Stammen, Karl-Heinz:

Manual for the Conception, Planning and Realisation of Graduate Surveys for Quality Management at Higher Education Institutions

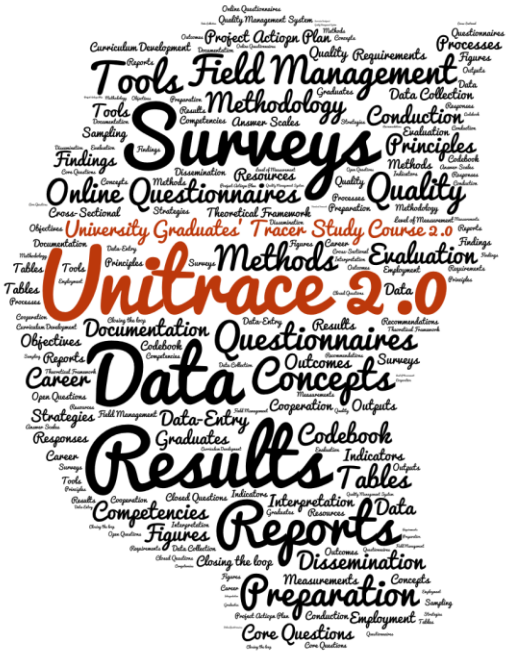
DOI: http://dx.doi.org/10.17185/duepublico/43571

URN: urn:nbn:de:hbz:464-20170327-084622-8

Link: http://duepublico.uni-duisburg-essen.de/servlets/DocumentServlet?id=43571

Manual for the Conception, Planning and Realisation of Graduate Surveys for Quality Management at Higher Education Institutions

Karl-Heinz Stammen



With financial support from the

Federal Ministry
for Economic Cooperation
and Development

Imprint

Author: Karl-Heinz Stammen

Reviewers: Prof. Omar Egesah, Dr. Choni Flöther, Dr. Mary Wahome

Edition: First edition, 2017

Publisher: DuEPublico, Duisburg/Essen, Germany

DOI: http://dx.doi.org/10.17185/duepublico/43571

Acknowledgment

This manual has been developed by academics of the University of Duisburg-Essen under the DIES (Dialogue on Innovative Higher Education Strategies) Programme conducted by the German Academic Exchange Service (DAAD) and the German Rectors' Conference (HRK). The project was funded by the Federal Ministry for Economic Cooperation and Development (BMZ). The author would like to take this opportunity to thank the DIES Programme and wishes to express his sincere gratitude to all the partners from East Africa and Germany who were involved in the development process. Without their support, the development of this guide would not have been possible.

The author also wishes to express his appreciation for the most valuable assistance and the contributions from institutional partners involved, namely
Commission for University Education (CUE), Kenya,
Inter-University Council for East Africa (IUCEA),
Moi University (Moi), Nairobi Campus, Kenya,
and all supporting members, especially Prof. Omar Egesah, Dr. Choni Flöther, Dr. Christian Ganseuer, Dr. Mareike Landmann, Prof. Loice Maru, Petra Pistor and Dr. Mary Wahome.

Last but not least the author wishes to thank all participants in the University Graduates' Tracer Study Course 2.0 (UNITRACE 2.0), namely:
Dr. Owuor Bethwell & Stephen Mailu, Catholic University of East Africa (Kenya); Rosemary Kagondu & Prof. Simmy M. Marwa, Dedan Kimathi University of Technology (Kenya); Dr. Robert Mwebi & Dr. Paul Nzioki, Laikipia University (Kenya); George Nyarango & Edwin Sang, Moi University (Kenya); Paul Wangila Barasa & Ngure Githinji, Tangaza University College (Kenya); Agnes Gachau & Bernard Lusuli, Technical University of Kenya (Kenya); Dr. Angelina Bijura & Dr. Nicholas Wachira, Aga Khan University (Tanzania); Iddi Ali Iddi & Hassan Juma, State University of Zanzibar (Tanzania); Dr. Godfrey Frederk Kimaro & Dr. Elizabeth Palela-Makawa, University of Dar es Salaam (Tanzania); Dr. Musa Matovu & Dr. Wardah Rajab-Gyagenda, Islamic University in Uganda (Uganda); Betty Enyipu Akurut & Dr. Sarah Kizza-Nkambwe, Uganda Christian University (Uganda).

The success of the course is above all due to their untiring commitment.

Karl-Heinz Stammen

Content

1. Introduction ... 7

1.1. The UNITRACE 2.0-project ... 7
1.2. Intent and purpose of a graduate tracer study and its preconditions ... 8
1.3. Work phases and tasks of a graduate tracer study ... 11
1.4. Excursus: quality development at universities by means of graduate tracer studies ... 12
1.5. The structure of this manual ... 13

2. Work phase I: conception and instrument development ... 15

2.1. Educational objectives of work phase I ... 15
2.2. Concept and methodology of graduate tracer studies ... 15
2.2.1. From conceptualization to measurement ... 15
2.2.2. Conceptual framework for graduate tracer studies ... 19
2.3. Objectives and stakeholders of graduate tracer studies ... 23
2.3.1. Objectives of graduate tracer studies ... 23
2.3.2. Relevant stakeholders of graduate tracer studies ... 24
2.4. Project management of graduate tracer studies ... 26
2.4.1. What makes a project a success? ... 26
2.4.2. Why might a project fail? ... 27
2.4.3. Project phases ... 27
2.4.4. The project manager's role ... 29
2.4.5. The planning and the management of a survey project ... 30
2.4.6. A planning tool for graduate survey projects: the project action plan ... 30
2.4.7. How to design a project action plan for graduate tracer studies ... 32
2.5. Development and survey realization ... 37
2.5.1. Quantitative and qualitative research strategies ... 37
2.5.2. Questionnaire development ... 37
2.5.3. Selecting an appropriate survey method ... 38
2.6. Types of questions ... 40
2.6.1. Open-ended questions ... 41
2.6.2. Partially close-ended question with multiple choice ... 42
2.6.3. Closed-ended question with single choice ... 42
2.6.4. Partially closed-ended question with single choice ... 43
2.6.5. Closed-ended question with a range of opinions, single choice ... 43
2.6.6. Likert items ... 44
2.6.7. Open-ended question with additional verbal instruction ... 44
2.7. Functions of questions ... 45
2.8. Question wording ... 45
2.8.1. 'Golden rules' of formulating questions ... 46
2.9. Design and layout of the questionnaire ... 48
2.10. Preparing to carry out the survey ... 49
2.10.1. Developing an address database ... 49
2.10.2. Technical aspect of carrying out a survey ... 53
2.10.2.1. Preparing an online survey ... 54
2.10.2.2. Preparing a paper-based survey ... 56
2.10.2.3. Preparing a telephone survey ... 56
2.10.2.4. Preparing a face-to-face-interview ... 57

2.10.2.5. Mixed-mode designs ... 57
2.10.3. Survey pre-tests ... 57
2.10.4. Design and content of an invitation letter ... 58
2.10.5. Timing of invitation letter and reminder ... 59
2.10.6. Graduate tracer studies and data protection ... 60
2.10.7. Incentives ... 61
2.10.8. Additional information ... 61
2.10.9. Measures to achieve a high response rate ... 62
2.10.10. Statistical population and random sampling ... 62
2.11. Determination of response rate and representativeness ... 63
2.12. Incomplete questionnaires ... 65
2.13. Checklist preparation of the fieldwork phase ... 65

3. Work phase II: data collection ... 67

3.1. Educational objectives of work phase II ... 67
3.2. Conduction of the survey ... 67
3.3. Managing the replies ... 68
3.4. Activities during the fieldwork phase ... 68
3.5. Development of a codebook ... 69

4. Work phase III: data analysis and reporting ... 72

4.1. Educational objectives of work phase III ... 72
4.2. Structuring a field report ... 72
4.3. Structuring data records ... 73
4.4. Developing an analysis plan ... 74
4.5. Getting started in SPSS ... 75
4.6. Preparation of data, data analysis and reporting ... 80
4.6.1. Data input and adjustment ... 80
4.6.2. Dealing with missing values in a descriptive analysis ... 82
4.6.3. Data analysis ... 83
4.6.4. How findings should be reported and interpreted ... 87
4.7. Further development of a graduate tracer study ... 92
4.8. Entrenching graduate tracer studies in East Africa ... 92

5. Appendix ... 93

5.1. Glossary ... 94
5.2. Example invitation letter ... 97
5.3. Example questionnaire (UNITRACE 2.0 questionnaire) ... 99
5.4. Phases and tasks of a GTS ... 116
5.5. PAP Template ... 117

References ... 119

Tables

Table 1: Operationalisation of course quality, adapted from Rindermann (1998) 19
Table 2: Stakeholder of GTS 25
Table 3: The process from research issue to question 38
Table 4: Questions for determining the appropriate survey method 40
Table 5: ‘Ten golden rules’ to formulate questions, adapted from Bryman (2004) 48
Table 6: Challenges and solutions when creating a data base 51
Table 7: Structure of an address data base section (extract) 52
Table 8: Possible problems of conducting a GTS 68
Table 9: Codebook entry of an open -ended, single choice question 70
Table 10: Codebook entry of a multiple question 71
Table 11: Analysis plan template 75
Table 12: Example of a frequency count 77
Table 13: Example of a frequency count based on a Likert scale 80
Table 14: Example of a frequency count based on a categorized variable 80
Table 15: Example of a frequency count based on a Likert scale incl. missing values 82
Table 16: Example of central tendency measures 84
Table 17: Example of a frequency count based on a metrical variable 85
Table 18: Example of a cross-tab (absolute distribution) 86
Table 19: Example of a cross-tab (percentage distribution) 86

Figures

Figure 1: Steps from operationalisation to measurement 16
Figure 2: Munich Multifactoral Model for Course Quality, adapted from Rindermann (2001) 16
Figure 3: Conceptual framework for GTS, adapted from Schomburg (2016) 20
Figure 4: Factors influencing academic success, adapted from Schomburg (2016) 21
Figure 5: Typical objectives of GTS, adapted from Schomburg (2003) 24
Figure 6: Areas of usage for GTS findings, adapted from Schomburg (2016) 26
Figure 7: Project triangle 29
Figure 8: ‘Vicious circle’ of GTS management 30
Figure 9: Open-ended question 42
Figure 10: Partially closed-ended question with multiple choice (nominal scale) 42
Figure 11: Closed-ended question with single choice (nominal scale) 43
Figure 12: Partially closed-ended question with single choice (nominal scale) 43
Figure 13: Closed-ended question with a range of opinions, single choice (ordinal scale) 43
Figure 14: Likert items (ordinal scale) 44
Figure 15: Open ended question with additional verbal instruction (interval/ratio scale) 45
Figure 16: Target group and response 64
Figure 17: Partially closed-ended question with single choice (nominal scale) 69
Figure 18: Likert items (ordinal scale) 70
Figure 20: SPSS Statistics Data Editor - Data View 76
Figure 21: SPSS Statistics Data Editor - Variable View 76
Figure 22: SPSS Statistics Syntax Editor 76
Figure 23: Likert items (ordinal scale) 79
Figure 24: Reading help from a GTS report (excerpt) 89
Figure 25: Executive summary of results (excerpt) 90

1. Introduction

1.1. The UNITRACE 2.0-project

Globalisation has created a vibrant and dynamic global market for goods and services with major impacts on Higher Education Institutions (HEI) worldwide. In Africa, the number of universities and accordingly the student population has grown tremendously over the last ten years. Against this backdrop it is a challenge for both old and newly established universities to maintain a certain quality level of teaching. In recent years quality assurance has become an important issue for internal university structures. This goes along with the increasing demand that higher education institutions should provide empirical evidence for the professional relevance of their study programs. In addition to the aspect of accountability, higher education institutions are becoming more and more interested in getting systematic feedback from their graduates.

In this context, graduate tracer studies (GTS) have become increasingly important in recent years for the evaluation of study and teaching at higher education institutions. Graduates can give a retrospective assessment of how far the contents and didactical design of their studies have fostered their knowledge and competences, particularly those qualifying them for the job market. To survey graduates is a special challenge inasmuch as target group members are usually not as easily contactable compared to students who are still physically present at the Higher Education Institution.

The University Graduates' Tracer Study Course 2.0 (UNITRACE 2.0) was conducted in 2015 and 2016 by the Centre for Higher Education Development and Quality Enhancement (CHEDQE) of the University Duisburg-Essen (UDE) in Germany and in co-operation with the Inter University Council for East Africa (IUCEA) and the Kenya Commission for University Education (CUE). The overall objective of UNITRACE 2.0 was to develop the skills of university administrators/managers and academics with the aim of enabling them to design, implement and analyse graduate tracer studies as part of the internal quality assurance systems. The training course was part of and financed through funds of the DIES course programme of the German Academic Exchange Service (DAAD). The UNITRACE 2.0 programme succeeds the DIES UNITRACE training conducted from 2007-2013 at the International Centre for Higher Education Research (INCHER) of the University of Kassel. While the first UNITRACE training was offered to participants from Central America, South East Asia and Eastern Africa, UNITRACE 2.0 exclusively drew its participants from higher education institutions in East Africa.

UNITRACE 2.0 targeted teams of two staff members from higher education institutions in East Africa who were responsible for the realisation of the graduate tracer studies: Pairs with one skilled in research methodology including statistics and the other one an expert in higher education policies. The participants were trained by experienced East African and German academics in the major

aspects of the studies such as the development of questionnaires based on relevant theories and specific research questions, research methodology, organization of the fieldwork, methodology to achieve a high response rate, data entry and data editing, coding, data analysis as well as interpretation and dissemination of findings and reporting.

The training programme took 1 year, starting in October 2015 and finishing in October 2016. It consisted of four workshops at the Nairobi Campus of Moi University (Kenya) and two online mentorships. The training was hands-on with a strong bias towards demonstrations and application. Participants developed and implemented a project action plan (PAP) during the training and by use of the PAP tool, they successfully applied GTS-theory to practice. It was requested that participants implement a graduate tracer study parallel to their training workshops. Both university delegates as paired up were expected to attend the whole series of four training workshops in order to assure that both independently gained a deep understanding of all aspects of a tracer study and hence would be able to support each other during the training and in the future. Teams from the following universities successfully completed the training: Catholic University of East Africa (Kenya); Laikipia University (Kenya); Moi University (Kenya); Tangaza University College (Kenya); Technical University of Kenya; Aga Khan University (Tanzania); University of Dar es Salaam (Tanzania); State University of Zanzibar (Tanzania); Uganda Christian University; Islamic University in Uganda (Uganda).

1.2. Intent and purpose of a graduate tracer study and its preconditions

There is no commonly accepted label for the research of issues related to graduates. ‘Graduate tracer study’ (14,600 Google hits), ‘Alumni research’ (354,000 Google hits) or ‘Follow-up study’ (479,000 Google hits)[1] all have the same intent. Schomburg (2016, p. 18) defines it thus:

> A tracer study or graduate survey is a standardised survey (in written or oral form) of graduates from education institutions, which takes place some time after graduation or the end of the training. The subjects of a tracer study can be manifold, but common topics include questions on study progress, the transition to work, work entrance, job career, use of learned competencies, current occupation and bonds to the education institution (school, centre, university).

The manual employs the term ‘graduate tracer study’ (GTS) since the UNITRACE 2. GTS is based on surveys of graduates from higher education institutions taken some months (or years) after their graduation. The GTS mainly aims at finding out

- which professional or general activities are being pursued after graduation,
- how is the transition process from tertiary education to occupation,
- if the professional activity fits to the educational profile, and

[1] Results of a search on google.com in November 2016.

- how graduates assess their studies with hindsight.

The timely questioning of former students would primarily reflect on their educational courses. However, the questionnaire may also take subject-specific aspects into account. Their feedback is an important source of information necessary to adjust the academic framework to the needs of current and future students. The findings from a GTS might be transmitted to faculties or central administration by means of (subject-specific) oral or written reports, tables and statistics etc. (cf. Chapter 4.6.4) and they offer multiple starting points for the university's development and the improvement of services provided:

- The list of key and supplement qualifications provided might be selectively adjusted based on survey findings.
- The study and job history of interviewed persons might help to improve the university's study and career services.
- For the review and further development of degree courses, faculties might check if the intended transfer of knowledge and competencies match the graduate's professional needs.
- The findings might be used for the (re-)accrediting process of a university course / programme.

In order to successfully execute a graduate survey, those in charge of carrying it out must have, or must be willing to acquire, a good understanding of higher education policy as well as a good knowledge of methodology and techniques of the empirical social sciences:

- The latter knowledge is beneficial for the professional design of a questionnaire and the relevant data collection.
- A good understanding of higher education policy issues (e.g. the development of a curriculum, quality assurance and accreditation) is necessary in order to identify a set of relevant data and to disseminate results to those parties who can make use of it.
- Knowledge of the principles and experience with the processes of project management might help with the steering of the survey project, reaching milestones on time and meeting challenges. This can be quite useful in preparation of the GTS project action plan (PAP).
- Advanced application knowledge of word processing software (e.g. MS-Word or comparable software) is helpful for the preparation of a questionnaire and for the administration and processing of collected data.
- Some knowledge of (recent) data-collecting techniques such as telephone or online interview helps to collect data in a way most relevant to the target-group and resource-saving way.

