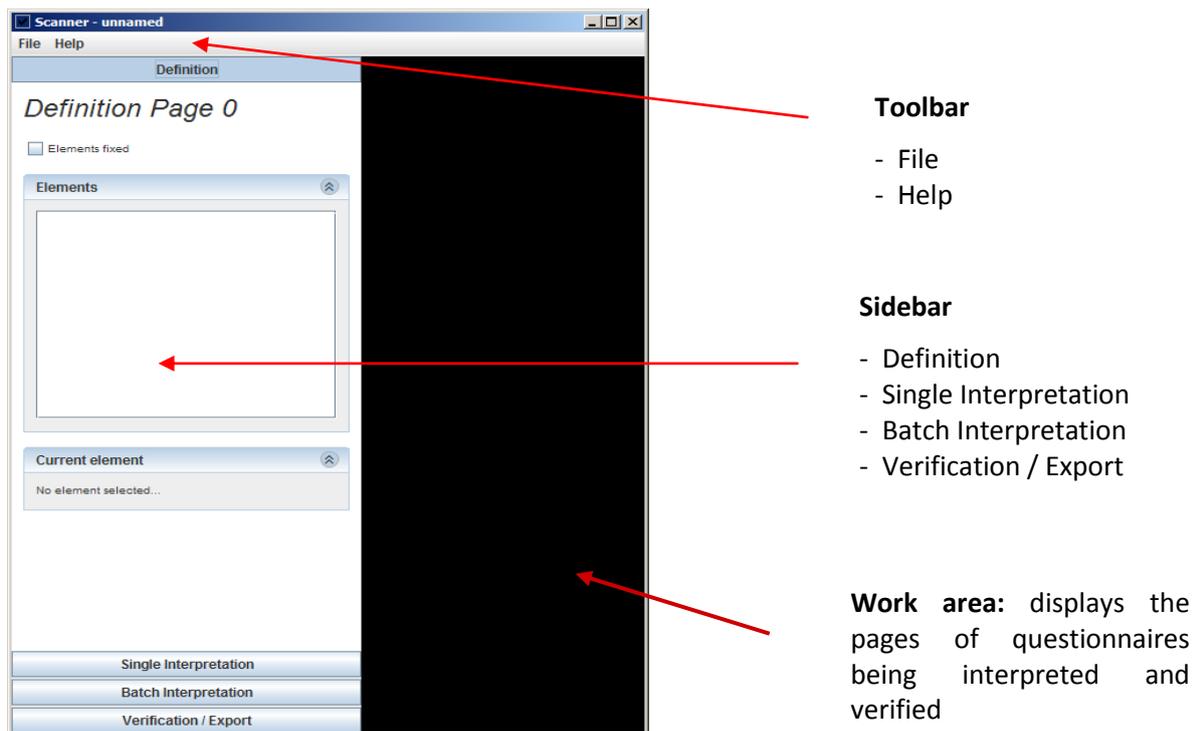


4. Verification of scanned questionnaires

Data verification is a process wherein the data is checked for accuracy and inconsistencies. It helps to determine whether data were accurately detected and are complete.

4.1 Opening the QTAFI-Scanner

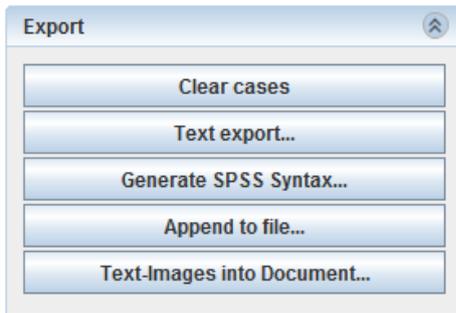
The opened QTAFI-Scanner - firstly without the data - is composed of three elements: (1) a toolbar, (2) a sidebar with a number of tabs and (3) a black work area.



The sidebar includes first and foremost the four tabs **Definition**, **Single Interpretation**, **Batch Interpretation** and **Verification / Export**. For the verification of questionnaires tabs **Single Interpretation**, **Batch Interpretation** und **Verification / Export** are of interest.

Batch Interpretation - allows automatic interpretation of a batch of selected questionnaires. It is the mostly used function for the interpretation of questionnaires.

Verification / Export - allows verification of the data of questionnaires and export of the results for further work with them and their analysis. The window **Export** comprises several functions:



Clear cases removes all the verified data from the data table in order to start the verification of new data. The removed data can be returned by clicking **Restore last dump** to be found under the command **File** in the menu bar.

Text export... - serves for obtaining the results of the verification in a text format

Generate SPSS Syntax... serves for producing the data transformation and performing the data analysis in SPSS.

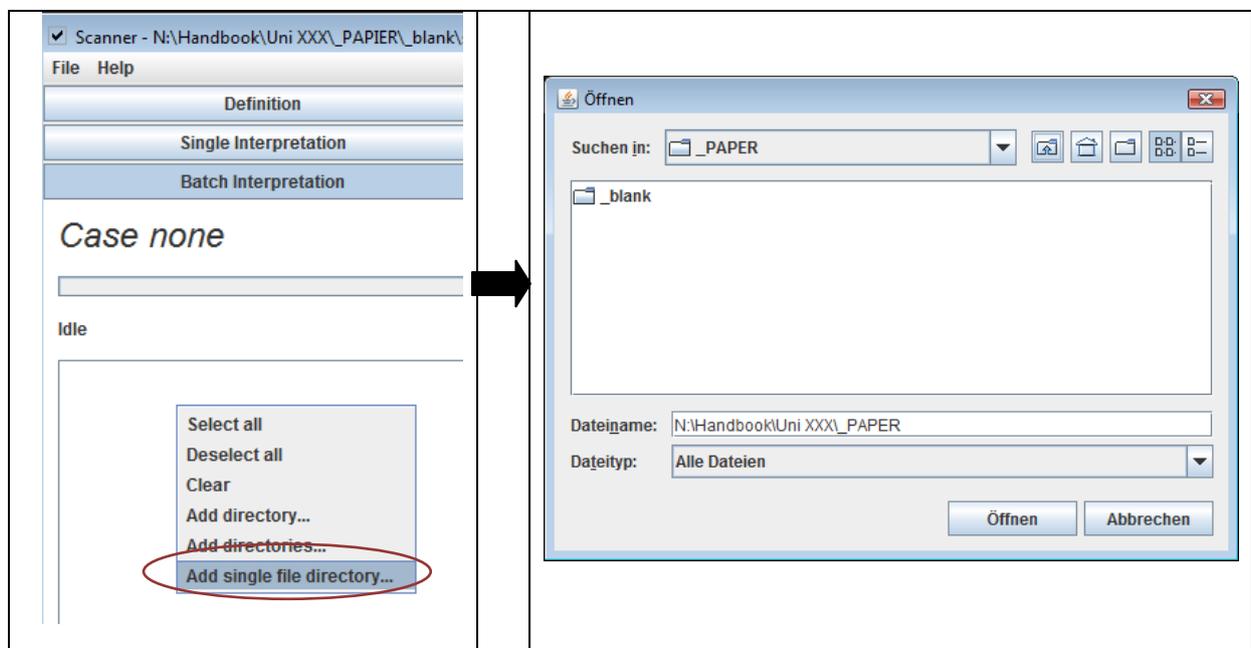
Append to file... serves for saving the results of the verification process

Text-Images into Document... the command serves for saving text answers given to open questions as an image in a separate document, for example, in a .pdf format. It is essential for further working with and analysis of the text.