- Advanced application knowledge of the IBM SPSS software (incl. the generation of SPSS-syntaxes, cf. Chapter 4.5) or similar software for the statistical analysis of empirical data is necessary, as is a profound knowledge of basic statistical methods for the analysis of a database.

An adequate time schedule and sufficient financial resources provided by the commissioning authority (e.g. the university's directorate) are further indispensable success factors for a GTS. Sometimes it can be a challenge to obtain the necessary 'goodwill' from the university administration. A higher education institution must understand the value of a GTS and incorporate the instrument in all their policy documents e.g. mission, vision, core values and objectives (Egesah, Wahome, Langat, & Wishitemi, 2014). This might find its expression in the inclusion of GTS in budgets and internal procedures.

It has to be observed that it takes at least a year - starting from its conception until the analysis of findings – to successfully carry out a GTS, a process which is never without cost. A budget must be calculated individually for each university and each project since its size is highly influenced by staff costs, which in turn depends on the number of project team members and their hourly commitment as well as data collection costs, which in turn depend on sample size (e.g. the number of interviews), the type and quality of an alumni database, the questioning method applied as well as expenses for software, telecommunication and travel (Schomburg, 2016). Clearly, online GTS surveys are proving to be relatively cheaper to execute compared to paper surveys.

A first time survey in particular has its challenges inasmuch that basic but necessary groundwork needs to be done. For instance, an alumni database with a comprehensive and central address register needs to be created or a survey software accessed in order to carry out online-interviews or to record paper questionnaires. The time and funds necessary to create such a database and to implement and get such a survey/analysis software operational need to be taken into account individually, and required budgets might differ highly for each university. To support a GTS, a university should initiate a functional process for relevant entities (e.g. admissions office, faculties or schools, departments, alumni office) in order to create and maintain an alumni contact database.

1.3. Work phases and tasks of a graduate tracer study

Graduate tracer studies comprise the following three work phases of approximately four months duration each (Schomburg, 2016):

Work phase I: Concept and instrument development; preparation of data collection.
Work phase II: Data collection with reminder actions.
Work phase III: Data analysis and report writing; dissemination activities.

Work phase I tasks:

- specification of aims and concept, coordination, planning, organization;
- questionnaire development / adaption, testing (incl. technical concept for carrying out the survey, formulation of questions/response items, formatting of questionnaire);
- lobbying for goodwill and all forms of support from university management and relevant offices. This may also include debriefs and short training of people to aid in the survey implementation;
- procuring addresses and preparation of fieldwork phase (incl. printing of questionnaires and dispatching other material).

Work phase II tasks:

- conducting the survey and checking of questionnaires returned (incl. training of survey team, assurance of high response rate);
- development of a codebook.

Work phase III tasks:

- coding of open responses, data entry and data editing (quality control);
- data analysis (frequencies, tables, charts). This may involve complex analyses relating more than one variables of interest;
- interpretation of findings to introduce meanings to results;
- report writing;
- presentation of results, discussion and revision, including strategic dissemination of some results obtained from the survey;
- correction and revision of the publication.

The allocation of a four-month time slot for each working phase can only be approximate especially since working phase I and III might be more time consuming when carrying out a survey for the first time.

1.4. Excursus: quality development at universities by means of graduate tracer studies

It has already become apparent that the information generated through a GTS should feed into the university's quality management and thus not only will quality standards be assured but quality levels can be improved where necessary. But what is the core meaning of terms such as 'quality', 'quality assurance' and 'quality development'?

The understanding of what makes up a university's qualities appears to depend on the assessor's individual circumstances since students, teachers, employers, government, sponsors and the public each have a highly subjective approach to assess the quality of academic study and teaching, depending on the one hand on the aims and impact, and on the other hand to what extent these targets were met or measures had the desired effects. Hence, the initial step for a university quality management is to define certain quality targets on the one hand and to map out a strategy to achieve those targets on the other hand. This process of continuous improvement is reflected in the Plan-Do-Check-Act (PDCA) cycle[2], a concept which serves as a basic tool for the quality management of organizations, institutions, programmes, processes and projects focusing on continuous improvement. Hence, a PDCA cycle – the basic formula of quality management also for universities – is instrumental for a continuous quality improvement rather than a mere quality assurance. The design of a course shall illustrate how a PDCA cycle may work. An initial definition of course objectives is the starting point for conceiving this course module in accordance with existing standards and qualification targets of the study course module handbook (Plan). The study course is then taught according to plan (Do) and receives a concluding student evaluation (Check). A discussion of survey results with students is highly recommended in order to identify possible needs for course adjustments. Examination results might give further clues as to whether educational objectives have been achieved. Certain measures might be taken and improvements might be introduced to future courses if educational results deviate from previously defined objectives (Act). One option might be to improve education didactics through teacher training courses and amend the concept of a course accordingly. The PDCA cycle would then start again in order to check the effectiveness of this measure.

Being a target-oriented technique, quality development shall hence work towards raising quality levels as part of a general development process which is not insignificant since this process needs a commonly accepted understanding of quality that must translate into the daily work routine. Only then can a culture of quality emerge where individuals embrace their responsibility to contribute to comprehensive and overarching quality development initiatives.

In the example of the course, the teacher must be willing to make personal improvements in the first place but also students must be prepared to give constructive feedback and discuss their

[2] https://www.deming.org/theman/theories/pdsacycle

evaluation rendered. Last but not least the educational institution must support its teaching personnel to reflect on and improve teaching didactics. Without support in the form of teaching didactic evaluation and training for example, an existing quality level might at most be maintained but not improved.

In summary the following elements constitute the basis of a quality development process:

- predefined quality targets,
- a mutually accepted understanding of quality,
- a willingness to contribute to comprehensive and overarching quality improvement initiatives, as well as
- the possibility to introduce and carry out PDCA cycles.

If GTS are used for the university quality management, the Check component of a PDCA cycle requires certain data and information in order to systematically assess if quality targets have been met. If targets are missed GTS results should give clues as to what measures aiming at quality improvement should be taken (Act). These measures need to be defined (Plan), implemented (Do) and their efficiency tested (Check) which might initiate a further PDCA cycle.

1.5. The structure of this manual

This manual has been conceived and developed for university staff to aid carrying out graduate surveys to support the quality management of academic study and teaching. It describes and structures the stages of and requirements for such surveys in a way that a GTS might be carried out by an educational institution using internal resources and without external help. This manual is a practical guide and a result of the UNITRACE 2.0 training programme. The author tried to include all his practical experiences acquired during facilitation of the training course on carrying out graduate tracer studies in East African countries with a focus especially on GTS project management. The reader must remember that during the one year training course, the trainees prepared and conducted GTS at their respective universities and thus the author writes from a vantage point full of experiences reported by participants in conducting their first GTS. This manual is structured in chapters dedicated to each working phase of a GTS with the aim to describe the tasks and convey the knowledge and skills required in an action-orientated way. Where applicable, technical terms used in the social sciences are explained and good-practise examples are given to facilitate easy understanding of the processes described in the manual. The author's approach includes an introduction of the manual user to GTS project management in order to enable even a person without prior GTS experience to design and carry-out such a survey and perform a basic analysis of its findings. It goes without saying that this manual is not a substitute for a study course in social sciences. The reader has to be proactive in order to acquire further knowledge and deeper under-

standing of an issue if deemed necessary. The author, however, supports the reader's own study initiatives by referring to suitable literature for further reading.
This manual also has its limits inasmuch that its recommendations and the guidance given for carrying out a GTS in East African countries are not universally applicable. Experience has shown that the process of carrying out a graduate survey is similar for most educational institutions but might, however differ considerably in certain respects and contexts. For instance, the initiation of a process appears to be more difficult at larger universities compared to smaller ones. Furthermore, the East African study environment offers unique platforms that we may not generalise from in practical sense, to other parts of the world.

A glossary of technical terms used, an exemplary invitation letter to a questionnaire as well as the questionnaire developed as part of the UNITRACE 2.0 programme, a summary of the GTS working phases and several planning aids can be found in the appendix to this manual.

2. Work phase I: conception and instrument development

2.1. Educational objectives of work phase I

The following chapters will elaborate on

- …the conceptual framework for a GTS;
- …targets and objectives a GTS might have;
- …the relevant stakeholders in a GTS;
- …possible influencing factors for academic success;
- …how the project management for a successful GTS might look;
- …how Project-Action Plans (PAP) might be employed in the design and management of a GTS;
- …how to select a suitable survey methodology;
- …‘Golden Rules’ of how to phrase questions;
- …the design and creation of an address data base;
- …the technical implementation of a GTS;
- …how the response rate is calculated and construed;
- …how to push-up and maximise the response rate.

2.2. Concept and methodology of graduate tracer studies

2.2.1. From conceptualization to measurement

A survey is often also described as measurement because it is part of a scientific process to collect data (Groves et al., 2009). Considering measurements in daily life, it is rather easy to carry them out: in fact, we do it every day, for example, the average rainfall in litre per square meter, the quantity of rice we need for our favourite meal or the size of our children in centimetres. Such measurements differ from data collection because they are based on a structured design and a structured scale. For example, a body height of 1.75 metres can be expressed as 175 centimetres, based on the metrical scale. But how do we proceed, if we want to find out about the quality of study programmes at our higher education institution? Are we able to measure the quality of study programmes in such an easy way? The answer is: yes, because we can measure everything (Babbie, 2004)! This sounds easier than it really is. Very often, we do not know exactly what is to be measured. When talking about ‘the quality of study programmes’, it is an issue that we all link with different perceptions or ideas. Furthermore, we are not able to touch or see these ideas, which means that we cannot directly observe or measure them (Pistor & Stammen, 2017).

The fundamental basis of data collection (and with it also of measurement) is a concept. Based on this, the first step of measurement is to develop an idea (or concept) that is accepted generally. The process of coming to a joint understanding about the meaning of a term is called conceptualisation, and the result is called a concept. Specific aspects of a concept are called dimensions (Babbie, 2004; Bryman, 2004). The second step is to translate this idea in such a way that the intangible concept becomes measurable. For reasons of complexity, this process may involve having to divide our concept into different components or dimensions. This 'translation' is called operationalisation.

Figure 1: Steps from operationalisation to measurement

During the operationalization we look for criteria that are tangible or measurable, and thereby quantifiable. Such criteria are also known as indicators because they indicate something about a concept and its dimensions, and with it they have a logical link with the concept. Indicators stand for the concept and we use them to tap concepts that are not directly quantifiable.

To make indicators quantifiable and measurable, we have to convert them in a third step into variables (Bryman, 2004; Babbie, 2004). Variables can have different values that are connected in a logical way. For example, the variable 'gender' can have the values 'male' or 'female'.

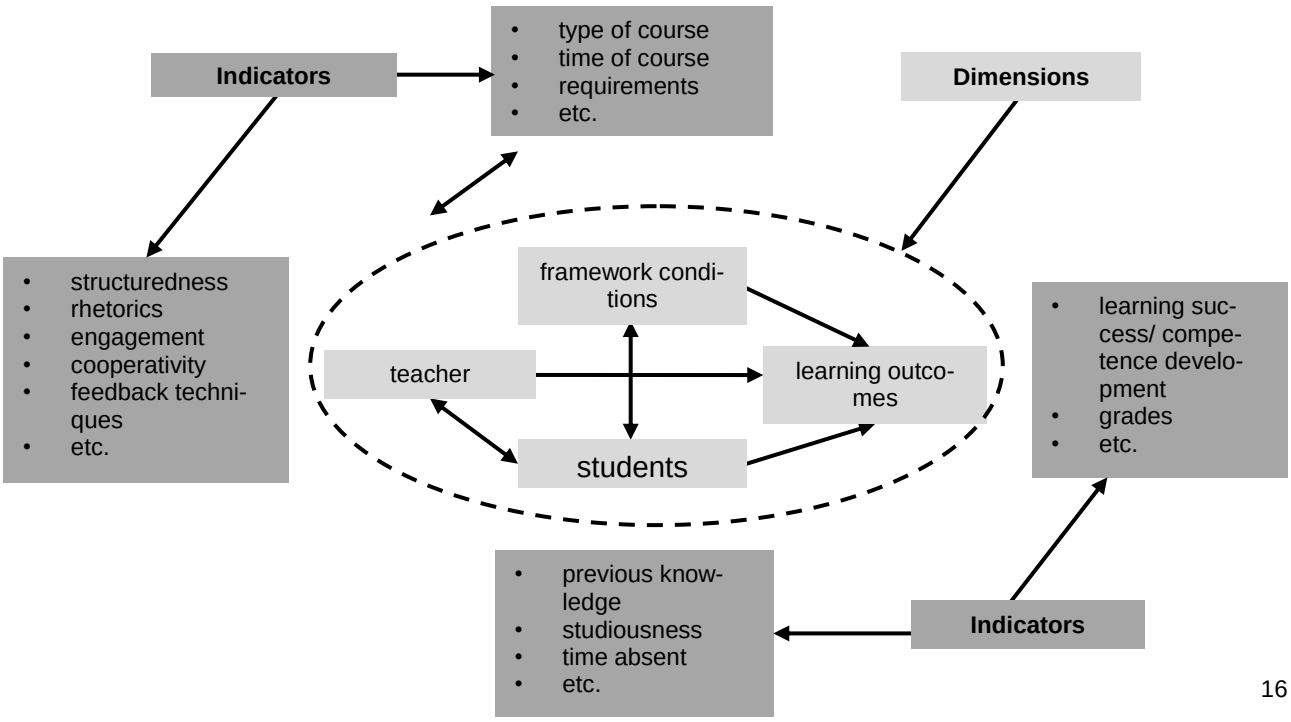


Figure 2: Munich Multifactoral Model for Course Quality, adapted from Rindermann (2001)

The following example describes the process of operationalization (Pistor & Stammen, 2017). The *Munich Multifactorial Model for Course Quality* by German psychologist Heiner Rindermann (Rindermann, 1998, 2009) is an attempt to systemize the factors that have an influence on the success of a course – or in other words on its quality. Up to now, there is no scientifically based model to assess teaching quality. For example, in a model from Rindermann, it is an indicator of good teaching if students achieve certain learning outcomes at the end of a course. Based on this, the success of a course depends on a positive influence on learning outcomes. We will use this influence as a first dimension of our concept. In summary, Rindermann assumes that three dimensions contribute to the achievement of learning outcomes and thus to successful teaching and learning: the capabilities and behaviour of the teacher (e.g. speaks clearly and comprehensibly), the capabilities and behaviour of the students (e.g. contribute actively to the discussions in the course) and the framework conditions within which the course takes place (e.g. course has 10 students). These dimensions again can be operationalised and transferred to different indicators and thus can be used in a survey. Therefore, we still have to differentiate the indicators, so that they deliver concrete measurable results. The level of differentiation can refer to the conclusion that a certain aspect exists or does not exist (e.g. question: 'Have tools for preparation and revision (such as scripts, slides, e-learning services) been provided?' Answer options: 'yes' or 'no'. It also can refer to determining the degree or extent of a certain aspect (e.g. question: 'How much time did you spend on preparation or assignments for the course last week?' Answer option: 'Please fill in numbers'.

The following table gives an overview on how to operationalise the dimensions, defined by Rindermann, and translate them into indicators. Please note that an indicator can be described by different questions. For example, in order to get to know more about the students' commitment in a particular course, you can ask how students' presentations are perceived by their fellows, or how students judge their active participation in the course, or whether group work is perceived to be fruitful etc.

Dimension	**Indicator**	**Example questions/statements in a student survey / variables**
Teacher's performance	structuredness	✓ The learning objectives are made clear. ✓ The course requirements are clearly communicated. ✓ The content of the individual session is coherent and integrated into a broader context of the subject matter. ✓ …
	rethorics	✓ The lecturer speaks clearly and understandably. ✓ The content of the course is presented in an understandable way. ✓ Teaching methods and techniques of learning are used appropriately.

		✓ I can easily keep up with the presentation of course content and the related tasks. ✓ …
	engagement	The lecturer... ✓ ...seems to be well-prepared for the individual sessions. ✓ ...shows real interest in students' learning success. ✓ ...facilitates students' questions and active participation. ✓ ...answers questions or remarks of the students appropriately. ✓ ...creates a constructive learning environment. ✓ ...is sufficiently available for queries or additional advice (if needed). ✓ …
Students	previous knowledge	✓ The contents of the course relate to my previous knowledge. ✓ …
	students' engagement	I think most of the students in this course... ✓ ...attend the individual sessions regularly. ✓ ...are prepared adequately for the individual sessions. ✓ ...participate actively as far as possible. ✓ ...follow the course with interest and attention. ✓ ...contribute sufficiently to the course's success. ✓ …
Framework conditions	room conditions	✓ The number of students in relation to the room size is acceptable. ✓ The equipment of the learning area (furniture, media technology, design of a learning platform as part of e-learning etc.) seems to be useful. ✓ …
	requirements of the course	✓ I can fulfil the requirements of the course (preparation and post-processing, active participation). ✓ Generally, I can fulfil the required preparation and assignments for the course within my time schedule. ✓ …
Learning outcomes	competence development	The course helps me to... ✓ ...present basic facts and concepts in the subject area of the course. ✓ ...be able to work on typical questions or problems of the subject area of the course. ✓ ...critically discuss limits and possibilities of the subject area. ✓ ...improve my learning methods. ✓ ...improve my competency of self-regulated working/studying. ✓ ...raise my interest in the subject area. ✓ … ✓ The course content is related to the occupational field and

		the application of knowledge. ✓ The learning arrangement enables me to deepen my understanding of the course content individually. ✓ …

Table 1: Operationalisation of course quality, adapted from Rindermann (1998)

2.2.2. Conceptual framework for graduate tracer studies

GTS provide an opportunity for an ex-post quality assessment of a university's teaching and classes by means of analysing the further study and professional vitae of alumni who, after graduation, are in a unique position to review their degree course against the backdrop of their current personal and professional situation. The graduates' feedback about experience and expertise gained during their studies may help a higher educational institution (HEI) to assess the quality of its degrees and the contributing factors for a successful entry into professional life. The alumni may for example

- evaluate their degree courses with hindsight,
- give information on their current occupation and field of work,
- describe how their current work relates to their university education, and
- assess the relevance of the expertise and know-how gained at university for their current career path.

Graduate Tracer Studies may have a significant role in the evaluation of a university's degree programmes since they provide valuable clues as to the fitness of graduates for professional life as well as to the quality of degree courses and services provided by the university. Being an element of a university's institutional research a GTS must fulfil scientific requirements in order to empirically uncover possible shortfalls and to be a reliable basis for future planning. Relevant topics for a GTS are therefore issues like professional success (career, status, income), the relevance of acquired knowledge and skills (relationship between knowledge and skills and work requirements, area of employment, professional position) as well as the assessment of study conditions and services provided.

Are the academic courses offered appropriate and successful? is one of the key questions to be answered by means of a GTS and information on the educational output (e.g. acquired knowledge, skills, grades) as well as the outcome (the graduates' transition from education to employment, employment, service to society etc.) is needed. It is, however, too short-sighted to capture output and outcome only and to conclude on the quality of a course solely on this base. Higher education is, after all, a complex process influenced by factors determined both by students (e.g. socio-demographic aspects, experience) and the HEI (e.g. study conditions, curricula, contexts and envi-

ronments, facilities). Therefore, the evaluation of a degree course must take into account the local labour market, regional characteristics, socio-economic development and personal specifics. East Africa HEIs are continually challenged to ensure relevance of study programmes to the job market.

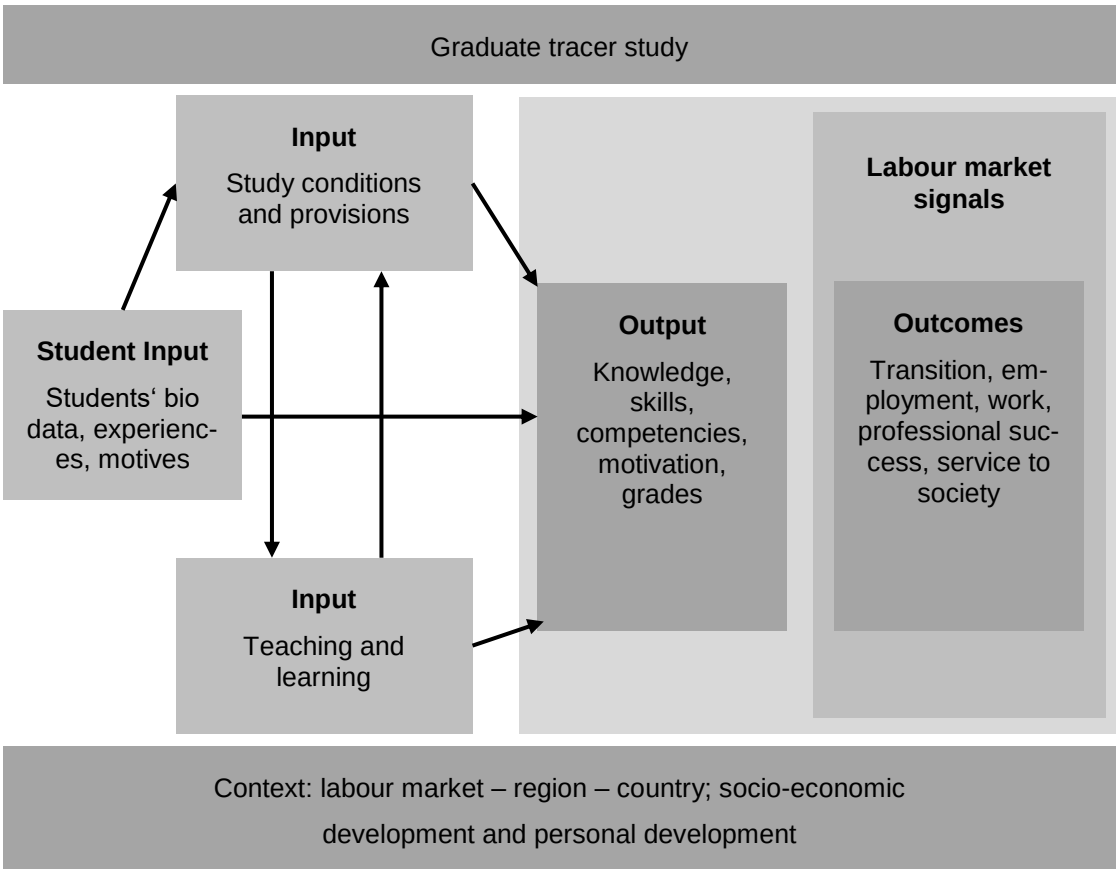


Figure 3: Conceptual framework for GTS, adapted from Schomburg (2016)

In order to evaluate degree courses by means of GTS the factors which might indicate a successful programme need to be identified. These could be the graduates' job search duration, employment status, income, position, hierarchy level match, field of study match, work autonomy, job satisfaction, etc. However, the extent of professional success might also partially be explained by various individual and structural factors outside the university's sphere of influence such as the labour market, regional mobility, individual motivation, etc. which have to be taken into account. For instance, a successful graduate might still be unemployed or be earning a salary below his/her educational potential due to an unfavourable labour market (a structural factor) or due to his/her unwillingness to relocate for a new job (an individual factor). In other words, individual professional accomplishment might be the consequence of a higher education but this is not necessarily so. Personal networks might also play an important role for an individual career path which leads to the question which elements of a higher education might have a concrete influence on the academic success.

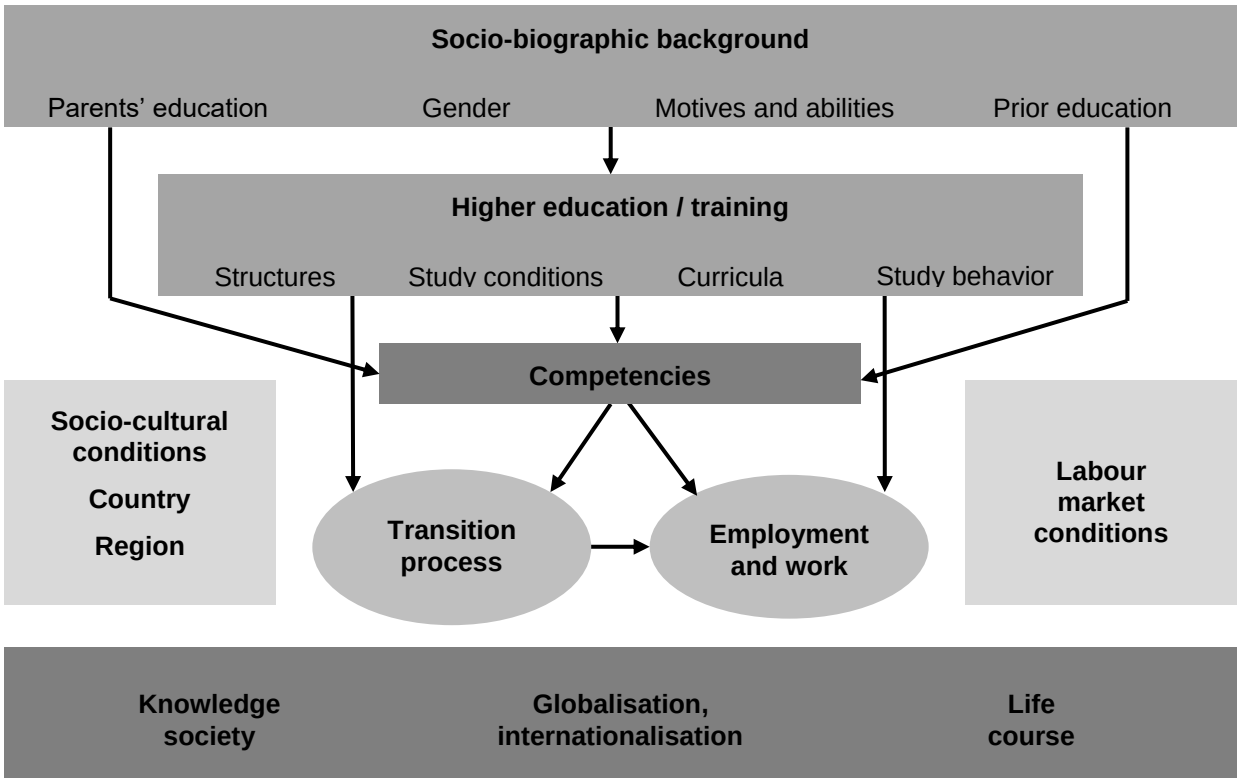


Figure 4: Factors influencing academic success, adapted from Schomburg (2016)

A GTS which aims at improving the degree courses should not only focus on (educational) output and (career) outcome but needs also to regard the university's teaching and learning processes as well as the contextual factors. The output quality may, in principle, also be objectively expressed by means of higher education statistical data such as:

- student/teacher ratio and number of graduates;
- grades;
- cohort ratio of graduates who finished their studies within the designated period of time.

It has to be observed that such metrics require a contextual analysis as well. For instance, a student without any financial obligations or without the need to finance his living will find it easier to graduate within the designated period of time.

The following dimensions might be suitable for determining educational output:

- Possession of knowledge and skills upon graduation, e.g.
  - expert knowledge connected to the field of study;
  - ability to apply scientific methods;
  - ability to develop new ideas and solutions;
  - ability to productively work in a team.

Both objective metrics and subjective assessments derived from a GTS might be used to determine the outcome:

- Objective measures for transitional period and professional success, e.g.
  - period of job search;
  - number of successful / unsuccessful applications;
  - employment characteristics (full-time / part-time);
  - income;
  - position within the company.

- Subjective indicators for job satisfaction and the relationship between study and profession, e.g.
  - overall satisfaction;
  - appropriateness of position to level of education;
  - extent of use of acquired knowledge and skills within the job.

The following assessments derived from a GTS might be suitable for assessing the university input:

- Valuation of the process of study and study progress, e.g.
  - special emphasis on particular teaching methods (e.g. problem-based, e-learning);
  - internships, time abroad;
  - acquisition of scientific work methods, foreign language skills, ‘soft skills’;
  - time period of study, problems in course of study.

- Assessment of study conditions, e.g.
  - schedule and coordination of courses;
  - advice and guidance by teaching staff;
  - access to literature, laboratories;
  - sources of income during course of study;
  - support with employment search.

Individual admission requirements might be derived from a GTS by gathering information on, e.g.

- individual prerequisites of student;
- age, gender, nationality;
- place and time of attainment of higher education entrance qualification;
- type of entrance qualification;
- type of school attended before;

- professional trainings;
- family background;
- disabilities, chronic diseases.

2.3. Objectives and stakeholders of graduate tracer studies

2.3.1. Objectives of graduate tracer studies

It goes without saying that it is a prime objective of higher education to prepare students for a future occupation. It has already been mentioned that a GTS aims in its essence to gather information which might give clues as to what could or must be changed and which can be used for improving and progressing the quality of teaching at universities.

The main goals pursued with the use of GTS generated data can be summarized as follows:

1. evaluation & (internal) quality development (e.g. degree programme evaluation and curriculum development; retrospective assessment of study process and study conditions; assessment of relationship between qualifications acquired during course of study and needed in job),
2. external quality management (to contribute to the accreditation process),
3. to evaluate the relevance of higher education (e.g. to contribute to study reforms; information about the whereabouts of the graduates; information about requirements of the job market), and
4. information and consulting (e.g. career service; student / parent counselling; dialogue with job market / developmental planning; alumni work).

A graduate survey should hence give answers to the following questions (Schomburg, 2016):

- What happens to graduates after leaving the education/training institution?
- Were they able to get paid employment in an acceptable period of time?
- Do they use the skills and knowledge they have gained in the education/training institution? If not, what are the reasons?
- What are the skills and competencies demanded in the labour market?

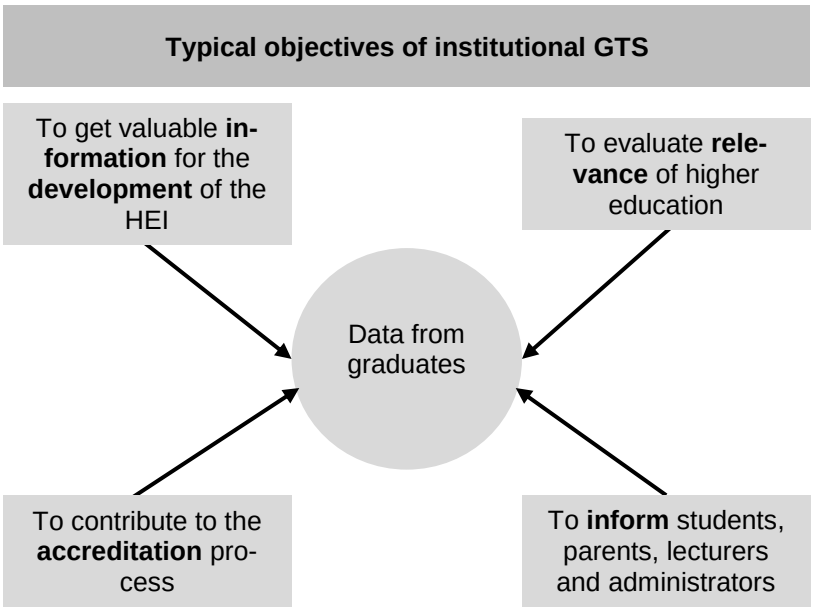


Figure 5: Typical objectives of GTS, adapted from Schomburg (2003)

Even if a GTS might pursue a multitude of goals and might be analysed from different angles, it remains important to keep in mind that

- study conditions, for instance, are being assessed in retrospective and a description might be distorted since the respondent graduate has become unaware of certain aspects or overrates some single issues,
- a complex multivariate data analysis is necessary in order to analyse, for instance, the relationship between input / process on the one hand and output / outcome on the other,
- it is quite ambitious to thoroughly examine the relationship between qualifications acquired during the course of study and those needed in the job.

2.3.2. Relevant stakeholders of graduate tracer studies

Since GTS are part of an evaluation procedure targeting teaching and study and since serving the university's quality management, they generate information primarily about the processes and the output of teaching and study. But the compilation of information and the generation of knowledge about a topic is not an objective in itself. In fact, the information collected and the knowledge gained can serve as a basis for analysis and the formation of deep insight (causalities and backgrounds) into a subject matter and the deduction of measures for improvement. Information and data gathered during an evaluation can be fundamental to the dialogue between different stakeholders and the person in charge of a measure. This dialogue provides the opportunity to analyse the information and data-base respecting different perspectives and to jointly develop adequate measures for improvement (Pistor & Stammen, 2017).

Who are possible stakeholders of a GTS? Considering the objectives of a graduate survey, the UNITRACE 2.0 training course identified the following internal and external stakeholders:

Stakeholder	
Internal	**External**
University management / council / senate	Government / education ministry
Quality control directorate / quality management	University commissions (global, country, region) / statutory & regulatory bodies
Deans / faculties / departments	Employers / employer federations
Head of academic departments / programmes	Graduates / alumni
Registrar	Parents / university aspirants
Academic board	Sponsors
School of research / research departments	Schools
Researchers / academic staff	Research community
Current students	Quality assurance networks
	Professional bodies / peer institutions
	Human resource practitioners / firms

Table 2: Stakeholder of GTS

There is a striking multitude of actors which might be even larger than the list above (Schomburg, 2016). Target groups and important protagonists with differing requirements as to the quality of the university's processes and products are numerous. The university is confronted with a variety of expectations from the public sector, teaching staff, students, parents and researchers which might lead to an inconsistent set of definitions for quality and to conflicting stakeholders' demands. Whereas a university usually regards a low dropout rate and a minimum length of study as an indicator of quality, students might put an emphasis on small classes, individual advisory service and courses with a high degree of individual subject choices (Pistor & Stammen, 2017).