4.2 Import of questionnaires

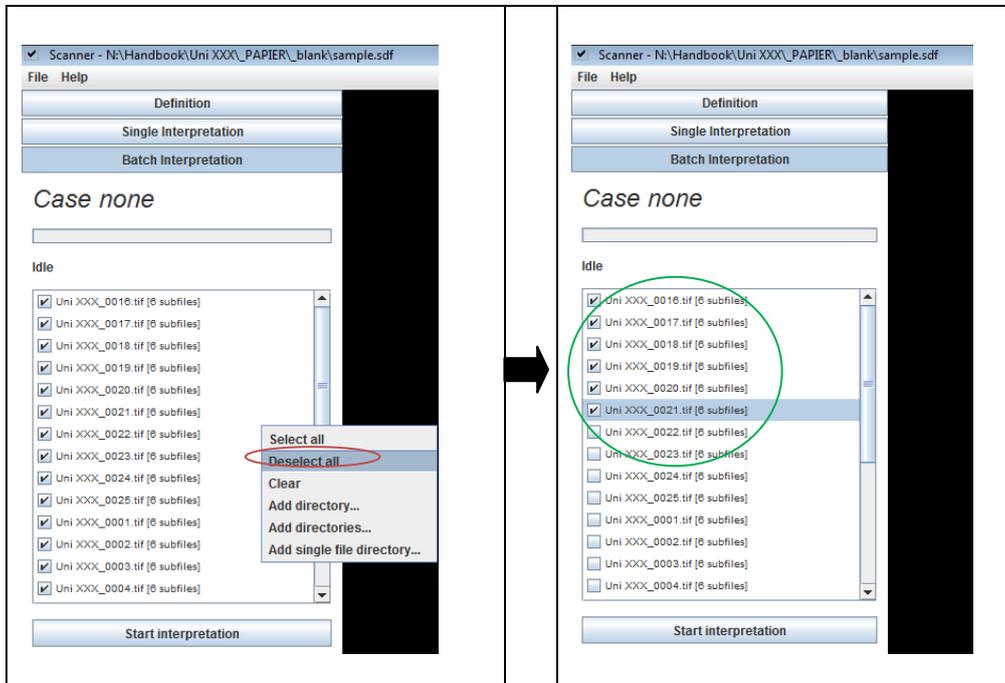
To import questionnaires into the QTAFI scanner, click the tab **Batch interpretation**. Click the right mouse button within the appeared empty window at the sidebar. This will bring up a context menu, whose command **Add single file directory...** allows the selection of multi tiff files.

Import all questionnaires of a particular university in one go.



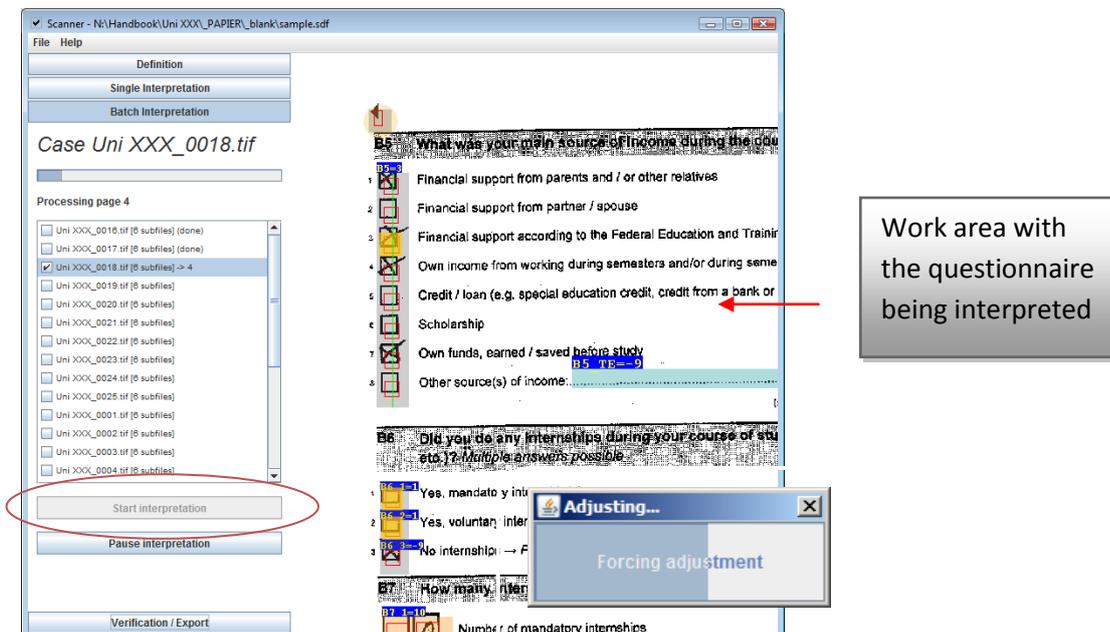
Now the window shows all the imported questionnaires. The questionnaires may not be imported in a sequential order, but this is not a problem. The questionnaires can be verified in the order they are.

It is not recommended to verify all the questionnaires at once due to the reason that some problems with the program might arise and this will cause the loss of already verified data. Therefore, it is recommended to verify five or ten questionnaires at a step. By clicking the right mouse button within the window with all questionnaires and choosing the command **Deselect all** the questionnaires will be deselected; then questionnaires to be verified first are to be selected with the help of the mouse by clicking on the small squares next to the questionnaire numbers.



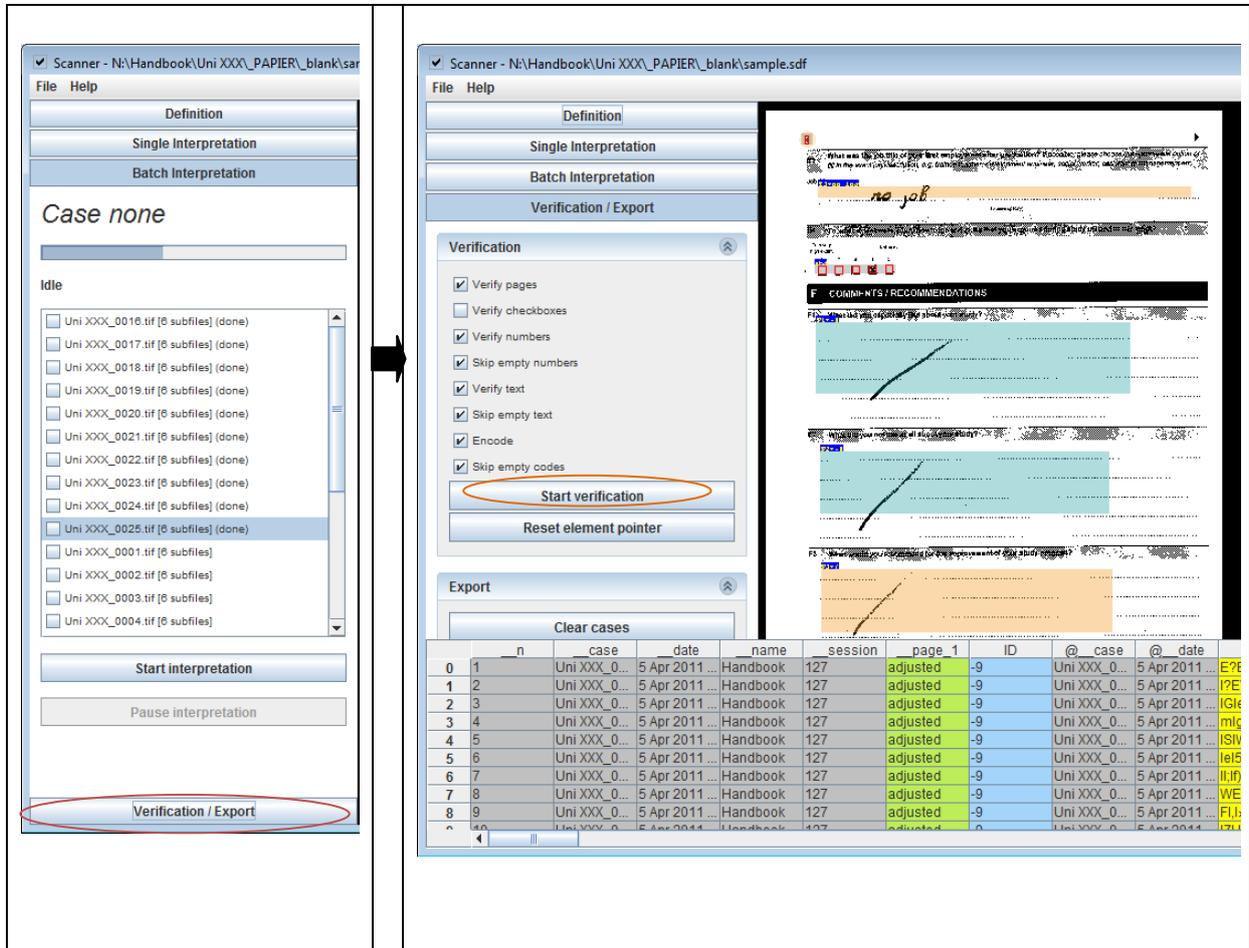
4.3 Interpretation of questionnaires

After selecting the questionnaires, the click on the tab **Start interpretation** activates the interpretation process: it appears in the work area. The disappearance of the ticks next to the questionnaires and the appearance of the word "(done)" next to a questionnaire indicates the end of the interpretation process of a particular questionnaire.