The purpose and the selection of survey data to be raised might also differ with each single stakeholder and the wish to acquire new insights on various aspects of academic life such as alumni activities, internal quality management, the evaluation of an academic reform, academic and occupational related research, etc. might overload a GTS. Hence, it is indispensable to be aware of all stakeholder interests, to collect their requirements and, if necessary, to prioritize when designing the survey questionnaire.

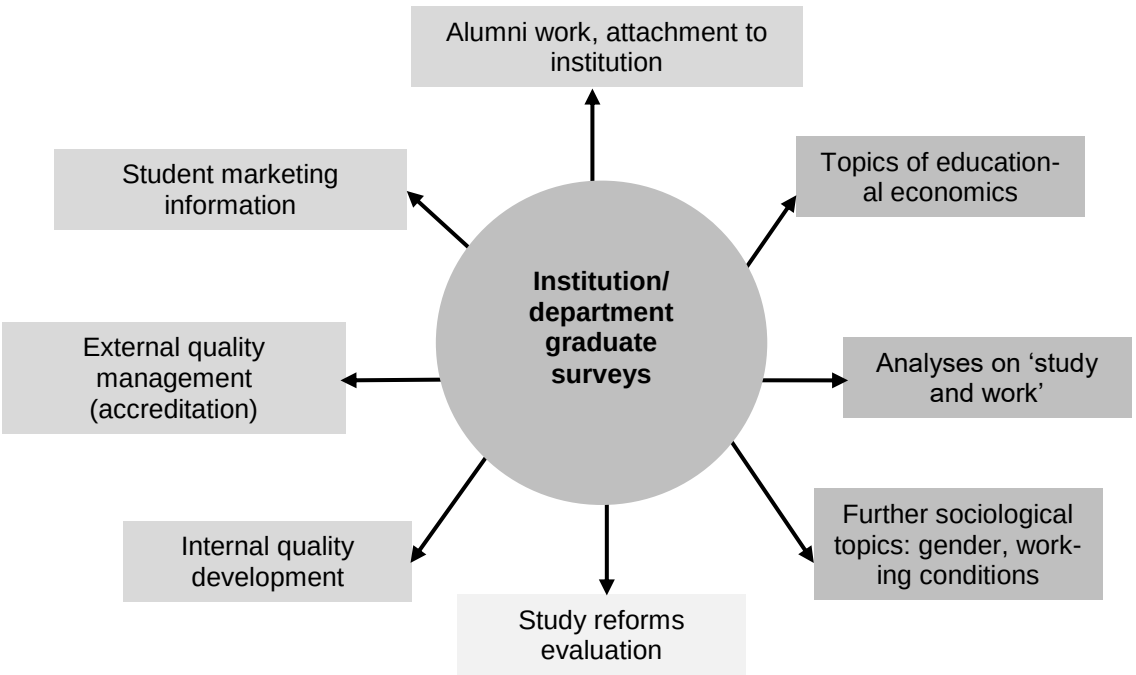


Figure 6: Areas of usage for GTS findings, adapted from Schomburg (2016)

2.4. Project management of graduate tracer studies

It goes without saying that carrying out a graduate survey is, like any empirical survey, a project which needs to be appropriately planned and managed. Therefore it makes sense to consider the essence of a project in general: A project is 'a temporary endeavour designed to produce a unique product, service or result with a defined beginning and end, undertaken to meet unique goals and objectives' (A guide to the project management body of knowledge, 2013). In other words, innovation as well as time and resource restrictions are characteristics of all projects. Sensible project planning is thus the key factor for a project to succeed under these circumstances.

2.4.1. What makes a project a success?

A project is regarded as successful if it (Department for Business Enterprise & Regulatory Reform, 2010):

- delivers the outcomes and benefits required by the organization, its delivery partners and other stakeholder organizations;
- creates and implements deliverables that meet agreed requirements;
- meets time targets;
- stays within financial budgets;
- involves all the right people;
- makes best use of resources in the organization and elsewhere;

- takes account of changes in the way the organization operates;
- manages any risks that could jeopardize success;
- takes into account the needs of staff and other stakeholders who will be impacted by the changes brought about by the project.

Considering the requirements above it is not easy to successfully carry out a project such as a graduate survey which might be a complex process full of unexpected occurrences. This is especially true if a university carries out a GTS for the first time. However, a routine might evolve if further regular surveys are required say for accreditation purposes.

2.4.2. Why might a project fail?

Typical reasons for a project to fail are (Department for Business Enterprise & Regulatory Reform, 2010):

- failure to take into account the needs and influences of stakeholders;
- failure to communicate and keep the stakeholders informed of developments;
- lack of attention to the impact of project work on the normal business of the organization;
- using expensive 'gold plated' solutions when simple workable products would suffice;
- failure to identify and deal with the many risks that can affect achievement of project objectives;
- insufficient attention to planning, monitoring and control of the work of the project.

A sensitive risk management is thus an integral part of a professional project management with the aim to identify risks and resistance early on, to discuss those issues within the project team and with stakeholders concerned, and to jointly find a feasible solution if problems occur.

2.4.3. Project phases

A project can be generally structured into distinct phases which are as follows:

Project Phase 1) Project Initiation

Basic work such as clarifying the need to carry out a project and its feasibility is typical for this phase. For instance, a GTS might be a condition for the accreditation of a degree course. As the feasibility of a GTS is highly dependent on the availability of resources a project is normally outlined first and the blueprint is then proposed to the university's directorate for a decision on the release of funds. Such a blueprint should therefore illustrate and give information on (Department for Business Enterprise & Regulatory Reform, 2010):

- the reasons for the project;

- desired benefits and who will realise them;
- the scope – what’s in and what's out?
- objectives - achievable and measurable (SMART, cf. Chapter 2.4.6);
- the background - why does this project need to be done and why now?
- constraints that must be taken into consideration during the project;
- assumptions;
- any known risks;
- dependencies on other projects/activities/decisions;
- stakeholders (internal and external);
- deliverables/outcomes;
- estimated timescale;
- estimates for resources required;
- lessons learned from similar projects and/or from people who have done similar projects.

Since the blueprint is the starting point for a detailed project plan, it is worth thinking it out well. Considering the following questions might be helpful:

- Why should I start this project?
- What do I want to achieve?
- What are the project milestones[3] and objectives?
- What do I need to reach these milestones and objectives?
- Which resources are required?
- Who are the stakeholders?
- Who should be involved and how?
- What are the potential risks for the project?

If the university’s directorate gives its approval to the project it also has to ensure that it can be carried out successfully. Necessary resources are to be made available and the project should be explicitly supported in the university’s agenda (cf. Chapter 1.2).

Project Phase 2) Project Planning

Based on the blueprint, the project now needs to be planned and structured in detail. A project manager needs to be appointed and responsibilities need to be assigned. It makes sense to select a project manager with good knowledge of higher education policy issues (e.g. curriculum development, quality assurance and accreditation) and with methodological expertise of the empirical social sciences (cf. Chapter 1.2). If the project manager lacks such knowledge and expertise, the

[3] Milestones mark the completion of important tasks in a project, which are essential for the success of a project.

other project team members have to make up for it. The project's success could otherwise be in danger since inherent risks might be overlooked or underestimated when detailing the project plan. Finally a detailed budget must be determined and resources need to be allocated.

Project Phase 3) Project Execution

The main goal during the third project phase is to carry out the planned activities on time and remain within the allocated resource budget. Experience with previous GTS has shown, however, that it is unlikely that all activities can be carried out as scheduled. For instance, interviews cannot be conducted if the questionnaire has not yet been completed. However, unexpected deviations from the plan do not necessarily mean a project failure. It is up to the project manager to anticipate problems and delays early on and to find and implement possible solutions.

Project Phase 4) Project Closure

During this phase, which marks the formal project completion, GTS findings are presented to stakeholders and project goals are reviewed. This is usually done by means of a project report which documents the project process as well as project results.

2.4.4. The project manager's role

The project manager plays a key role when a project is being carried out. It is his/her responsibility

- to plan the project,
- to monitor project execution as well as the use of time and resources,
- to ensure project quality,
- to communicate with all relevant stakeholders,
- to manage risk,
- to continuously review and adapt the project plan if necessary, and
- to document the project.

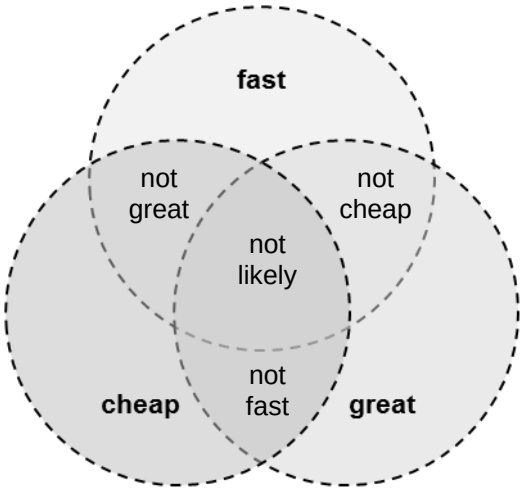
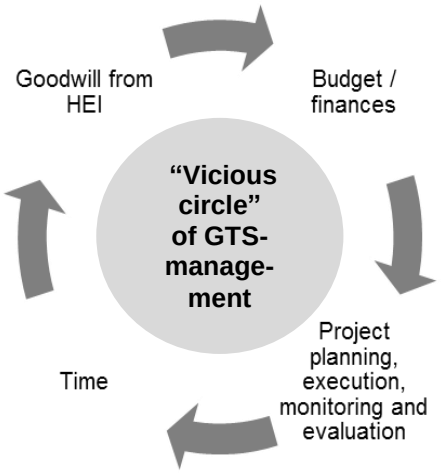


Figure 7: Project triangle

The project manager is often faced with a dilemma since project time, cost and quality are interdependent. A swift project execution on a high quality level is often costly. On the other hand the quality may suffer if a project is speedily carried out and has a low budget. Finally, the execution of a project on a high quality level but with a low budget might take an undesirably long time. The requirements in this 'project-triangle' (Lock, 2007) namely to be fast, cheap and great cannot be satisfied simultaneously. The univer-

sity's directorate has to set priorities and project plan details have to take into account these specifications in order to ensure that a project can successfully be completed. In other words, a high quality graduate survey project requires adequate funds and time.



If resources are insufficient, the GTS project manager will soon find themselves in a vicious circle. A lack of support from the university's directorate might result in an insufficient budget which in turn weighs on project planning and execution time.

Figure 8: 'Vicious circle' of GTS management

2.4.5. The planning and the management of a survey project

The project manager is responsible for incorporating the usual three working phases of a Graduate Tracer Study into the general project management. It must be considered that delays in one working phase inevitably have knock-on effects for the following phase(s). If, for instance, the conceptional design is incomplete, a survey cannot be executed. A thorough planning and a comprehensive project management is highly recommended last but not least because multi-tasking is a necessary technique during each working phase which makes the adequate allocation of resources difficult for inexperienced project managers. The efforts for creating or updating an address data base, for instance, need to be accounted for and resources (time, software, working hours, etc.) need to be allocated depending on the existence or the completeness of such a data base. In other words, potential difficulties and risks must be described in order to be able to identify them early on if they occur and find a suitable solution. A forward-looking plan dividing the project processes into small steps is thus indispensable.

2.4.6. A planning tool for graduate survey projects: the project action plan

The development of a so-called Project Action Plan (PAP) and its continuous application during GTS project planning and management has turned out to be very useful. This is true as evidenced

by how the UNITRACE 2.0 project used the tool successfully among all the participants. The paired participants developed and used the PAP to plan and execute their respective GTS projects and the author of this guide was responsible for a comprehensive training and adoption of the UNITRACE 2.0 PAPs. A PAP is a powerful tool for planning and monitoring a project. It lays out the steps for the conduction of a project and includes all necessary information. PAPs take the form of a matrix (cf. Chapter 5.5) which helps to detail and describe a process step by step. A good project action plan

- names the objectives of the project which should be as specific as possible, measurable, achievable, relevant and time-bound (SMART) (Department for Business Enterprise & Regulatory Reform, 2010):
    - **S**pecific to the project, and within the project.
    - **M**easurable. It has to be defined in as measurable and subjective terms as possible what must be achieved.
    - **A**chievable. It must be possible to achieve the objective in practical terms and also within whatever time target has been set.
    - **R**elevant. Are the objectives consistent with and do they contribute towards the goal/objective at the next level up?
    - **T**ime Bound. It is useful to have a deadline by which each objective should be achieved.
- describes outcomes which define what the project must achieve in order to be complete and successful and hence ready for completion,
- describes strategies and activities for achieving these outcomes,
- describes actions that are achievable with regard to everyday work,
- is simple and straightforward,
- describes resources needed and
- names responsibilities.

2.4.7. How to design a project action plan for graduate tracer studies

A Project Action Plan for GTS (Qin, 2015) might be designed in seven steps described below:

Step 1: Clarification of objectives and purposes of the GTS

Before the project planning goes into detail and the PAP is formulated, the objective and the purposes of the GTS need to be clarified. The more precise an objective is defined, the more detailed a project plan can be. It is important to involve the stakeholders concerned when defining an objective which also might have a motivational effect or might give a clue if there is resistance to be expected. Answering the following questions might help with the clarification process:

- Who is a stakeholder in the project?
- Which stakeholder needs to be involved?
- How can a stakeholder be involved?
- Which potential risks come with the involvement (or exclusion) of a stakeholder?

Possible internal and external stakeholders were already introduced in Chapter 2.3.2. In order to design a PAP it now has to be decided which stakeholder to involve and how his involvement might take shape. A co-operation with relevant stakeholders has high importance for the project to succeed and for findings to be meaningful. As discussed previously the objectives of different stakeholders might be inconsistent which can be a challenge. Stakeholders also might have conflicting requirements towards a GTS. They may be reluctant to participate in the project due to time constraints. Such obstacles and challenges are to be anticipated well in advance and strategies to overcome conflicts and resistance need to be devised at an early stage.

Following the exchange with stakeholders (which in the case of a graduate survey are mainly internal stakeholders such as the university management, departmental deans, the head of academic programmes, etc.) the project manager shall define the objectives for the project. Answers to the following questions might help with the definitions:

- What are the reasons for executing this project?
- What is to be achieved with the survey findings?

Possible objectives might be:

- Collect representative data on university education, first employment and career profile of the graduates (Information und Monitoring).
- Evaluation of study programmes inasmuch as the imparted knowledge matches the competencies required in employment (Evaluation).
- Single out and analyse the factors of higher education that have an influence on employment success (Research).

It must be noted that theses exemplary objectives are overarching the whole project. Experience has shown, however, that stakeholders are often unable to specify their individual objectives and expectations. In order to professionally plan, execute and manage a project it is essential to break down those general objectives and translate them into milestones or goals which are specific, measurable, achievable, relevant and with a time-limit attached (cf. step 5).

Step 2: Definition of survey population

After the survey's objectives and purposes have been clarified, its target population needs to be defined. Initially it has to be decided if the higher education institute shall be assessed as a whole or whether only certain institutes or faculties should be surveyed. Sometimes even only single study courses are under investigation. The next step is to determine the graduate cohort to be surveyed. A graduation year usually forms a cohort for a GTS. It is necessary to select a cohort that is best suited to answering questions related to the GTS project objectives, one of which is usually to find out about the alumni's career start and their first employment after graduation. A survey of most recent graduates since would make little sense but rather students who left university at least one year ago should be questioned in order to find out about the transition process. If the graduation dates back longer, say three to five years, the alumni might also add information about their early career and after more than five years since graduation a career path which could be surveyed should have been established. Career stages such as transition, start of employment and career promotion illustrate that the alumni surveyed might be in very different career phases depending how long the graduation dates back. Summarizing the replies of all graduate cohorts might hamper an analysis of findings and it is thus customary to separate a survey into cohorts according to the year of graduation. Finally the graduation cohort with some 1 – 3 years since graduation might best be suited to give feedback about the quality of a study course and its classes (Schomburg, 2016).

The question if the survey should cover a complete graduation year is to be resolved next. If a graduation year shall or can only be covered partly, the survey is only on a sample basis, which is only preferable if a complete survey is impossible due to a lack of funds or time (cf. Chapter 2.10.10). This might for example be the case if the survey population is very large and interviews must be carried out face-to-face. These so called sample surveys have the ability to generate information from relatively few respondents in order to describe the characteristics of an entire population and it takes less time and money to interview few respondents than to interview many (Salant & Dillman, 1994).

Hence, the decision to carry out a complete or a sample survey also depends on the interview methodology in which case two basic forms with the following characteristics can be distinguished (cf. Chapter 2.10.2):

- Structured, personal interview
    - face-to-face (very time consuming; high demand of personnel resources; labour costs; travel expenses);
    - by telephone (high demand of personnel resources; labour costs; airtime).
- Structured questionnaire to be completed by the interviewed person
    - paper & pencil (very common; medium resources; printing costs; data collection costs);
    - online (very common method; few resources needed, however, technical infrastructure is necessary; the respondent might incur communication costs).