4.4 Verification of questionnaires

Verification of the data can be started upon the completion of the interpretation process by clicking the tab **Verification/Export** and then **Start verification**. Click on the tab **Verification/Export** will bring up the data table with variables that is located at the bottom of the scanner.



4.4.1 Data table with variables

n	case	date	name	session	page_1	ID	@_case	@_date	PIN	page_2	page_3	adjust 12	adjust 13	A1	A2	A2_1	A2 TE	A3	A3 TE	B1	B2	B3	B4 TE	B4_A_1
0	1	Uni XXX_0...	4 Apr 2011 ... Handbook	123	adjusted	-9	Uni XXX_0...	4 Apr 2011 ...	EFEETRE	adjusted	adjusted	4.0072859...	3.4953495...	2	1	H	-9	1	1	2.1	1	2	-9	2
1	2	Uni XXX_0...	4 Apr 2011 ... Handbook	123	adjusted	-9	Uni XXX_0...	4 Apr 2011 ...	FEWEE	adjusted	adjusted	4.2821158...	3.6082474...	2	1	RS	-9	1	1	1.9	1	1	-9	90
2	3	Uni XXX_0...	4 Apr 2011 ... Handbook	123	adjusted	-9	Uni XXX_0...	4 Apr 2011 ...	CIel PI QM	adjusted	adjusted	4.2279411...	2.9411764...	2	1	RS	-9	2	2	2.3	2	2	-9	1
3	4	Uni XXX_0...	4 Apr 2011 ... Handbook	123	adjusted	-9	Uni XXX_0...	4 Apr 2011 ...	mlgEAIlg	adjusted	adjusted	0.8714596...	0.5154839...	2	1	H	-9	3	3	11	2	7.1	-9	88
4	5	Uni XXX_0...	4 Apr 2011 ... Handbook	123	adjusted	-9	Uni XXX_0...	4 Apr 2011 ...	SWI 142M	adjusted	adjusted	3.4807597...	10.152284...	1	1	HH	-9	1	1	61	2	3.7	LI Treas...	1
5	6	Uni XXX_0...	4 Apr 2011 ... Handbook	123	adjusted	-9	Uni XXX_0...	4 Apr 2011 ...	hSI lmsl	adjusted	adjusted	2.7196652...	7.4074074...	1	1	LQ	-9	2	2	60	2	7.2	-9	3
6	7	Uni XXX_0...	4 Apr 2011 ... Handbook	123	adjusted	-9	Uni XXX_0...	4 Apr 2011 ...	hFI OI&A	adjusted	adjusted	1.7500000...	8.1218274...	1	1	-9	-9	3	3	7	1	1.2	-9	0
7	8	Uni XXX_0...	4 Apr 2011 ... Handbook	123	adjusted	-9	Uni XXX_0...	4 Apr 2011 ...	WEIXCI 13l	adjusted	adjusted	2.0040080...	9.5238095...	2	2	emvew	2	-9	0	1	2.3	-9	25	
8	9	Uni XXX_0...	4 Apr 2011 ... Handbook	123	adjusted	-9	Uni XXX_0...	4 Apr 2011 ...	Fl> T	adjusted	adjusted	4.0848275...	7.5675675...	-9	-9	RM	-9	3	-9	11	-9	7.1	-9	-9

The data table is the table which contains the information about the questionnaires being verified regarding the number of a questionnaire, its name, PIN, ID, etc. as well as the variables of the verified questions. The table has its specific indications which are considered below:

- ___ - a sign of a system variable that is set automatically
- __n - running number of a questionnaire being verified
- __case - a specific name of a folder with a complete questionnaire

__session - the running number of the batch of questionnaires being verified in one go

__date - date of the questionnaire verification

__adjust - the number of the adjusted field. Every page has two adjusted fields. Every adjusted field has its particular number.

The screenshot shows a questionnaire form with two sections: 'A SOCIO-BIOGRAPHICAL DATA' and 'B INFORMATION ON YOUR STUDIES AT THE UNIVERSITY'. Two adjusted fields are highlighted with blue diamonds: one in section A (field 12) and one in section B (field 13). Red arrows point from these diamonds to the corresponding columns in the data table below.

Two adjusted fields and their respective numbers in the data table

	__page_2	__page_3	__adjust_12	__adjust_13	A1	A2	A2_1	A2_2
E	adjusted	adjusted	4.0072859	3.4653465	2	1	H	-9
E	adjusted	adjusted	4.2821158	3.6082474	1	1	HS	-9
hly	adjusted	adjusted	4.2279411	2.9411764	2	1	KS	-9
g	adjusted	adjusted	0.8714596	0.5154639	2	1	H	-9
HM...	adjusted	adjusted	3.4907597	10.152284	1	1	HH	-9
t	adjusted	adjusted	2.7196652	7.4074074	1	1	LG	-9

The variables in the data table are highlighted with various colors. Every color has its meaning:

Yellow - marked as probably invalid. The value is to be checked.

Red - marked as invalid. The value could not be recognized at all.

White - marked as valid. The value was recognized.

Green - marked as checked. The value is verified.

Blue - marked as empty. No answer is available.

Grey - marked as not editable (system variable). The variables will not be exported.

4.4.2 Introduction into the verification process

During the verification process the scanner first adjusts the whole page and after that separate questions within a page are verified. In some cases the first page is not adjusted. It means that the program was not able to recognize the majority of the data, therefore the data should be entered or corrected mostly manually. Even if the first page is not adjusted, the verification process should be nonetherless proceeded.

The detected answers are highlighted with a yellow color. The recognized by the program answers are given in a small window - verifier - that appears on each page and with each answer being

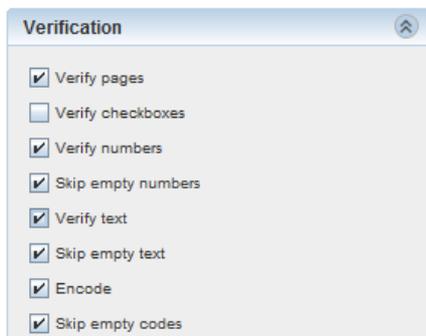


verified . When an answer is recognized wrongly it should be corrected manually. A correct answer is to be confirmed with the button **Next**.

It is advised to work primarily with the keyboard during the verification process. Press "Enter" to confirm the answer and get to the next question or page - you don't have to click the button "Next" with the mouse.

4.4.2.1 Verification Parameters

Before starting verifying paper questionnaires verification parameters in the program should be set. The sidebar includes the following verification parameters:



Verify pages - verification of the whole pages of a questionnaire to see how they have been adjusted in general

Verify checkboxes - verification of every checkbox which contains an answer. Checkboxes represent themselves the boxes which require answers in the form of a cross or a tick, e.g. in single choice questions, single choice group questions and multiple choice questions

Verify numbers - verification of all numbers given as responses to questions

Skip empty numbers - omission of the questions to which responses in the form of numbers were not provided

Verify text - verification of the text given as a response to a question

Skip empty text - skipping the questions to which the answers in the form of text are not provided

Encode - the option is connected with Encoder element, which is not widely used. However, in case the elements were encoded, this option verifies the encoding of respective answers

Skip empty codes - omission of the questions which do not contain any encoding

Especially important parameters for verification are the following: verify pages, verify numbers, skip empty numbers, verify text and skip empty text. They should necessarily be marked. The parameter "verify checkboxes" can be omitted as the program works pretty well and recognizes itself the answers within the checkboxes correctly. Thus, there is no necessity for the program to point to every single checkbox with the given answer.

4.4.2.2 Variable ID

Every questionnaire has its ordinal number that constitutes its **ID**. The number is indicated in the right upper corner of the cover page of a questionnaire. Normally the program does not recognize the number and in the window with the **Variable ID** -9 is indicated. Therefore, the ID should be entered manually and confirmed with the button **OK**.

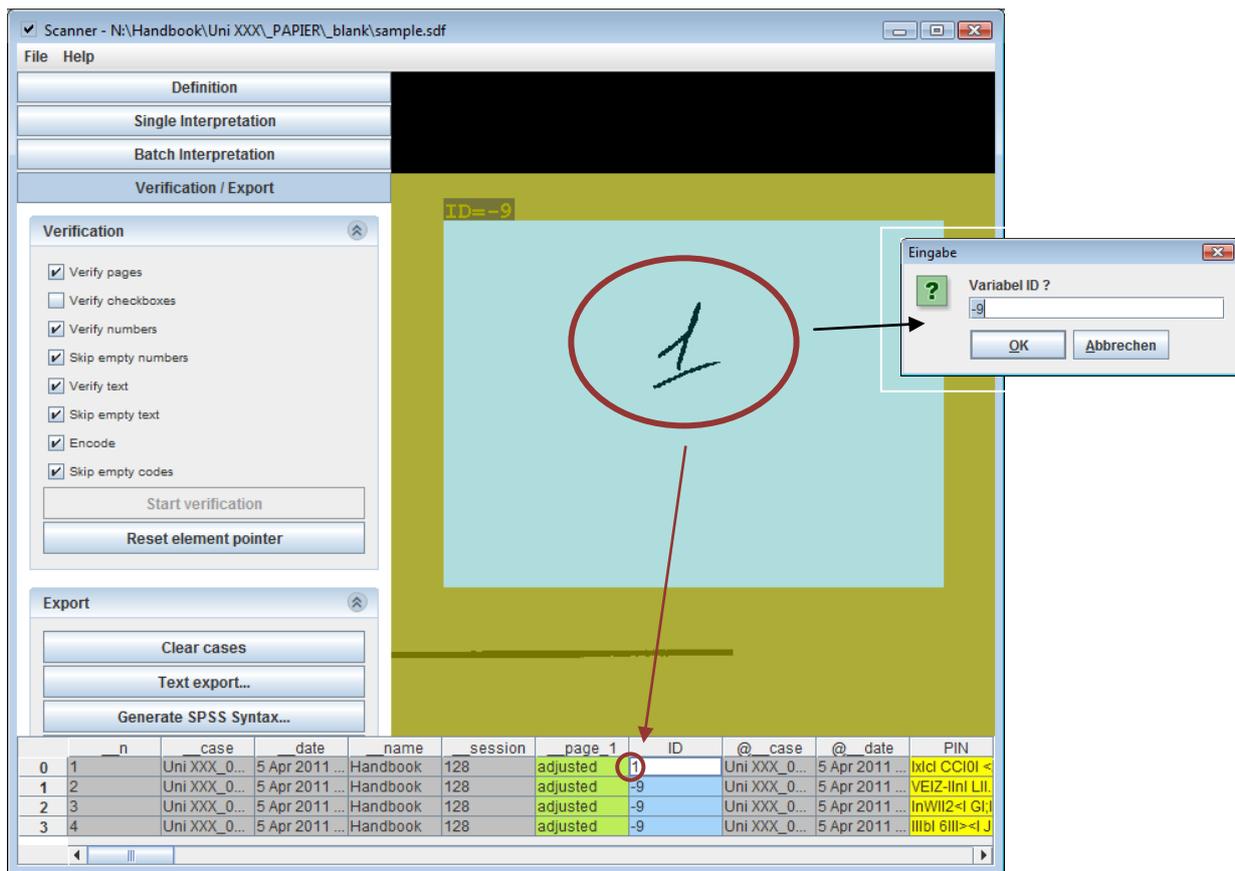
The screenshot shows a software window titled "Scanner - NI\Handbook\Uni XXX_PAPER_\blank\sample.cdf". On the left, there is a "Verification" panel with several checked options: "Verify pages", "Verify numbers", "Skip empty numbers", "Verify text", "Skip empty text", "Erase", and "Skip empty codes". Below this is an "Export" panel with options like "Clear cases", "Text export...", "Generate SPSS Syntax...", and "Append to file...".

The main area displays a questionnaire cover page for "Iuate Survey of the University XXX". The title is "Iuate Survey of the University XXX" and the subtitle is "urvey of graduates of the winter semester xxx (year) and summer semester xxx (year)". A handwritten "1" is visible in the top right corner of the questionnaire page. Below the title, there is a list of questionnaire versions and a table of data.

At the bottom, there is a table with columns: ID, @_c214, @_date, PNI, _p32e_2, _p32e_3. The table contains 10 rows of data, with the first row highlighted in blue. The first row has the value "1" in the ID column.

Two "Eingabe" (Input) dialog boxes are shown on the right. The first dialog has a question mark icon and the text "Variabel ID?". The input field contains "-9". The second dialog also has a question mark icon and the text "Variabel ID?". The input field contains "1". A red arrow points from the handwritten "1" on the questionnaire page to the input field of the second dialog box.

In cases when the window with the **Variable ID** does not appear during the verification process, the number of a questionnaire can be indicated manually either directly at the data table under the variable **ID** with the double click or in the window with the variable ID that is to be brought out manually by making a double click on a blue area with the ID on a questionnaire page.



4.4.2.3 PIN Verification

The PIN is to be verified with the relevant PIN data and entered manually into the verifier under **Verify PIN**.

Before entering the PIN, it is recommended to verify it by referring to the list of correct PINs. The reason for this is that it is possible that the numbers or letters of the PIN might be read wrongly by a person doing the verification or a PIN in the questionnaire itself was given with a mistake.

The list of correct PINs is usually saved in the Excel document. To facilitate the search of PINs in the Excel document, the search function **Ctrl + F** is used.

The image shows a software interface for verifying a PIN. On the left, there is a sidebar with options like 'Verify paper', 'Verify conditions', etc. The main area displays instructions: 'We have prepared two versions of this questionnaire for you to choose from: an online version and this paper version.' Below this, it says 'If you want to fill in the paper questionnaire, please enter the access code from the cover letter in the box below so that we can link your data to the online survey.' A small window shows a PIN input field with the text 'bTf3g9' entered. Below that, a larger window shows the same PIN 'bTf3g9' entered into a text box. The interface includes 'Next' and 'Pause' buttons.

In some cases PIN is not entered or simply crossed out by a person filling out the questionnaire. In this case just leave PIN blank or indicate -9 as the absence of data.

The image shows a software interface for verifying a PIN. On the left, there is a sidebar with options like 'Verify paper', 'Verify conditions', etc. The main area displays instructions: 'We have prepared two versions of this questionnaire for you to choose from: an online version and this paper version.' Below this, it says 'If you want to fill in the paper questionnaire, please enter the access code from the cover letter in the box below so that we can link your data to the online survey.' A small window shows a PIN input field with the text 'PIN=1//' and a red circle around it. Below that, a larger window shows the same PIN '1//' entered into a text box. The interface includes 'Next' and 'Pause' buttons.

If the PIN is not clearly visible because it was written with a pencil for example, it can be verified by looking at the original paper questionnaire.

The image shows a software interface for verifying a PIN. On the left, there is a sidebar with options like 'Verify paper', 'Verify conditions', etc. The main area displays instructions: 'We have prepared two versions of this questionnaire for you to choose from: an online version and this paper version.' Below this, it says 'If you want to fill in the paper questionnaire, please enter the access code from the cover letter in the box below so that we can link your data to the online survey.' A small window shows a PIN input field with the text 'PIN=BIKITITI?I?' and a red circle around it. Below that, a larger window shows the same PIN 'Da0xcc' entered into a text box. The interface includes 'Next' and 'Pause' buttons.

4.4.2.4 Closed questions

For the closed questions - where the answers can be marked with the crosses - the program displays the values that it captured in the appropriate boxes that are highlighted with yellow color. When the whole page is going to be adjusted it is important to check if all the answers given especially to the closed questions are detected correctly, e.g. a value is captured in the box that is marked with the cross. If the program has not detected all the crosses in the right places, then correct manually with the double-click on the red boxes with not-recognized crosses. Crossed out boxes that are nonetheless marked are to be demarcated with the double-click. With the button **Next** confirm the result.