The decision about a survey method is, amongst others, dependent on the available funds but also the existing address data base is an important factor. A telephone survey is only feasible, if contact phone numbers are available or can be made available. In the case of an online survey an address data base is sufficient. The alumni can be invited by letter to participate and receive a link to call up the online questionnaire.

Step 3: Estimate of resource requirements

If the survey population and the survey methodology have been determined, it should be possible to give an estimate of resource requirements. Both human resources (e.g. pay for the design of a questionnaire, the carrying out of interviews, data collection and analysis, etc.) and material resources (printing, postage, software, online infrastructure or manual input of paper based questionnaires, etc.) must be taken into account as well as incidental costs such as for:

- communication (phone, e-mail, P.O.),
- travel and accommodation (in the case of face to face interviewing),
- training for GTS teams / research assistants at the HEI,
- workshops to raise awareness amongst higher education management (fora, meetings etc.),
- software purchases,
- personnel costs (original team, research assistants, data entry, data analysis, report writing costs etc.),
- stationery & consumables,
- incentives (for respondents),
- dissemination and publication and
- others.

Important: Project planning is time consuming too! It is absolute necessary to reserve adequate resources for this activity!

Having estimated the necessary resources, it has to be determined who will provide them. The funds for conducting a tracer study could come from external sponsors or be included in the university's annual budget plan. In the latter case an early planning of fund requirements is mandatory since funds have to be applied for and must be approved before work on the GTS commences.

Step 4: Estimation of time-frame

As previously mentioned it takes some 12 months at least to professionally carry out a graduate survey. But the time-frame can vary significantly depending on the objectives and resources available. Especially for a first-time survey the estimated time-frame should leave room for unforeseen events.

Step 5: Description of milestones, tasks and desired output/outcomes

The transformation of comprehensive objectives into specific tasks and actions is challenging but nonetheless necessary. In order to meet a comprehensive objective such as 'Collect representative data on university study, first employment and career profile of the graduates', the collection of suitable data by means of a survey becomes necessary. This specific task requires actions such as carrying out a literature research, formulating a set of questions, defining a survey methodology and the survey population etc. The completion of various specific tasks will lead to the achievement of project milestones which might read for example 'a survey concept has been formulated and finds mutual agreement from stakeholders', 'the survey population has been defined', 'the survey methodology has been determined', etc. Milestones can thus be described as outputs of a project which give proof that a task has been completed successfully and the achievement is being evidenced for instance through minutes, the formulation of a concept, a completed or updated address data base, an invitation letter from the university etc. The project manager has to think about what should be achieved after each task or milestone so that they can then check if the milestone was really reached. It will also help if they define the tasks in a more specific manner and make the tasks and expected output/outcomes transparent to the project team and stakeholders.

Step 6: Identification of risks/constraints.

It is important to consider risks and obstacles on the way towards reaching a project milestone even at the early stage of project planning in order to be prepared and have a set of countermeasures readily available. For instance the coordination of the project with the university's directorate might be tedious because of a tight schedule. A proactive measure might be an early ar-

rangement of meetings which requires, however, that the time-frame for achieving a project milestone is being set realistically.

Step 7: PAP documentation

It is advisable to document activities and outcomes of step 1 to 6 for example in the form of a rough project sketch based on which a PAP matrix (cf. Chapter 5.5), which in turn leads towards a full PAP, might be formulated. The PAP as a starting point for carrying out a project successfully helps to revisit each single project step in a structured manner. This is because each PAP task might require preparatory or ensuing work to be done. A PAP might also reveal additional resource requirements or the need for further internal coordination as well as making unused resources obvious. In other words the project sketch might need adjustments since certain tasks have been unaccounted for. To become aware of just these insights is the intent and purpose of a PAP and it is quite normal that it must be continuously reviewed and updated. It is also a must that PAP adjustments are being kept transparent and are explained and communicated to project team members and stakeholders concerned. All working steps towards a project milestone, procedures, obstacles, solutions and resource requirements need to be documented in the PAP which then might also be used in repeat projects.

In sum the following recommendations might be given to a GTS project manager:

- Pay continuous and thorough attention to planning, monitoring and revising your project or rather your PAP.
- Identify and deal with potential risks for the project.
- Involve all relevant stakeholders.
- Document and communicate project achievements continuously.
- Keep in mind that project work has an influence on everyday business.

Furthermore a HEI in East Africa wishing to embark on a GTS project should put an emphasis on (Egesah & Wahome, 2016):

- training in GTS theory and methodology, data analysis, dissemination and use of results;
- forging and obtaining goodwill and (financial) support from university management; sensitization through consultation and planning meetings and workshops;
- identification of GTS host for example in QA or alumni office;
- development of an accurate graduates' address data bank.

2.5. Development and survey realization

A PAP is the ideal planning tool for a GTS and a good starting point for preparing and carrying out the survey related activities.

2.5.1. Quantitative and qualitative research strategies

Quantitative data collection methods are usually the base for developing a questionnaire and carrying out a survey. This means that survey data primarily comes in the form of numbers rather than text (Babbie, 2004).

Quantitative research strategies like online surveys are structured procedures, in which the design of the research process and the expected data material is already defined in advance (Kumar, 2005) and the respective incidences are described based on numbers. For example, if you can describe student satisfaction with their study programme with numbers from 1 to 5, these are numerable and countable quantitative data. Since the students can define their satisfaction in the same way (by numbers from 1 to 5), the process is called a standardized data collection that also delivers standardized data.

A big advantage of quantitative strategies is that due to this standardization the collected data can be analysed relatively easily and in large quantities with software for statistical analyses, because of the numerical data basis. Contrary to quantitative strategies, qualitative research strategies put more emphasis on words or text rather than on numbers. They focus on relationships and describe the social world as seen through the eyes of the subjects to discover how it is constructed. Qualitative research strategies usually collect data in a non-standardised way. For example, a non-standardised form of data collection is when students' satisfaction is described in an interview verbally (e.g. based on the question to describe the satisfaction with the study programme). The resulting text is defined as qualitative data because the students' statements exist as a non-numerical text. A big advantage of qualitative strategies is that the collected data has a high significance because of the missing standardisation. That means the opinions and views of the interviewed persons can be collected without restrictions.

2.5.2. Questionnaire development

Every quantitative standardized survey is based on a set of questions. The data collected by means of a GTS questionnaire must give answers to those research issues that triggered the survey. Depending on the objectives of the GTS

- the research topics have to be determined and be transformed into questions for the questionnaire (this transformation is also called operationalization);

- a meaningful wording and an expedient question type needs to be selected;
- the questionnaire's layout and the order of questions need to be determined.

Typical steps in the development of a questionnaire are its conceptionalization and its operationalization (cf. Chapter 2.2.1). Initially a generally accepted concept needs to be developed for every research issue. A thorough literature research might be a good help and 'generally accepted' means in our case that all relevant stakeholders agree to a concept that stands for professional success. Having reached this common understanding, empirically measurable quantities (so called variables) need to be developed. The annual income, for instance, might serve as indicator for professional success. Operationalization means determining research topics and transforming them into questions. The process starts with the formulation of research issues and assumptions. The deduction of suitable indicators then follows. Next comes the formulation of questions, the answers of which shall quantify the indicator. The following table illustrates the process of conceptionalization and operationalization in a structured manner:

Research Issue/ Assumptions	Concept	Indicator	Question
Does higher education lead to high professional success?	Professional success	Income	What is your monthly gross income?

Table 3: The process from research issue to question

2.5.3. Selecting an appropriate survey method

The selection of an appropriate survey method is probably one of the most difficult decisions for a GTS project. For example, the study population greatly influences which survey method is suitable or not. Online surveys are not eligible if respondents do not have a computer with internet access, even though they may have an e-mail address that could be used for the survey administration. Survey methods with interviewers are not possible, if there are not enough human and financial resources to do so. If results are needed quickly, semi or unstructured survey methods are also not suitable.

The following table illustrates more questions to be asked in order to determine the opportunities and limitations of the survey design (Pistor & Stammen, 2017). Please note: All questions have to be answered taking into account the preconditions at your Higher Education Institution. Some answers to the questions indicated in this table may vary because they are interdependent (e.g. a large sample increases the cost of a face to face survey).

Questions to be asked	Survey design			
	mail	**online**	**telephone**	**face-to-face**
Contact: What do I need to contact the respondent?	postal address (if necessary, other information to find out address)	email address or postal address (if necessary, other information to find out address)	telephone number (if necessary, other information to find out the number)	postal or email address or telephone number
Costs: How much financial resources are available for the survey?	average (e.g. printing questionnaires, dispatching and packaging, return postage, data collection etc.)	low (no costs for printing questionnaires, dispatching and packaging, return postage, data collection etc. – maybe costs for online survey-software)	high or very high (e.g. costs for computer assisted telephone interviews software, telephone charges, interviewer wages, data collection etc.)	very high (e.g. costs for computer assisted staff, interview software, telephone costs, mobile devices, interviewer wages, transport and accommodation costs, data collection etc.)
Support: How much staff do I need to realise the survey? Which facilities are available (software, hardware)?	some (without software to collect data), little (with software to collect data)	little	a lot or a great many	a lot or a great many
Sample: How many interviews are to be carried out? How large is the sample?	Average to high/big	very high	high	small to average
Complexity: How complex should the content of the survey be?	small to average	high to very high	small to average	high to very high
Length: How long should the questionnaire be? Can we expect the respondents to be able to answer the questions?	average	average to long	average to long	very long
Time: How much time is needed to collect the data?	a lot (without software for data collection), little (with software for data collection)	very little	average	a lot to average

Form of data collection: Who completes the questionnaire? Is there a need for interviewers?	self-administrated	self-administrated	interviewer-administrated	interviewer-administrated

Table 4: Questions for determining the appropriate survey method

Sometimes different survey methods are applied parallel (cf. Chapter 2.10.2.5) especially if the number of survey participants can thus be increased. Some potential participants might also prefer a certain interview method. To carry out a survey using more than one interview approach means, however, a higher drain on resources and all methods used must generate compatible data which requires more coordination efforts. For these reasons more than two different survey methods are hardly combined.

The following recommendations for the parallel application of different survey methods can be made (Dillman et al., 2014):

- Use the same question format and wording across survey modes.
- Use similar visual formats across survey modes.
- Review and test the questionnaires for each survey mode being used.
- Test all implementation procedures, especially the coordination across survey modes.
- Plan an initial pilot test, especially if testing a new mixed survey mode design.
- Document and disclose the methodology used and the results achieved.

2.6. Types of questions

Questions are the essence of a survey. They are used to generate data which in the form of variables make up a data set. The selection and formulation of adequate types of questions for a research design is of upmost importance since these activities highly influence the quality of collected data. Each question has a set of possible answers also called scale or range since an answer kicks-off the measuring activities. An answer is also called a variable due to the fact that it might vary. A particular characteristic of variables, the so called scale level, helps to distinguish between different types of variables and determines how they will be analysed. Basically, we can differentiate between four types of measurement scales: nominal (or classificatory) scale, ordinal (or ranking) scale, interval scale and ratio scale.

The way to formulate questions determines the type of variable and how we classify our measurement with a certain measurement scale. Choosing a question type has huge consequences for the data analysis: The higher the level of measurement, the more statistical data analysis procedures are possible to use.

We can classify different types of variables for our measurement: Variables can be constant and only define one value or one category (e.g. a student). They can define at most two values (e.g. yes/no). In this case, they are dichotomous. Or they can describe more than two categories, in which case they are polytomous (e.g. Christian, Muslim, Hindu, and Jew). These categorical variables differ from continuous or metric variables, such as income or age. Metric variables can refer to any value on the measurement scale (e.g. income: dollars and cents; age: years, months and days).

We have a nominal scale when we have to decide between equality and inequality. Nominal scales name, classify, or number. But the values of the variables cannot be graded according to their size (e.g. gender). Each subgroup has a special characteristic that is common to all within that subgroup (e.g. male).

An ordinal scale has the characteristics of a nominal scale. In addition, subgroups have a relationship to one another. They can be arranged in ascending or descending order. Thereby, we do not know the intervals between the individual values.

Scale levels cannot be applied to open-ended questions if the reply comes as a text. They do not offer fixed answers, but the respondents can answer the questions in their own words. Respondents are not forced to answer in the same way, compared to questions that already include response choices. Such open answers make possible replies that the researcher might not have considered yet. Freely formulated answers are hence a valuable source of additional information, for example about a personal point of view, but are more time-consuming to give. They are also more difficult to analyse as compared to when possible answers are standardized. Freely formulated answers need to be read individually and be assigned to a suitable subject or category which can be very time-consuming. That is why a questionnaire should avoid an ‘open-ended question’ when a ‘closed-ended question’ is equally feasible. The categorization of qualitative data will be further discussed in chapter 4.6.1.
In the following, we will look at different types of questions as they are typically used in surveys (Salant & Dillman, 1994; Dillman et al., 2014).

2.6.1. Open-ended questions

Closed-ended questions offer the respondent different pre-formulated answers. When developing such closed-ended questions, the proposed responses have to encompass all possible answers as response items. We differentiate between so-called single-choice questions that only offer one choice for response, and so-called multiple-choice questions that offer various response possibili-

ties. If several responses are possible, this should be indicated in the question. Furthermore, we can also pose partially closed-ended questions. These questions are a mix of open and closed-ended questions. Besides pre-formulated answers, respondents have the possibility to answer in their own words. The following open-ended question is exemplary for GTS use:

Taking into account your experience, which important changes would you recommend for your higher education institution?
.....
.....

Figure 9: Open-ended question

2.6.2. Partially close-ended question with multiple choice

The technical term for a question open to several possible answers is a ‘multiple-choice question’. If there is also the option to freely formulate the response, the question is labelled ‘partially closed-ended’. In the following example of a partially closed-ended question, the possible answers exclude each other and no hierarchical order is given. This renders the answer(s) into a nominal scale.

		What prompted you to apply for your first job? *Multiple responses accepted*.
1	☐	Salary
2	☐	Benefits (housing, transport, medical, retirement package, opportunities for further studies, etc.)
3	☐	Location
4	☐	Passion
5	☐	Peer influence
6	☐	Relevance to skills acquired
7	☐	Only option/ availability of the job
8	☐	Other:.....

Figure 10: Partially closed-ended question with multiple choice (nominal scale)

2.6.3. Closed-ended question with single choice

The technical term for a question open to only one answer from a list of pre-formulated replies, is ‘closed-ended question with single choice’. In the following example of a closed-ended question the possible answers exclude each other and no hierarchical order is given. This renders the answer into a nominal scale.

	When did you start looking for a job?
1 ☐	Prior to completion of my studies
2 ☐	At the time of completion of my studies
3 ☐	After completion of my studies
4 ☐	I did not look for a job

Figure 11: Closed-ended question with single choice (nominal scale)

2.6.4. Partially closed-ended question with single choice

A closed-ended question with a single choice might have an additional option to give a freely formulated answer. The technical term for this type of question is ‘partially closed-ended question with single choice’. In the following example of a partially closed-ended question, the possible answers exclude each other and no hierarchical order is given. This renders the answer into a nominal scale.

	How did you get your first job after graduation?
1 ☐	Interview
2 ☐	Retention
3 ☐	Applications
4 ☐	Others: ..... (please specify)

Figure 12: Partially closed-ended question with single choice (nominal scale)

2.6.5. Closed-ended question with a range of opinions, single choice

Scales are usually employed if an assessment needs weighing, especially in order to express different levels of perception, appraisal or impression. A scale might be pre-defined with a limited range and fixed values expressing agreement (high value) or disagreement (low value). For Graduate Trace Studies scales with a range from 1 to 5 having the fixed values of 1, 2, 3, 4 and 5 are a common standard. By choosing a value the interviewed person makes a subjective assessment which then becomes measurable. In the following exemplary question possible answers exclude each other, however, a greater/smaller hierarchy is established. This renders the answer into an ordinal scale.

	How useful were the courses in assisting you get employed?				
	Not useful at all				Very useful
	1	2	3	4	5
1	☐	☐	☐	☐	☐

Figure 13: Closed-ended question with a range of opinions, single choice (ordinal scale)

The sample question above relates to one single issue only. A question requiring responses in the form of agreement or disagreement to several statements, is technically described as the Likert scale, which is an ordinal scale as well.

2.6.6. Likert items

	To what extent has your study programme at the university been a good basis for ….?					
	Not at all				To a very high extent	
	1	2	3	4	5	
1	☐	☐	☐	☐	☐	Starting work?
2	☐	☐	☐	☐	☐	Performing your current work tasks?
3	☐	☐	☐	☐	☐	Potential/future career(s)?
4	☐	☐	☐	☐	☐	Your personal development?
5	☐	☐	☐	☐	☐	Development of entrepreneurial skills

Figure 14: Likert items (ordinal scale)

For the use of scales in a questionnaire it is recommended:

- to offer a neutral assessment (e.g. to use an uneven number of scale values);
- to only explain values at the fringe of a range;
- to apply only one single range of values throughout the questionnaire (e.g. not to use scales of both a 1-5 and a 1-7 value range in one survey);
- to scale in only one single direction (e.g. from disagreement on the left fringe to agreement on the right fringe);
- to start a scale with a value that is typical for grading locally (e.g. 1 = very good or very bad?).