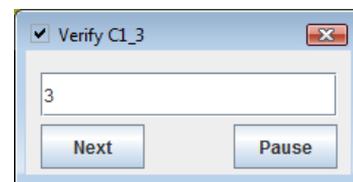
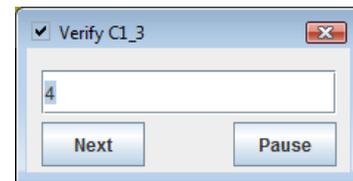
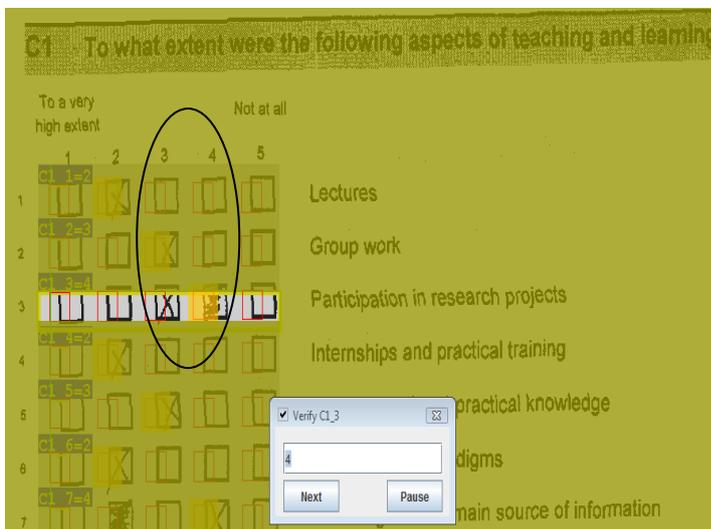
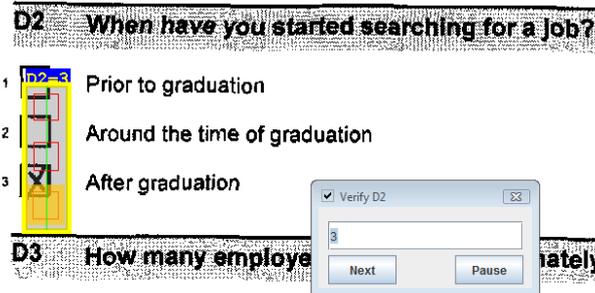
<p>A SOCIO-BIOGRAPHICAL DATA</p> <p>A1 What is your gender?</p> <p>1 <input type="checkbox"/> Male</p> <p>2 <input checked="" type="checkbox"/> Female</p> <p>A2 Where do you currently live?</p> <p>1 <input checked="" type="checkbox"/> In Germany → Please enter the place identifier of the lic</p> <p>2 <input type="checkbox"/> In another country → Please enter the name of the cour.</p> <p>Not recognized answer</p>	<p>A SOCIO-BIOGRAPHICAL DATA</p> <p>A1 What is your gender?</p> <p>1 <input type="checkbox"/> Male</p> <p>2 <input checked="" type="checkbox"/> Female</p> <p>A2 Where do you currently live?</p> <p>1 <input checked="" type="checkbox"/> In Germany → Please enter the place identifier of the lic</p> <p>2 <input checked="" type="checkbox"/> In another country → Please enter the name of the cour.</p> <p>Manually detected answer with the double click on a red square</p>
--	--

In cases when the answers are not given, but the areas for answers are anyway highlighted with yellow color as if the answers are provided, the highlighting should be removed manually with the double click on corresponding red squares. See, example below:

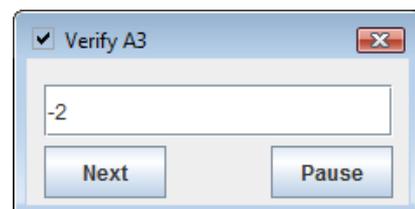
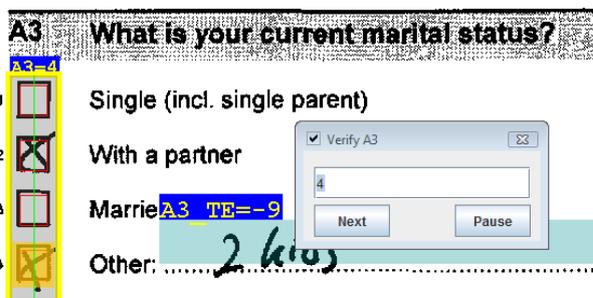
<p>C1 To what extent were the following aspects of teaching and learning...</p> <p>To a very high extent 1 2 3 4 5 Not at all</p> <p>1 <input checked="" type="checkbox"/> Lectures</p> <p>2 <input checked="" type="checkbox"/> Group work</p> <p>3 <input checked="" type="checkbox"/> Participation in research projects</p> <p>4 <input checked="" type="checkbox"/> Internships and practical training</p> <p>5 <input checked="" type="checkbox"/> Fact-oriented and practical knowledge</p> <p>6 <input checked="" type="checkbox"/> Theories and paradigms</p> <p>7 <input checked="" type="checkbox"/> Teaching staff as main source of information</p> <p>8 <input checked="" type="checkbox"/> Project and / or problem oriented learning</p> <p>9 <input checked="" type="checkbox"/> Written work</p> <p>10 <input checked="" type="checkbox"/> Oral presentations by students</p> <p>11 <input checked="" type="checkbox"/> E-Learning</p> <p>12 <input checked="" type="checkbox"/> Self-study</p> <p>4</p>	<p>Double click</p> <p>C1 To what extent were the following aspects of teaching and learning...</p> <p>To a very high extent 1 2 3 4 5 Not at all</p> <p>1 <input checked="" type="checkbox"/> Lectures</p> <p>2 <input checked="" type="checkbox"/> Group work</p> <p>3 <input checked="" type="checkbox"/> Participation in research projects</p> <p>4 <input checked="" type="checkbox"/> Internships and practical training</p> <p>5 <input checked="" type="checkbox"/> Fact-oriented and practical knowledge</p> <p>6 <input checked="" type="checkbox"/> Theories and paradigms</p> <p>7 <input checked="" type="checkbox"/> Teaching staff as main source of information</p> <p>8 <input checked="" type="checkbox"/> Project and / or problem oriented learning</p> <p>9 <input checked="" type="checkbox"/> Written work</p> <p>10 <input checked="" type="checkbox"/> Oral presentations by students</p> <p>11 <input checked="" type="checkbox"/> E-Learning</p> <p>12 <input checked="" type="checkbox"/> Self-study</p> <p>4</p>
---	--

If the program verifies the values in the questions with item sets without multiple answers or with the ordinal scale, the item or the point of the scale which is marked as an answer should be indicated in the verifier.

If the scan fields displaced from the original boxes in the questionnaire during the verification process (refer to the example below), make sure that the right answers (red boxes correspond to the original boxes) are given in the verifier.



When two answers instead of one are provided to the closed single-choice questions -2 should be indicated in the verifier. See the example below:



4.4.2.5 Open questions

For the open questions the recognized by the program answers should be verified with the original answers. If the answers are recognized wrongly, the correct answers are to be entered manually. Below are the examples of the cases that are to be met during the verification process of open questions:

1)

Enter KS manually to the verifier and confirm with the button **Next**

2)

Instead of 2,3 indicate the correct answer 2,1 and confirm with the button **Next**

3)

When entering the numbers, zero in front of the number can be omitted

4) When no answer is given to a question indicate -9:

Final or average grade

Verify B3

Verify B3

B1 Overall, how many semesters did you study this subject? (absence), but do include semesters spent at a different univer

B1-7 Overall number of course-semester

Verify E1_YE

-9

Next Pause

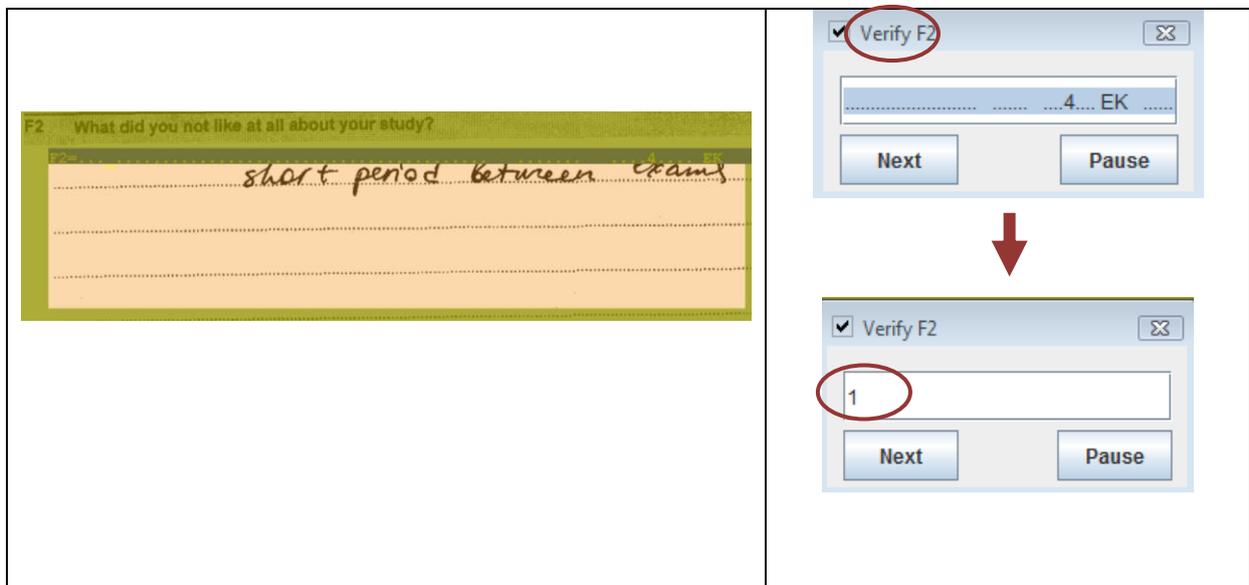
4) With regard to the verification of open questions with the **answers in a text form**, attention should be paid to the variables given to respective answers. In general if the variable ends with **_TE** (meaning "Text") and if a question concerns indication of a profession, the complete text-answer is to be entered into a verifier. These text-answers are very important for the analysis; that is why they should be present in the data record. There are, however, some other variables that require an indication of the text. People who are responsible for the data analysis are supposed to provide the list of text variables to a person who is in charge of the mask creation as well as to those who are in charge of questionnaire verification.

<p>family-re...</p> <p>B1-7</p> <p>Other: Training for professional sports</p>	<p>Verify B4_TE</p> <p>Training or professional sports</p> <p>Next Pause</p>
<p>E3 What was the job title of your first employment after graduation? fill in the exact job description, e.g. trainee teacher, development engin</p> <p>Job E3=Pvulnfrl. 4)A€11' ? I*94,,J' .r...»...I.I H .I...</p> <p>Research Assistant</p> <p>(please specify)</p>	<p>Verify E3</p> <p>Research Assistant</p> <p>Next Pause</p>

When the written text is not visible because of the coding above it, the coding can be removed temporarily and returned with the help of the function key **F12**.



In cases when the variable does not contain `_TE` - instead of the text-answer only digit **1** is to be entered into the verifier as for the data record it is enough to have information that an answer to a question is available. Usually those questions that ask for commentaries are defined with variables without `_TE` at the end as these commentaries are more important for a university itself as feedback, but not for the analysis of the data.



4.6 Single interpretation

Single interpretation is a manual interpretation of a single page of a questionnaire. It is meant for detailed observation of what the program has recognized and whether it has recognized the data correctly.

The screenshot shows the 'Single Interpretation' window. At the top, the title bar reads 'Scanner - N:\Handbook\Uni XXX\PAPIER\blank\sa'. Below it are 'File' and 'Help' menus. The main area is titled 'Definition Page 5' and 'Case Uni XXX_0019.tif'. A file path is shown: 'N:\Handbook\Uni XXX\PAPIER\Uni XXX_0019.tif:4'. At the bottom, there are several buttons: 'Next page', 'Prev page', 'Adjust', 'Interpret', and 'New case'.

Callouts explain the interface:

- Headline of the working area that shows the activated questionnaire page, a name of a complete questionnaire and the location of the questionnaire on the local drive** (points to the title bar and main text area).
- Buttons allowing the movement from one page to another** (points to 'Next page' and 'Prev page').
- Adjustment and interpretation of a single page of a questionnaire** (points to 'Adjust' and 'Interpret').

The click on the defined scan field in a questionnaire will bring up the detailed information regarding a particular variable which appears in the window **Current element**.

The 'Current element' window displays information for two elements:

- D2: When have you started searching for a job? Please exclude temporary non study related jobbing.**
 - 1 Prior to graduation
 - 2 Around the time of graduation
 - 3 After graduation
- D3: How many employers did you approximately contact? (applications etc.)**
 - Number of contacted employers

The 'Current element' panel on the left shows: Element: ONRElement (D3), X:158 Y:1400 W:179 H:68, Result: D3 = 10, and a 'Debug ONR' checkbox.

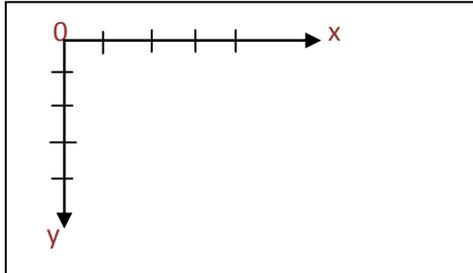
The 'Current element' window shows adjustment parameters for a scan field:

- Element: AdjustElement, X:132 Y:96 W:40 H:40
- Adjust: Last aberration: (0,91 / 2,33)
- Overlapping BP: 0
- X-aberration:
- Y-aberration:

The 'Current element' panel on the left shows: Element: AdjustElement, X:132 Y:96 W:40 H:40, and a 'Debug ONR' checkbox.

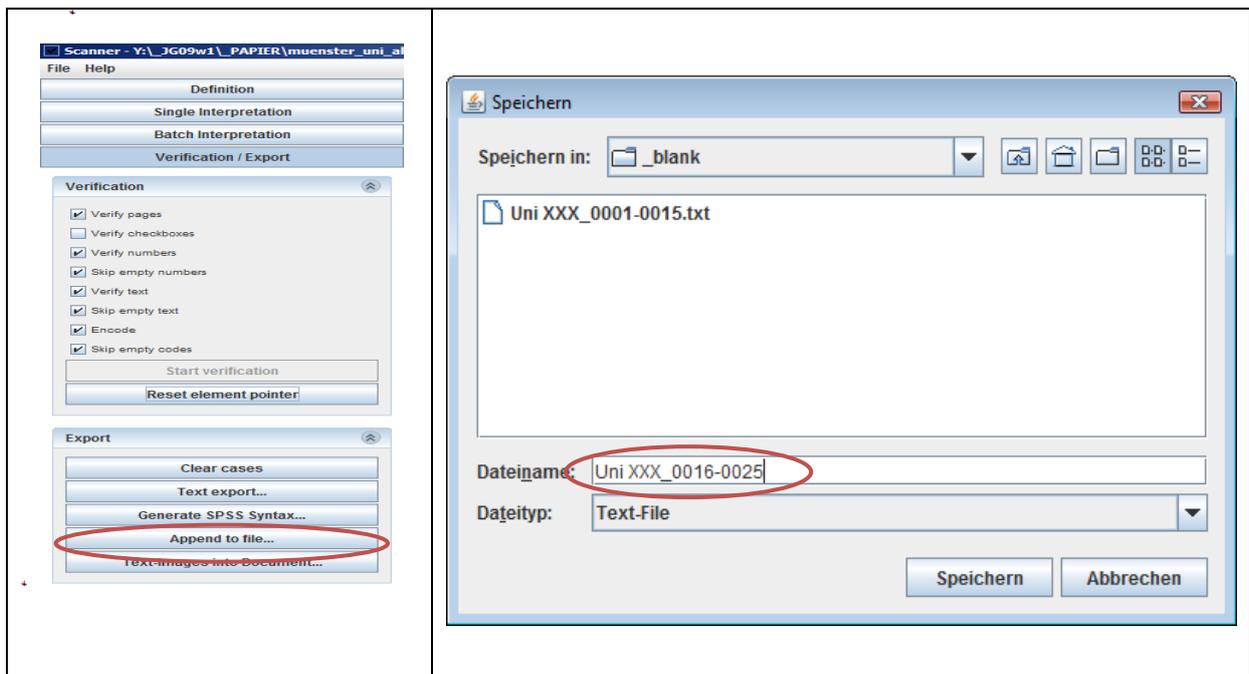
X-abberation - shows the indication of pixels in X direction that implies the displacement of adjusted fields in relation to the original questionnaire

Y-abberation - shows the indication of pixels in Y direction that implies the displacement of adjusted fields in relation to the original questionnaire



4.7 Saving the verified data

To save the verified data, the tab of the scanner **Append to file** should be used. The data are to be saved within the folder of the institution, the data from which were verified, under the folder **_blank**. Normally the same name as the name of the whole folder including also the numbers of the verified questionnaires is given as a name of a file. For example, if the name of the whole folder: Uni XXX and the questionnaires from 0016 to 0025 were chosen for verification, the name of the document with the verified data will be: Uni XXX_0016-0025.