2.6.7. Open-ended question with additional verbal instruction

If we are able to define the intervals between the values of a variable, we call it interval or metric scale (e.g. temperature). It has all the characteristics of a nominal and ordinal scale. In addition, it has a unit of measurement with an arbitrary starting and terminating point. A ratio scale includes all characteristics of a metric scale. In addition, it has a fixed starting point (e.g. income in $) (Kumar, 2005). The following exemplary question is about gross income. To propose a pre-formulated set of answers is not feasible and a free text entry, here in the form of numbers, is requested instead. To ensure a consistency of data it might be necessary, however, to give additional instructions for a text entry. In this case a statistical analysis of income data requires a consistent denomination of

metric values. Without the additional verbal instruction to give the income in US Dollar some respondents might enter a local currency amount instead.

	What is your approximate gross monthly income in US Dollar?	
1	☐☐☐☐☐	Major job
2	☐☐☐☐☐	Other jobs
3	☐☐☐☐☐	Over time etc.

Figure 15: Open-ended question with additional verbal instruction (interval/ratio scale)

Only few genuine metric-scaled variables are measured in GTS: e.g. income, age, period of job search, etc. It is recommended to request this data through an open question and possibly classify the responses in the data analysis.

2.7. Functions of questions

Intent and purpose of a question might sometimes go beyond merely receiving data and information. We can characterize questions according to their function in a questionnaire: Starting or contact questions are used to introduce a survey and to create a comfortable survey situation. They are the key to making respondents further participate in a survey. If the first questions of a survey are boring or ambiguous, many respondents will put the questionnaire aside. Questionnaires also become boring for respondents if they have to give answers to issues that are not relevant to them. For example, in a survey on study services, students cannot comment on services which they have not yet used. That is why we create so called filter questions that guide respondents through a survey and only lead to the questions that are relevant to them. Sometimes, questions can also have a control function. Such control questions are used to check the consistency of answers. Therefore, we ask two questions on the same issue (if possible, with a time interval). Only if both questions are answered in the same way, has the respondent answered consistently. Such control questions have to be used carefully because they can also create negative effects. For example, a respondent might feel they are not being taken seriously (Pistor & Stammen, 2017).

2.8. Question wording

A survey should aim at collecting data and information of the highest possible level of quality. If the questions in a questionnaire are poorly formulated, this may in turn influence the quality of answers given and hence the usefulness of the survey. Experience has shown: respondents usually answer any question, even if it is very poorly formulated. However, such answers are usually of low value and small use. As researchers, we sometimes only realise that a question was poorly formulated

when we see the answers. We become aware of this problem, for example, when many respondents do not answer to a specific question or if an answer to an open question does not relate to the original question.

Since a response is always only as good as a question, we should consider the following imperative: Questions always have to be understandable and answerable in the way we intended them to be understood and answered!

2.8.1. ‘Golden rules’ of formulating questions

In addition to this fundamental rule, the most important recommendations can be summarised in the following ‘Golden rules’ (Bryman, 2004). We should consider, however, that these rules are not universally valid and sometimes contradictory. That is why they should rather be considered as recommendations that cannot always be applied at the same time and in the same way.

‘Golden rule’	Example of a cumbersome wording	Possible alternative
Use simple, unambiguous formulations which can be understood by all survey participants in the same way.	“Have you patronized an ET course?” *Use of abbreviations (ET) & uncommon expressions (patronized).*	“Have you attended an Educational Technology-course?”
Avoid hypothetical questions.	“Imagine you had a 16-year-old son, who wanted to quit his studies to become a soccer professional. Would you support him?” *Probably far from the respondent’s reality and hard to imagine.*	Ask questions that are directly linked to what you want to know.
Avoid long and complex questions.	“Many people think that, in this day and age, students have too many other obligations besides their studies. For example, they have to work for their living or are actively participating within different student bodies, commissions etc. at their university or they have time- consuming hobbies. To what extent do you agree?” *Too long and lots of unnecessary information.*	“Today, students have too many other obligations (job, committee activities, hobbies) besides their studies. To what extent do you agree?”

Avoid double-barrelled questions and negative formulations.	“Please indicate how much you agree with the following statement: I do not feel welcomed by my boss and colleagues.” *Negative formulation (I do not feel welcomed) and double-barrelled (boss and colleagues).*	“Please indicate how much you agree with the following statements: I feel welcomed by my boss. I feel welcomed by my colleagues.”
Avoid allegations and suggestive questions.	“Now that you have experienced the benefits of taking additional courses to improve key competences (“soft skills”), would you choose such a course again next semester?” *Allegation/suggestive (you have experienced the benefits).*	“If you took an additional course to improve key competences (“soft skills”) last semester, how helpful was it?” Remember the possibility that no course may have been taken. Include an answer-option like “not applicable”.
Avoid needless questions.	“Please indicate how much you agree with the following statement: Self-employed people work very hard.” *Interesting to know, but what information do you get from this answer?*	Always double-check, whether a question is connected to your survey project.
Use questions with a clear-cut (timely) reference.	“How do you rate the counselling at your university in the past?” *No clear-cut reference (counselling by teachers, career service etc.?) and no clear-cut time reference (last 3 weeks, last 3 years?).*	“How do you rate the counselling by the central student office concerning your course options in the last semester (winter term 2014/15)?”
Use response categories, which are complete and disjunctive.	What was your age at the time of graduation? ☐ 22 – 24 years ☐ 24 – 26 years ☐ 26 – 28 years *Not disjunctive (what about people aged 24 or 26?) and not complete (what about people older than 27?).*	“What was your age at the time of graduation? ☐ 21 years or younger ☐ 22 – 24 years ☐ 25 – 27 years ☐ 28 years or older”

Ensure that the context of a question has no influence on the response behaviour.	A survey among renowned scientists has shown that 90% of them don‘t approve of the “Bologna process”. What is your opinion on this? *Contextual influence (a survey among renowned scientists has shown…).*	“How do you rate the “Bologna process” generally?”
Define unclear expressions.	What is your average monthly net household income? *Not everybody knows the definition of net household income.*	“What is your average monthly net household income (e.g. the combined income of all members of your household after taxes)?”

Table 5: ‘Ten golden rules’ to formulate questions, adapted from Bryman (2004)

2.9. Design and layout of the questionnaire

When designing a questionnaire, first of all, we should consider the following imperative: “Do unto your respondents as you would have them do unto you!” (Trochim, 2005, p. 86). We are imposing on the lives of our respondents and we are asking for their time, their attention, their trust and for their personal information. The following advice for a questionnaire design might be helpful towards creating a positive attitude with the surveyed person (Trochim, 2005):

- Thank the respondent at the beginning for allowing you to conduct your study - and at the end for participating.
- Keep your survey as short as possible! Only include what is absolutely necessary.
- Be sensitive to the needs of the respondent and be aware of any sign that the respondent is uncomfortable.
- Make the answering process as easy as possible.
- Group related questions that cover similar topics together.
- Begin with questions likely to be salient to nearly all respondents and choose the first question carefully.
- When a series of filter and follow-up questions are to be used, ask all of the filter questions before asking the follow-up questions.
- Follow some kind of ‘logic’ – in GTS often a chronological logic is applied (relevant experience before university – study time – job search – current employment situation).
- Layout should be attractive and neat.
- Don’t try to save space (in a paper questionnaire).

- Elements of the same type (e.g. questions; answers; titles of larger sections) should be formatted in the same way.
- Place sensitive or potentially objectionable questions near the end of the questionnaire.
- Avoid unintended question order effects.

A GTS questionnaire is usually pretty comprehensive and contains a lot of questions; however, this cannot be avoided having in mind the multiple objectives attached to a GTS. Whereas a terse set of questions is unlikely to lead to meaningful findings on the one hand, a multitude of questions is often blamed if the response rate is unsatisfactory (cf. Chapter 2.11). But the length of a questionnaire is only one factor to influence the response rate (Schomburg, 2016) and past experience suggests that some 10 to 20 pages of questions have no significant adverse effect. A time budget of 15-20 minutes at least is by all means acceptable if the golden rule is observed to stick to absolutely necessary items only. In the case of an online survey this self-restraint is all the more important since internet connections might be unstable or costly, and the unnecessary long download time of graphics or logos should be avoided (Wahome, Egesah, & Wanyama, 2015).

2.10. Preparing to carry out the survey

Preparatory work for a GTS is not limited to defining survey objectives, issues and content or designing a questionnaire; the actual survey activity needs to be well prepared too. In order to kick-off the fieldwork, a valid contact data base needs to be established and a technical infrastructure for carrying out the survey must be in place.

2.10.1. Developing an address database

A graduate address database is necessary to administer and organize the contracts and addresses of graduates. Keeping it up-to-date and complete is the key to reaching a maximum number of people and to achieving a high response rate. Firstly it is important to precisely define the survey target group, for example ‘The graduates of cohort 2013 of study programme X’ or ‘The graduates of cohort 2013 and 2014 from university Z’. Secondly the individuals belonging to that group have to be identified; a process where university statistics or the examination board might be of help. Thirdly the up-to-date contact information for these individuals has to be ascertained which normally is the most difficult and often tedious step.

Often only names and outdated phone numbers rather than current postal addresses are available but contact bits and pieces from different sources such as the student secretariat, a faculty, alumni organizations, etc. may be acquired. Each possible source has to be approached individually. In some circumstances the university might have a legal obligation to keep contact information on its

former students which might even include a postal address. Unfortunately this is more often than not the exception and the information on graduates is, if at all, stored de-centrally, and is incomplete and outdated. In reality the establishment of an address database thus poses a big challenge and a drain on resources.

A creative approach might be the only way if no or little suitable data is available. Media such as TV, radio or newspaper could disseminate an appeal to graduates to register with their former university. Social media such as facebook could also spread the call. It is important that such and appeal convinces former students that participating in the GTS is to their advantage as well and they might profit from say an alumni network membership or might even receive material incentives (cf. Chapter 2.10.7). A snowball process might be initiated to enlarge a small address database with an appeal to graduates with a known address to spread the word within their circle of acquaintances. Student WhatsApp groups might still be active after graduation and be of use. Sometimes an approach via the parental address (if available) or the employer (for instance in case of teacher training) might be successful (Osei & Dontwi, 2014; Shongwe & Ocholla, 2011). If a student received a grant during his studies, contacting the supporting agency might be of help too (Cape Higher Education Consortium, 2013). However, a database solely of graduates who received a grant or who are in (teaching) employment leads to distorted survey results and hence a number of various sources must be tapped.

The following table lists some challenges for the establishment of a graduate address data base that emerged during the UNITRACE 2.0 project as well as possible solutions:

Challenge	Possible solution approach
There is no central graduate address data base.	Development and building-up of a central data base whilst having a designated person responsible for updating and providing access. Raising awareness amongst relevant stakeholders (university directorate, faculties, registrar, alumni office) for the need of such a data base.
Bureaucracy in getting the data.	Liaise with university management.
Getting funds.	Identification of suitable funding sources.
Time constraint. Limited time to actually complete/compile the data bank into a usable form.	Finding personnel to do actual contact and follow up.
Mismatch of the numbers of students (and data sets) entering university and graduating.	Establish mechanisms to constantly update the data base at regular intervals.
Missing address data.	Data collection on all students / graduates at graduations.
Lack of active alumni.	Inviting alumni for dinner.
Acquisition of correct addresses.	Use of multiple sources to collect the information (e.g. registrar, alumni-office, former classreps),

	snowball schemes, social media (e.g. facebook, WhatsApp, etc.), media (radio, newspaper etc.).
Incomplete list of addresses.	Consolidate the graduates list from registrar and alumni office.
Incomplete contacts e.g. mobile or postal address, no e-mail.	Use the existing data (e.g. use mobile numbers to call) to get missing data (e.g. e-mail).
Not having up-to-date addresses/ contacts.	Test data sets to see how up-to-date they are and verify.
Unreliability of data (changed phone numbers / e-mail / addresses).	Verify by sending / calling alumni.

Table 6: Challenges and solutions when creating a data base

At this stage at the latest national data protection legislation and internal university regulations should have been taken into account. It goes without saying that these need to be strictly observed. Collected data then needs to be consolidated into a data base which usually takes the form of a matrix table. Its columns contain information on a variable (e.g. phone numbers) whereas a row describes a whole data record (e.g. contact information for a specific graduate). Large data bases might be managed with special software tools such as MS-Access or OpenOffice[4] database or spreadsheet programmes such as MS-Excel or OpenOffice Calc. A useful GTS specific address data base should contain the following variables:

ID
Last name
First name
Academic title
Address (street)
Address (special address appendix)
Address (ZIP code)
Address (city)
Address (country)
Email 1
Email 2 (if applicable)
Telephone / mobile number 1
Telephone / mobile number 2 (if applicable)
1st study subject /study course
2nd study subject /study course

[4] OpenOffice is an open-source office software. It is available in many languages and works on all common computers. It stores data in an international open standard format and can also read and write files from other common office software packages. It can be downloaded and used completely free of charge for any purpose: https://www.openoffice.org/

Other study subjects /study courses
Final grade
Final degree
Nationality
Date of birth
Gender
Type of degree
Duration of study
Home / parents address (street)
Home / parents address (special address appendix)
Home / parents address (ZIP-Code)
Home / parents address (city)
Home / parents address (country)
Other available aspects

It is important that each data field contains only one single piece of information. For instance the information on ZIP code and city should be entered in a separate table column. This facilitates the sorting of data records say according to ZIP codes or the designing of a serial letter. Some graduates may have the same family name, which makes it necessary to tag an ID (abbreviation for identifier) to each data record. Usually the first table column is reserved for such an ID number, which has to be unique for each data record.

ID	Last name	First name	Academic title	Address (street)	Address (special address appendix)	Address (ZIP code)	Address (city)	Address (country)	Email 1
1	Schneider	Thomas	Dr.	Main Street	20	22334	Vestergaard	Germany	me@t-schneider.net
2	Schneider	Maria		Vulcan Street	66	66521	Stindl	Germany	schneider@c-company.com

Table 7: Structure of an address data base section (extract)

Even if some or all of the variables from the list above might also be acquired through the survey, it makes sense to include them in the contact data base in order to test its representative nature. It is then necessary to compare the number of target group graduates with the number of data records which should ideally be the same. One should always attempt to complete data records. If, for instance, an online survey is to be carried out, but only contact phone numbers are available, the missing e-mail address might be inquired by phone and the data base might thus be completed. A phone call might also raise awareness amongst potential respondents and might make them support the survey.

Another important pre-survey activity is to confirm how up-to-date the contact data base is. Precious time would need to be diverted from fieldwork activities if mail remains undelivered and an address needs to be re-investigated. The validity of an e-mail address might be tested by sending a pre-survey mail containing an introduction to the GTS project. Undelivered e-mails could then trigger a phone call or a postal inquiry to investigate the current e-mail address.

Another aspect of a graduate contact data base, besides the administration of addresses, is of an organizational nature. For a proper management of the survey project it is advisable to add additional contact information during the fieldwork phase namely:

- last sent contact;
- address of the last sent contact;
- actual status;
- what to do next;
- what was already done in the past.

And in case of an address update:

- save old address;
- save old email address;
- is a report summary requested (yes / no)?;
- readiness to participate in future surveys (yes / no)?;
- other aspects (e.g. wants contact to its university alumni club);
- new addresses.

2.10.2. Technical aspect of carrying out a survey

It goes without saying that the nature and the extent of preparatory activities for technically carrying out a survey is highly dependent on the survey method chosen as well as on the budget available. All participating institutions in UNITRACE 2.0 (meaning 10 out of 10) carried-out online surveys. Four universities complemented their online survey with phone interviews and/or paper based questionnaires which were completed in face-to-face sessions by two project teams. Thus two institutions employed all four survey methods.

Dillman et al. give the following recommendations for the visual design of a questionnaire on paper or on a PC screen (Dillman et al., 2014):

- Establish consistency in the visual presentation of questions and use alignment and vertical spacing to help respondents organize the information on the page.

- Use colour and contrast to help respondents recognize the components of the questions and the navigational path through the questionnaire.
- Visually group related information in regions through the use of contrast and enclosure.
- Mark the beginning of each question and/or section consistently.
- Use visual elements and properties consistently across questions and pages/screens to visually emphasize or deemphasize certain types of information.
- Avoid visual clutter.

2.10.2.1. Preparing an online survey

Support software for all survey methods is for sale. In the case of online surveys professional software is widely available, some support software is even available for free. The online.QTAFI[5] tool (Questions, Tables and Figures), for instance, finds worldwide use in GTS. It is a database supported by web-use for the easy design, administration, and analysis of an online survey. The UNITRACE 2.0 programme, however, used the SoSci Survey[6] software for its online surveys[7] because the software required no further technical infrastructure. It is browser-based and only needs a working internet connection. The online-manual is comprehensive and contains a FAQ list. The SoSci Survey software can be used for free in non-commercial scientific projects. It also can be used as platform for discussion and for exchanging questions. The course trainers could monitor the project progress at each university and give their support if necessary. The data base was easily accessible and its download simple.

The following arguments are in favour of an online survey:

- An online survey is time-saving compared to paper, telephone or face-to-face interviews and the data collected is immediately available.
- An online survey is usually and by far the most economic survey method.
- The manual transfer of data from paper to digital form is not necessary, thus eliminating the risk of input errors.
- Respondents decide themselves when to complete the questionnaire.
- An online survey easily overcomes the geographical spread of graduates.

On the other hand, online surveys have some disadvantages too:

- Not all graduates have stable internet access free of charge. It might be the case that most graduates own a smartphone and/or a laptop capable of completing an online question-

[5] http://qtafi.com/
[6] https://www.soscisurvey.com
[7] The following link leads to a SoSci Survey screencast prepared for the UNITRACE 2.0 course: http://www.screencast.com/t/ZKSSzCPMC

naire. However, a mobile network is often the only way to connect to the internet and graduates may incur costs which they are not ready to bear. The university hence might or even must give further incentives for the completion of a questionnaire (cf. Chapter 2.10.7).

- The completion of an online questionnaire might be disrupted because the internet connection is unstable or the respondent decides to abort for various reasons (e.g. a lengthy questionnaire). Further incentives thus might be necessary (cf. Chapter 2.10.7).
- The multiple completion of a questionnaire is a risk that needs to be prevented by awarding individual access codes (PIN) which expires after the first completion.
- Participants may have concerns about the anonymity of their statements for instance if their access link and the address data base are linked. For this reason participants should be informed of data security (cf. Chapter 2.10.6).

The main reason for HEI participating in the UNITRACE 2.0 programme to employ an online survey was the time efficiency of this methodology especially if graduates in distant locations needed to be reached.

Dillman et al. give several recommendations for the conduct of an online survey (Dillman et al., 2014), some of which are listed below:

- Evaluate the technological capabilities of the survey population.
- Take steps to ensure that questions are similarly displayed across different platforms, browsers and user settings.
- Decide how many questions will be presented on each web page and how questions will be arranged.
- Create interesting and informative welcome and closing screens that will have wide appeal to respondents.
- Use a consistent page layout across screens and visually emphasize question information that respondents will need to complete the survey while deemphasizing information that is not essential to the task.
- Do not ask questions that are not absolutely necessary for the survey.
- Design survey-specific and item-specific error messages to help respondents troubleshoot any issues they may encounter.
- Allow respondents to stop the survey and finish completing it at another time.
- Test the survey using a variety of platforms, connection speeds, browsers, und user-controlled settings, and test the database to ensure that items are collected and coded correctly.

2.10.2.2. Preparing a paper-based survey

Software helping to carry-out paper-based surveys with functions such as the automatic data collection from a scan is available as well; however, the professional versions are usually very expensive. Therefore the project budget must, on the one hand, be adequate and on the other hand, the number of expected paper questionnaire returns must be high enough to justify the software purchase. Additional expenses might occur if no suitable scanner is available and initial training of personnel on how to use the software is necessary. Usually the software must be used to design the questionnaire in order to guarantee a flawless automatic collection of data which means that MS-Word might be unsuitable.

Dillman et al. give recommendations for carrying out a paper questionnaire-based survey (Dillman et al., 2014), some of which are listed below:

- Determine whether scanning will be used, and assess the limitations that may impose on designing and processing questionnaires.
- Construct paper questionnaires in booklet format, and choose physical dimensions based upon printing and mailing considerations.
- Decide question layout and how questions will be arranged on each page.
- Use symbols, contrast, size, proximity, and pagination effectively when designing branching instructions to help respondents correctly execute them.
- Create interesting and informative front and back cover pages that will have wide appeal to respondents.

2.10.2.3. Preparing a telephone survey

Designated telephone interview software, so called CATI software[8], which displays successive questions on the interviewer's laptop or PC screen during a telephone call is available as well. The whole sequencing logic including the filtering of questions is thus software controlled. The interviewer also receives reading instructions (for example to read out a set of possible answers) since the respondent has no questionnaire at hand. The CATI software might also incorporate a phone number data base so that a number is automatically dialed at a pre-arranged time if a current calling time is inconvenient or a call needs to be interrupted.

[8] CATI = Computer-Assisted Telephone Interviewing.

2.10.2.4. Preparing a face-to-face-interview

As mentioned above, two universities participating in the UNITRACE 2.0 programme carried-out face-to-face interviews in addition to other survey methods. The interviewer completed the questionnaire during individual interviews.

2.10.2.5. Mixed-mode designs

The two universities participating in UNITRACE 2.0 that carried-out paper based surveys in addition to the online survey originally intended to use an early version of the QTAFI scanner software. However, they met with difficulties during the automatic data collection procedure which could not be resolved immediately, last but not least because the publisher's support for that software version had ceased. Instead data from the paper questionnaires had to be transferred manually into functional online questionnaires in order to use this information. The project teams who collected survey data through phone calls or face-to-face interviews proceeded the same way. It turned out to be advisable to wait with the creation of functional online questionnaires until the actual online survey was finished, since it is then easier to calculate the daily online survey response rate during the fieldwork. Also the survey method by which a set of data was generated can more easily be traced if functional online questionnaires are being created en bloc with successive ID numbers attached. The creation of functional online questionnaires might also be time-saving since different databases (e.g. the sets of data generated from online surveys, paper-based surveys, face-to-face interviews and phone interviews which might each be created with different software) do not need to be consolidated. It is, however, of upmost importance that online and paper questionnaires do not deviate in content, which sometimes happen to be ignored. If, for example, a paper questionnaire contains more questions than the online version, the answers to these questions are lost when transferring data into a functional online questionnaire.

2.10.3. Survey pre-tests

To pre-test a survey is highly advisable especially if the university carries out a GTS for the first time. This is true for all survey methods applied. If respondents complete an online or paper questionnaire on their own, they have no opportunity to query an ambiguity or check with an expert present. Even a meticulously designed and technically well prepared questionnaire might contain shortcomings in the form of ambiguous questioning or misleading filtering of questions. Pre-tests may identify such shortcomings early and hence help to raise the quality of a data base and lower the drop-out rate.

The easiest way to pre-test a survey is by having several graduates who are not members of the target survey population each complete a questionnaire in the presence of an expert project mem-

ber. The test survey respondent should ‘think aloud’ whilst completing the questionnaire e.g. if something appears to be unclear or open to misunderstanding. The expert observer has to document all these remarks without commenting. However, if a test-reader is uncertain about a question they might be directly requested to voice their personal interpretation of what is meant. This also applies to technical terms and idioms that appear unclear. Only such a procedure guarantees that final survey respondents will grasp the content of a question in the way it is intended. In the case of a question comprising several sentences, the test-reader should also be asked if the question text was read completely. Finally feedback from five or more test-readers is a good basis for a questionnaire review. Sometimes a quick fix is possible, for instance in case of a missing category for answers. Sometimes there are also good reasons to stick to the current draft, for instance if only one test-reader has problems. The pre-test needs a re-run with a different test-panel after all amendments have been made in order to avoid improvements not to be for the worse. Questionnaires often have to be amended several times and at least two pre-test rounds are necessary to achieve a fully developed questionnaire.

2.10.4. Design and content of an invitation letter

A good communication with target survey participants is just as important as a clearly structured questionnaire with understandable wording. The GTS will only succeed if graduates can be convinced to participate. ‘Everything you do should motivate the graduate to fill in the questionnaire’ must be the project team’s motto and it might observe the following recommendations:

- provide a questionnaire of high scientific quality;
- explain your purpose and importance of your study;
- show appreciation for the graduates and their experiences;
- make access easy (e.g. online-survey running correctly? Enough information, guidance?);
- use incentives (if possible).

The GTS invitation letter is only one element for communicating with the graduate. A timely reminder to participate is important as well. The university might communicate by means of both postal letters or e-mails. In the case of a paper based survey, the questionnaire might be dispatched together with the invitation letter. Sending an invitation e-mail with the questionnaire attached is not advisable since the graduate might not want to print it out at their own expense. In the case of an online survey, sending the URL and log-in instructions by e-mail is an option, however, a postal letter gives a more reputable impression, whereas an e-mail might easily end-up unread and in a spam file.

The predominant goal of an invitation letter is to motivate the recipient to participate in the GTS. This is why the letter should mention and highlight the following issues:

- objectives of the GTS;
- how findings will be used (follow-up);
- the important position of the graduate as an experienced expert on the quality of their study course;
- all relevant issues for a GTS participation.

Therefore an invitation letter should contain:

- sender's address;
- salutatory address;
- GTS objectives;
- reasons for participation (e.g. improve future study programme);
- in the case of an online survey:
    - the URL link;
    - a password/PIN;
- assurance of confidentiality and data protection;
- name of the project manager (incl. contact information);
- list of incentives (if applicable);
- authorized signature.

If necessary the invitation letter as well as the reminder might be sent out in different language versions, and of course the questionnaire should be available in the relevant language.
The reminder might be sent by post or e-mail as well and may have a wording similar to the invitation letter. A phone call, SMS or a WhatsApp message might also serve the purpose. A report on the GTS project in newspapers, the radio or in social networks might also raise the awareness of prospective survey respondents.

2.10.5. Timing of invitation letter and reminder

Four contacts with survey target graduates are recommended e.g. the dispatch of one invitation letter and up to three reminders if a questionnaire has not yet been completed and returned. The recommended contact interval depends on the contact medium and should be around 14 to 21 days for postal mails allowing for delivery time and some 7 to 10 days for phone calls or e-mails. For a GTS invitation with phone or e-mail reminders, the contacts might thus be scheduled as follows:

- Day 1 1st Contact
- Day 11 2nd Contact
- Day 21 3rd Contact
- Day 31 4th Contact

The time span between survey kick-off and survey closing should not be stretched unnecessarily and could range from at least 6 weeks in the case of online surveys and 3 months in the case of paper-based surveys. A time buffer to cope with unexpected events should be added and national as well as school holidays might have to be taken into account.

Experience shows that the return flow of questionnaires during the fieldwork phase is not even. The first days after sending out the invitation letter usually sees clear peaks in the return number of completed questionnaires. The return flow then slowly abates and has its next peak after the dispatch of the first reminder. The project manager should therefore not despair if the return flow dries up after a couple of days. Even the third reminder will have a noticeably positive impact on the return flow.

The combination of online and paper-based survey is an exception. Graduates first receive an invitation letter to an online survey. Then, a paper questionnaire is enclosed with the first or second reminder letter. The recipient may then decide whether to participate online or to complete the paper questionnaire. The invitation and reminder procedure should run as follows (Schomburg, 2003):

- 1st dispatch action: (invitation): invitation to online survey;
- 2nd dispatch action (= 1st reminder): invitation to online survey + paper questionnaire + self-addressed envelope;
- 3rd dispatch action (= 2nd reminder): invitation to online survey;
- 4th dispatch action (= 3rd reminder): invitation to online survey + paper questionnaire + self-addressed envelope.

2.10.6. Graduate tracer studies and data protection

Any information gathered on graduates regardless whether it is during the GTS preparatory phase (names, addresses, final grades, etc.) or the fieldwork phase (marital status, income, etc.) could be very personal and sensitive. Graduates are willing to disclose this information for project purposes only. This is why data protection should be a matter of utmost concern and implies that the address data base has to be kept separate from the survey data base if technically feasible. If the questionnaire also inquires about address data, this information must be immediately severed from other

survey data once the survey is finalized. The respondents' confidence might be won if the invitation letter clearly states how the data will be used. If contact data is to be used for purposes other than the survey, e.g. by the alumni office, it is mandatory to ask for permission. For example: 'Do you agree that we forward your name and address to the alumni office?' (Yes/No).

2.10.7. Incentives

The use of incentives might significantly increase the response rate of a GTS. Little signs of gratitude might be distributed to every graduate together with the invitation letter (e.g. by enclosing a ballpoint pen with the university logo or a small gift of money) or may come in the form of a raffle where every survey participant can participate. Past experience suggests that prepaid financial incentives are one of the largest contributors to improved response rates (Dillman et al., 2014). As general handouts are often too dear and might even get lost in the post, lotteries might be a less expensive alternative. A test of survey strategies carried out by the University of Duisburg-Essen concludes that the survey response rate was 7.4% higher in a survey population with the chance to win a high price gift as compared to its reference group which was not incentivized.

2.10.8. Additional information

Any other available possibility such as flyers, websites, etc. should be used to make former graduates aware of a GTS. Especially the university's or a dedicated website might carry information during or even before and after the fieldwork phase. During the fieldwork phase it might

- present the project to graduates who visit the website,
- inform on the survey originator and the use of data raised,
- answer frequently asked questions,
- guide graduates to the questionnaire.

Before or after the fieldwork phase the university or a dedicated project website might

- present GTS issues to internal and external stakeholders,
- publish results and findings,
- describe what changes were initiated due to GTS findings.

If the GTS has a dedicated website it should be easily reached and should have a relatively simple URL. It needs to have an attractive design, its content (and possible contacts) must be current and should not contain dead-end links.

2.10.9. Measures to achieve a high response rate

The following list is a summary of possible measures to achieve a high response rate:

- avoid sample errors (making false limitations to your target group);
- ensure a high quality level for the address data base;
- use an appropriate survey method;
- invite your graduates as neatly as possible (e.g. personalise the invitation);
- make your survey appear important to your graduates;
- provide a good questionnaire (e.g. technically, design and layout, relevance of questions);
- provide information about your survey;
- in the case of a paper-based survey: include a stamped envelope addressed to the project secretariat;
- ensure confidentiality and data security;
- make the questionnaire interesting and as short as possible;
- make the questionnaire convenient to respond;
- advertise your survey (e.g. webpage, general media, university media, social networks);
- use incentives (if resources are available);
- inform your graduates that opportunities to respond are limited;
- express your gratitude and say thank you.

2.10.10. Statistical population and random sampling

A GTS should aim for a full census, meaning that all graduates of a cohort should be invited to participate in the survey. This is because several cohorts may each have varying study experiences and might have had a differing transition into the labour market as well. It can be assumed, however, that conditions and circumstances for members within a cohort were similar and thus comparable. For an explanation/interpretation of the labour market experiences and professional situation of graduates, it is necessary to take into account the relevant context, which might have changed in a short time. Another argument for selecting just one cohort is that including more than one cohort in one survey will hamper the analysis of effects of time (Schomburg, 2016). But sometimes it is impossible to cover a complete graduate cohort. One reason for not being able to ask all people, the so-called population of a study, can be that the population is too big and it would take too much time to survey all of them. For example, a survey of all graduates of a Higher Education Institution is often not possible due to financial and/or time constraints. That is why a survey often just covers a sample of the whole survey population. To create samples, we select some units (a sample) from a larger group of units (the sampling population).

A sample is representative when it reflects the population accurately so that it is a microcosm of the population (Babbie, 2004). To give an example: In a study population there are 45% women and 55% men. The sample should have the same percentage proportion.
Samples in GTS should be based on a random selection. We call it random selection when each unit of the population has an equal or independent chance to be selected. 'Equal' in this case means that the chance to be selected should be the same for all, and no units can be selected several times. 'Independent' means that the selection is only determined by chance and no other factors (e.g. preferences of the one who makes the selection). If sample units are selected according to these criteria the chance to receive a sample that reflects the specific and measurable characteristics of the population in a similar proportion is relatively high.

2.11. Determination of response rate and representativeness

A response rate relates the number of actual survey participants to the number of people originally invited to participate. The ratio might be any percentage ranging from 0% to 100%, but a GTS should always aim for the highest response rate possible. As a rule of thumb, a response rate over 50% is highly desirable whereas ratios below 20% are not acceptable. GTS response rates usually range between 30% and 60% (Schomburg, 2016). Unfortunately there are limited possibilities to test if the responding sample differs systematically from the non-responding sample. Since achieving a 100% response rate is highly unlikely, even a full census will turn out to be a sample survey in the end - whether we like it or not. To be able to make conclusions about a population, the group to be asked (the sample) has to be similar to the population. That means, the distribution of characteristics among the study population and the sample should be nearly the same. If this is not the case, we call it a sampling bias. Those selected would not represent the study population they have been chosen from.

To test if a random sample survey sufficiently reflects all relevant characteristics of the whole cohort population, a comparison of data contained in the address data base and of survey participants' data is necessary. The following characteristics of survey sample and cohort population might be compared:

- gender (e.g. theory: women participate more often);
- type of degree (e.g. theory: Ph.D. holders are difficult to contact);
- course of study (e.g. theory: engineers participate less often);
- graduation date (e.g. theory: the longer it is since graduation, the more difficult it is to contact people);
- study duration (e.g. theory: the longer the study duration, the lower the willingness to participate);

- final grade (e.g. theory: the worse the grade, the lower the willingness to participate);
- nationality (e.g. theory: foreigners are harder to contact).