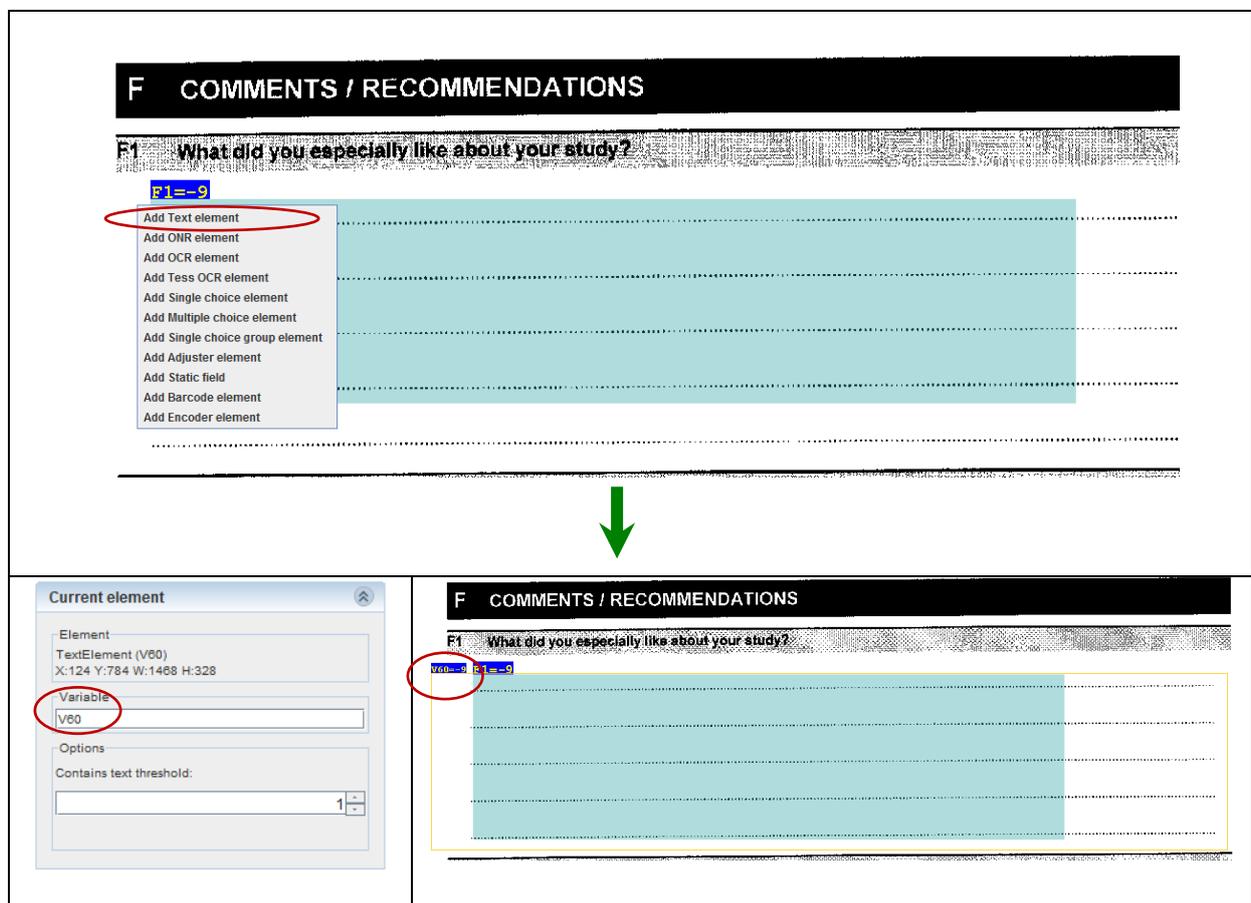


4.8 Text images into document

Normally during the verification process information given in the section of a questionnaire "Comments and recommendations" is not written down, but indicated with "1", meaning that information is available. In case when the text given as a comment or recommendation is required, it can be obtained from the questionnaire with the help of the option "Add Text element" upon creating the scan mask as well as with the option "Text images into document" upon verification.

Add Text Element serves for defining scan fields on open questions that require answers in the form of text, saving the answers as images and transferring them into a separate document for further detailed analysis. Within the blank questionnaire with the scan-mask an open question should be defined with the "Add Text Element" that marks the answer with the yellow frame. The name of the variable is determined automatically by the program and should not be changed into the variable label for the given question.

The yellow frame is to be pulled over all lines to capture the whole available text.



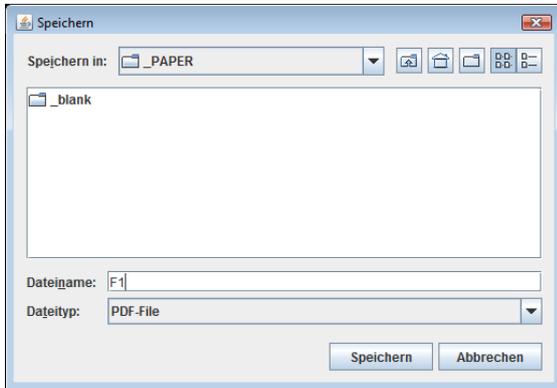
After the verification of a questionnaire, the relevant variable of an open question is to be found in the data table (in the sample questionnaire it is the variable V60). With the click of the right mouse button on the variable in the data table, the function "Insert Images to Document" will appear:

F2	F3	adjust_73	adjust_74	V60
1	.9	7	4866310	

Insert Images to Document...

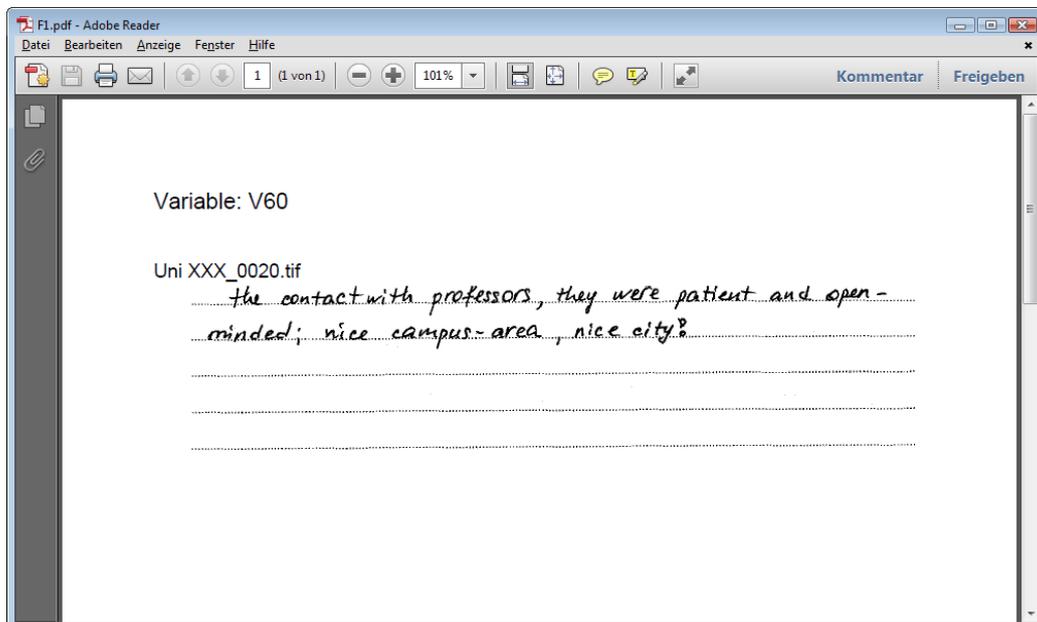
Text-Images into Document... the command serves for saving text answers given to open questions as an image in a separate document, for example, in a document of the .pdf format. It is essential for further working with and analysis of the text.

Clicking on the function "Insert Images to Document" will bring up a window which allows saving the image:



Provide the name for a text image (in the given example it is F1 as an indication of a question from which the respond is being saved).The text image will be saved in pdf format.

Saved pdf file with the text will have the following look:



4.9 Data export

The data entered during the verification process into the data table is to be exported into a text file from which the data will be used for further analysis. The data is exported with the help of the commands of the scanner **Append to file** or **Text export**. To have a better overview of the verified data, the text file is to be opened with the program **Edit with Notepad++**. This is how the file with the saved verified data looks like:

ID	@_case	@_date	PIN	A1	A2	A2_1	A2_TE	A3	A3_TE	B1	B2	B3	B4_TE	B4_A_1	B4_A_2	B4_A_3	B4_A_4	B4_A_5	B4_A_6		
16	Uni XXX_0016.tif	4 Apr 2011 12:15:17:857	bTf3g9	2	1	M	-9	-2	-9	10	1	2,1	-9	20	15	5	-9	40	2	0	20
17	Uni XXX_0017.tif	4 Apr 2011 12:15:29:074	rzU4Bc	1	1	KS	-9	1	-9	10	1	1,9	-9	8	15	5	-9	-9	-9	-9	5
18	Uni XXX_0018.tif	4 Apr 2011 12:15:40:103	Q6pq8y	2	1	KS	-9	2	-9	12	2	2,3	-9	10	20	0	10	2	-9	-9	15
19	Uni XXX_0019.tif	4 Apr 2011 12:15:51:101	D5dhK6	2	1	M	-9	3	-9	14	2	2,1	-9	12	10	-9	10	-9	-9	-9	10
20	Uni XXX_0020.tif	4 Apr 2011 12:16:01:334	SWv7Mp	1	1	HH	-9	-2	-9	13	2	1,8	Training for Professional sports								
21	Uni XXX_0021.tif	4 Apr 2011 12:16:10:648	G5jH38	1	1	KS	-9	2	-9	6	2	1,3	-9	25	30	10	20	30	0	10	10
22	Uni XXX_0022.tif	4 Apr 2011 12:16:21:536	DAaxbc	1	1	-9	-9	3	-9	10	1	1,8	-9	20	10	20	7	30	-9	-9	10
23	Uni XXX_0023.tif	4 Apr 2011 12:16:29:430	DAXCbcd	2	2	-9	Spain	2	-9	0	1	2,3	-9	-9	-9	-9	-9	-9	-9	-9	-9
24	Uni XXX_0024.tif	4 Apr 2011 12:16:40:506	-9	2	1	Gö	-9	3	-9	10	2	2,1	-9	-9	-9	-9	-9	-9	-9	-9	-9
25	Uni XXX_0025.tif	4 Apr 2011 12:16:51:488	c2Lb1z	1	1	PB	-9	2	-9	7	1	2,4	-9	10	6	4	4	4	-9	-9	8

The format of the file is the following: The first line always comprises only the names of the variables, including ID of a questionnaire, case, date of the questionnaire verification, PIN as well as the variables of questions in the questionnaire. Other lines contain the verified data for each variable. Each line contains the data of one questionnaire. All the variables and data are separated with the Tabulator . Below the separation between the data is shown with the orange errors.

ID	@_case	@_date	PIN	A1	A2	A2_1	A2_TE	A3	A3_TE	B1	B2	B3	B4_TE	B4_A_1	B4_A_2	B4_A_3	B4_A_4	B4_A_5	B4_A_6		
16	Uni XXX_0016.tif	4 Apr 2011 12:15:17:857	bTf3g9	2	1	M	-9	-2	-9	10	1	2,1	-9	20	15	5	-9	40	2	0	20
17	Uni XXX_0017.tif	4 Apr 2011 12:15:29:074	rzU4Bc	1	1	KS	-9	1	-9	10	1	1,9	-9	8	15	5	-9	-9	-9	-9	5
18	Uni XXX_0018.tif	4 Apr 2011 12:15:40:103	Q6pq8y	2	1	KS	-9	2	-9	12	2	2,3	-9	10	20	0	10	2	-9	-9	15
19	Uni XXX_0019.tif	4 Apr 2011 12:15:51:101	D5dhK6	2	1	M	-9	3	-9	14	2	2,1	-9	12	10	-9	10	-9	-9	-9	10
20	Uni XXX_0020.tif	4 Apr 2011 12:16:01:334	SWv7Mp	1	1	HH	-9	-2	-9	13	2	1,8	Training for Professional sports								
21	Uni XXX_0021.tif	4 Apr 2011 12:16:10:648	G5jH38	1	1	KS	-9	2	-9	6	2	1,3	-9	25	30	10	20	30	0	10	10
22	Uni XXX_0022.tif	4 Apr 2011 12:16:21:536	DAaxbc	1	1	-9	-9	3	-9	10	1	1,8	-9	20	10	20	7	30	-9	-9	10
23	Uni XXX_0023.tif	4 Apr 2011 12:16:29:430	DAXCbcd	2	2	-9	Spain	2	-9	0	1	2,3	-9	-9	-9	-9	-9	-9	-9	-9	-9
24	Uni XXX_0024.tif	4 Apr 2011 12:16:40:506	-9	2	1	Gö	-9	3	-9	10	2	2,1	-9	-9	-9	-9	-9	-9	-9	-9	-9
25	Uni XXX_0025.tif	4 Apr 2011 12:16:51:488	c2Lb1z	1	1	PB	-9	2	-9	7	1	2,4	-9	10	6	4	4	4	-9	-9	8

Troubleshooting

Questionnaires are filled out with pencils or light felt-tipped pens:

Solution: If a questionnaire is filled out with pencils or light felt-tipped pens, the answers might not be visible after scanning the questionnaires and thus will not be recognized by the QTAFI scanner upon verification. In that case it is recommended to decrease the brightness in the scanning settings.

The handwritten numbers, letter or words are not readable:

Solution: If the handwritten numbers, letters or words are not readable, zoom in so far that they become more visible and more readable. If this does not help, seek out original questionnaires.

Questionnaire is not adjusted by the QTAFI scanner:

Solution: Even when a questionnaire is not adjusted, the scanned pages can be nonetheless read by the QTAFI scanner, which is assured by adjuster elements during the creation of a scan-mask. However, in this case the majority of the given answers can be read wrongly by the scanner. The answers are to be corrected manually.

PIN is indicated neither in a paper questionnaire nor in an online questionnaire:

There is no solution if a PIN is not indicated. This information will be considered as missing. Try to make a strong emphasize on the importance of PINs on the cover page of a questionnaire for respondents to provide PIN.

Validation error in the verifier window is displayed:

Solution: If the recognized answer given in the verifier is wrong, it should be corrected manually.

Glossary

OCR element - defines scan fields by non-numeric character string. OCR stands for **O**ptical **C**haracter **R**ecognition, conversion of images of text into characters. It works under the GOCR engine

Tess OCR element - defines scan fields by non-numeric character string. It works under the engine named Tesseract that offers slightly advanced recognition of non-numeric character string in comparison with the GOCR engine

ONR element - defines scan fields by numeric character string (e.g. zip codes). ONR stands for **O**ptical **N**umber **R**ecognition

Static field - the assignment of an element (e.g. the defined number of a folder represented by case, current date of questionnaire verification) in relation to the complete questionnaire

Adjuster element - determines if the page is twisted or not and ensures that possibly wrong scanned pages can be nonetheless read

Threshold - a border value that measures the value of blackness of a particular area. The value is expressed in percentage

Tiff file - stands for a **T**agged **I**mage **F**ile **F**ormat. It is a highly used file format for storing images in many image processing applications. They differ from other formats in the way that by using OCR they can be read, written, and searched like a text file

Multi tiff files - storing several images as a multi-page Tiff file. Each scan represents a different image (or tiff file); however, during the scanning, the images can be concatenated to create one large image (file) with multiple pages (a multi-page tiff). In this case all pages together form a single document

BP - stands for **b**lack **p**ercentage. It is a black level that determines a blackness value

X-abberation - shows the indication of pixels in X direction that implies the displacement of adjusted fields in relation to the original questionnaire

Y-abberation - shows the indication of pixels in Y direction that implies the displacement of adjusted fields in relation to the original questionnaire

Codebook - a document containing list of codes used in a survey



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