If the characteristics of survey sample and cohort population deviate, a so called coverage error has occurred. Such a coverage error can sometimes be explained with:

- gender: Women tend be more eager to participate in a survey rather than men;
- type of degree: Graduates with a bachelor or master degree are often easier to trace than those with a PhD degree;
- course of study: Engineer graduates are less likely to respond rather than teachers;
- graduation date: Difficulties to contact a graduate tend to increase the further in the past the graduation date is;
- study duration: Long-term students tend to shy away from contacting their university after graduation;
- final grade: Graduates with a poor grade tend to ignore correspondence from their former university;
- nationality: Foreign nationals are more difficult to contact.

If the coverage error is significant but unavoidable, the project documentation must mention these shortcomings and the analysis of data and findings need to be adjusted.

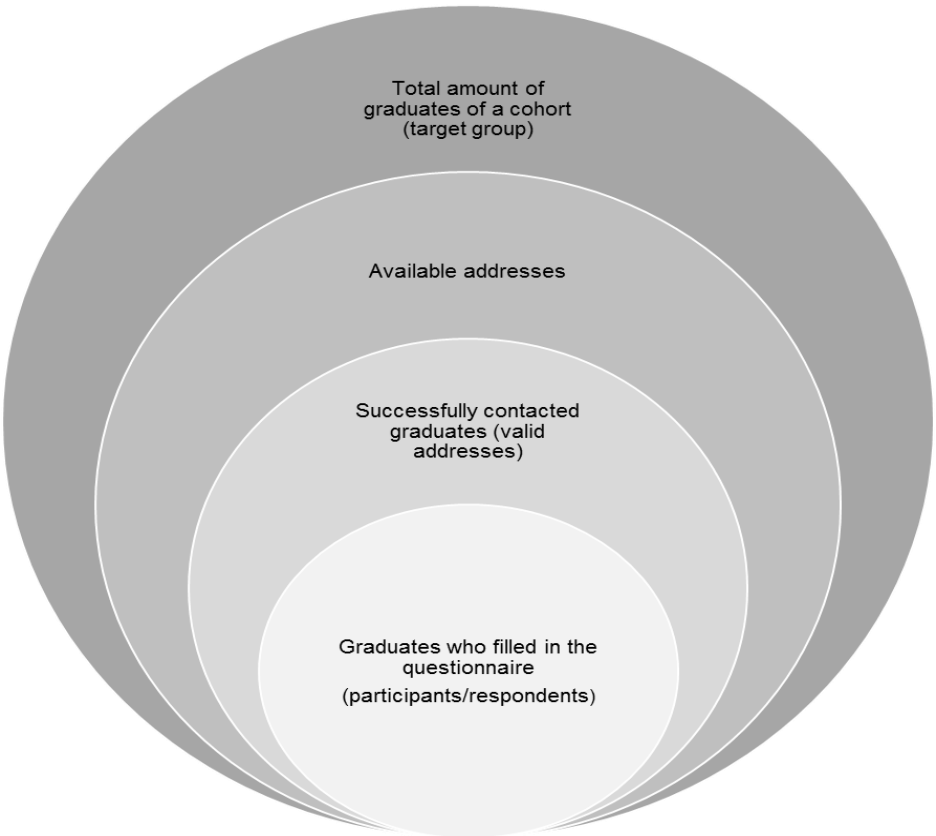


Figure 16: Target group and response

The following values must be available for the calculation of a response rate:

- A: Total number of eligible persons (e.g. the number of graduates that could theoretically be questioned → gross sample, e.g. n=1000);
- B: The number of invalid addresses (e.g. 200);
- C: Total number of eligible persons having a valid address (e.g. those graduates which could realistically be reached → adjusted gross sample, e.g. 1000-200 = 800 ≙ 100%);
- D: Total number of contacted graduates who did not respond (e.g. those graduates who actually received an invitation letter and did *not return or complete* the questionnaire e.g. 450);
- E: Total number of contacted graduates participating in the survey (e.g. those graduates who actually received an invitation letter and returned a questionnaire with data ready for the analysis → net sample e.g. 350).

The response rate is then calculated as follows: Response rate = E/C*100 and in our example takes the value of 43.75% (350/800*100=43.75%). The UNITRACE 2.0 teams achieved a response rate of 38% on average.

2.12. Incomplete questionnaires

It often occurs that survey questionnaires are not fully completed. Especially online surveys are subject to the 'lurker' phenomenon meaning people who only browse through a questionnaire but do not answer questions. Other participants rush through the questionnaire, answering questions inconsistently and without thought. This might happen if an incentive is promised for returning a questionnaire which the lurker is eager to obtain but feels completing the questionnaire is a hassle. Some online survey participants, the 'drop-outs', abort the questionnaire completion process at an early stage for whatever reason. In Chapter 4.6.1 it is explained how to decide if data from incomplete questionnaires can be used for the analysis. It remains important, however, to identify and dismiss a lurker's questionnaire since the data analysis and its findings might be distorted otherwise.

2.13. Checklist preparation of the fieldwork phase

The following checklist summarizes the most important steps in the preparation of a GTS project.

- Have GTS purposes and objectives been defined?
- Were all relevant GTS stakeholders (e.g. university directorate, alumni office, registrar, etc.) identified?
- Were all stakeholders briefed and aware of the GTS?

- Have all duties and responsibilities been defined and clearly assigned?
- Is there a good estimate of financial, material and human resource requirements?
- Are sufficient funds available to properly carry out the GTS?
- Has a Project Action Plan (PAP) containing
    - a realistic timeframe with some leeway for unexpected events,
    - an assignment of duties and responsibilities, and
    - possible obstacles and how to meet them been created and
    - is the plan regularly updated?
- Is statistical information available about the target population (number of graduates, composition, etc.)?
- Has the GTS target group been clearly defined?
- Does the questionnaire have the approval of relevant stakeholders?
- Is the address data available an accessible?
- Has an address data base been created?
- Were addresses verified and up-dated?
- Has the survey methodology been determined?
- Is the technical infrastructure for the chosen survey methodology in place?
- Has the survey procedure been sufficiently tested?
- Has third party communication (e.g. invitation letter, reminder, website, flyer, etc.) been designed and have relevant stakeholders given their approval?
- In the case of a paper based survey, have
    - questionnaires been printed?
    - the (personalized) invitation letters been printed)?
    - envelopes and stamps been acquired?
    - stamped envelopes for the return of the questionnaire been prepared?
- Are the relevant people (e.g. career service, alumni service) informed?
- Is there a personnel backup (student assistants) available?

3. Work phase II: data collection

3.1. Educational objectives of work phase II

The following chapters will elaborate on…

- …activities in preparation of the fieldwork phase,
- …the tasks during a fieldwork phase,
- …the importance of a codebook and its use and structure.

3.2. Conduction of the survey

There are some important tasks to be performed during the so called fieldwork phase, e.g. the timespan when survey questionnaires are to be completed. It is of upmost importance that the survey process runs trouble-free and one has to keep in mind, that it is not a matter of course that graduates receiving an invitation to participate in the GTS will actually respond. But survey participation is only one element of successfully carrying out a GTS. Participants in the UNITRACE programme reported several obstacles before and during the fieldwork phase. The following table lists solution approaches to some of the problems observed:

Problem	Possible solution approach
Deciders' busy schedules.	Contact relevant stakeholders as early as possible and convince them of the benefits of a GTS. Raise awareness of the challenges that are to be met when carrying out a GTS.
Funding issues.	A GTS is doomed if funded insufficiently. 'Zero budget' GTS is wishful thinking. An adequate budget depends amongst others on the survey methodology chosen, the extent and nature of the survey population and the availability and quality of an address data base. The use of a PAP tool is very helpful when budgeting necessary resources.
Availability of relevant supportive staff.	Staff availability depends on resources and the early estimate of the number of staff needed is highly recommended.
Time limits / workload / time constraint because of other obligations.	It took 188 working days on average for the UNITRACE 2.0 teams to plan and execute their local GTS. A timeframe of 200 working days is, however, just a guide. Past survey experience is an important factor for time usage of a GTS together with the number of target graduates, the survey methodology chosen, the availability and quality of an address data base, the depth of the analysis of data and the reporting, etc. When carrying out a GTS for the first time, a timeframe of at least 200 working days should be planned and it should be ensured that project members and staff are not constrained through other obligations. The employment of dedicated staff is justified by all means.
Addresses not present, address data not up-to-date, address with errors.	If it is not already carried out, it is essential that a university registers its students at the beginning of their studies in a central electronic address database, which needs to be actively managed and updated. This database should contain at least the student's phone number, e-mail address and a hometown contact address. Graduation is the last feasible opportunity to obtain this contact data. Of special interest is the student's e-mail address which should not be university specific and might expire after

	graduation.
Problems with the implementation of the (online) survey.	The carrying out of a survey is not a trivia and needs sufficient lead time, especially in the case of an online survey. The questionnaire must be programmed and needs thorough testing in order to identify and repair possible shortcomings. However, this is only one issue to be resolved. Administration of participants, dispatch of invitation letters by post or e-mail and the management of replies require adequate training of project staff.
Incomplete questionnaires.	Possible solution approaches are suggested in Chapter 2.10.9.

Table 8: Possible problems of conducting a GTS

3.3. Managing the replies

The management of replies is one important activity during the fieldwork phase. Each reply, be it a completed questionnaire or undelivered mail has to be registered in the address data base in order to insure that no unnecessary or undeliverable reminders are being sent out. This is not only a time and money-saving practice but also avoids annoying graduates who have already completed a questionnaire. In case of undelivered mail, the current postal address needs to be investigated and the address data record needs to be amended. Any database modification, however, must be recorded and the new data file should be renamed (e.g. incorporating the date of change in the file name).

In the case of a paper-based survey the returned questionnaires must be collected, administered and prepared for further processing. They need to be tagged with successive ID numbers and the return date should be added on each cover.

3.4. Activities during the fieldwork phase

The following activities and tasks need to be pursued during the fieldwork phase:

- coordination of general processes with concerned university offices (e.g. mailroom);
- administering the replies (moved to new address, moved to unknown address, replied);
- investigation of new addresses for undelivered mail;
- organizing the dispatch of invitation letters and reminders;
- actual mail dispatch;
- answering of queries from graduates in case of general questions or problems;
- development of a codebook.

It is also necessary to give interviewers an adequate training if face-to-face or phone interviews need to be conducted. A competent supervisor with sufficient authority must be available to guide the interviewing staff and to help out with problems.

3.5. Development of a codebook

Codebooks are a powerful tool to organize data records. A codebook is a document used in data processing and analysis that tells the location of different data items in a data file. Typically, the codebook identifies the locations of data items and the meaning of the codes used to represent different attributes of variables (Babbie, 2004). There are no formal requirements except that anybody who reads the codebook should be able to understand how the information given in the questionnaire should be treated as data (Schomburg, 2016). All relevant information about data entry and data analysis should be stated in the codebook in a way that makes the data easily accessible also for third parties and even years later. Every codebook should contain a full definition of the variable, namely:

- exact wording of the question asked;
- variable name which must be self-explanatory but brief. The database software used might also have syntax requirements that need to be observed;
- variable label: Frequency counts by statistical analysis software such as SPSS usually have the header for labelling. Header entries hence should be brief and self-explanatory. It is advisable as well to include the numbering of questionnaire questions if applicable;
- value (code category): These are numerical values which replace a text in order to make calculations possible;
- value label: A label that you can attach to a code, indicating the attributes comprising each variable.

For benchmarking purposes the UNITRACE 2.0 course jointly developed a questionnaire with core questions for all participating HEIs. In addition a set of optional questions was developed which each university could decide upon individually. The universities were of course at liberty to develop and include their own questions in their questionnaire. The codebook should include a description on the type of question. The following example shows a partially closed-ended question with a single choice (cf. Chapter 2.6.4):

	A8	**Which type of high school/ college/ university did you graduate from prior to attending this university?**
1	☐	Public
2	☐	Private
3	☐	Other:.....
		(please specify)

Figure 17: Partially closed-ended question with single choice (nominal scale)

A matching codebook entry could be as follows:

- Exact wording of the question asked = ‘Which type of high school/ college/ university did you graduate from prior to attending this university?’
- Variable name = c_a08.

- Variable label = A8: Type of college.
- Values = 1, 2, 3, -9.
- Value labels: 1 = Public, 2 = Private, 3 = Other, -9 = not answered.

Because the free-text answer option ‘other’ needs to be registered as a separate variable, it is coded in addition below. Online surveys automatically register free text particulars in separate variables.

c_a08	A8: Type of college	Core
Which type of high school/ college/ university did you graduate from prior to attending this university?		
1	Public	
2	Private	
3	Other	
-9	Not answered	
c_a08_o	A8: Type of college (free text)	Core
string		

Table 9: Codebook entry of an open -ended, single choice question

The following question requires a response to a list of Likert items (c.f. Chapter 2.6.6) in the form of agreement or disagreement to several statements on a scale of 1 to 5.

B10 How do you rate the following study experiences?

	Very bad 1	2	3	4	Very Good 5	
1	☐	☐	☐	☐	☐	Classroom environment (lectures & tutorials)
2	☐	☐	☐	☐	☐	Internship programme (fieldwork course /work experience)
3	☐	☐	☐	☐	☐	Community service and outreach
4	☐	☐	☐	☐	☐	Conducting fieldwork research
5	☐	☐	☐	☐	☐	Research supervision
6	☐	☐	☐	☐	☐	Student organization
7	☐	☐	☐	☐	☐	Participation in extracurricular activities
8	☐	☐	☐	☐	☐	Social relations (peers, friends)
9	☐	☐	☐	☐	☐	Formal relations (teaching and non-teaching)
10	☐	☐	☐	☐	☐	Counselling & guidance

Figure 18: Likert items (ordinal scale)

A matching codebook entry could be as follows:

o_b10_01	B10: Rating: Study experiences: classroom environment	Optional
How do you rate the following study experiences? Classroom environment (lectures & tutorials		
1	Very bad	
2	2	
3	3	
4	4	
5	Very good	
-9	Not answered	

Table 10: Codebook entry of a multiple question

Sometimes, it can occur that data in a survey is collected in a more differentiated way than actually needed. It is consequently possible to summarize several variables in one new variable. In doing so, we aggregate the data. For example, several variables that refer to the educational career of parents might constitute one new variable on the graduate's educational background. Another possibility to treat over-differentiation is to summarize answers in categories. For example, to be able to illustrate the responses on income graphically, it makes sense to categorise these responses in a new variable. In this case, the variable income that consists of individual numerical values could be transferred into a new variable that summarises the numerical values in different scopes. The new variable might then have the following values: 1 (= no income); 2 (= income of up to $250); 3 (=$251 - $500); 4 (=$501 - $750); 5 (=$751 - $1000); 6 (=$1001 and above); 9 (= no answer). This process is called the recoding of a variable. It is important, however, that the original data is saved since the recoding process might turn out to be erroneous and need to be repeated. A recoded variable must always be classified as a new variable for codebook entry.

The codebook also has to take into account of the fact that data-collection seldom occurs without mistakes. A graduate might refuse to answer a certain question which is an eventuality the codebook must provide for. If the question does not have a 'no-answer' option, all other answering options will remain blank. Also this information should have a code in the codebook and thus find its way into the data record.

4. Work phase III: data analysis and reporting

4.1. Educational objectives of work phase III

The following chapters will elaborate on…

- …how to structure a fieldwork report;
- …data records and how to structure them;
- …how to develop and structure an analysis plan;
- …how to employ a syntax for data processing and data analysis;
- …how to eliminate inconsistencies from data records;
- …how to treat missing values in a data analysis;
- …how to analyse data descriptively and how to report on findings;
- …what is to be observed when findings are reported and interpreted;
- …how a HEI could use the experience gained during a first time GTS for developing and improving future studies.

4.2. Structuring a field report

Once all field activities are completed, a field report needs to be prepared. It should document special occurrences during the fieldwork phase which would normally not find their way into the final survey report and make them transparent. Methodological aspects of the current and future GTS might thus become easier to compare. First drafts of the field report could already be written during the fieldwork phase. Field report and the final survey report should both contain at least a definition of the target population and its selection procedure as well as information on the survey methodology employed, the survey period, average questioning time and the response rate.

Schomburg gives a list of details for a comprehensive field report as follows (Schomburg, 2016):

- information on project leader and managers;
- background and GTS objectives;
- definition of target population;
- documentation of how the survey population and the sampling procedure (if applicable) was determined;
- information on the socio-demographic structure of a sample, if possible in comparison with similar university statistics;
- survey methodology employed;
- depending on survey methodology

    - reason for the selection of methodology;
    - survey period;
    - number of reminders and dispatch date;
    - average length of interviews (in minutes);
    - nature and use of incentives (if applicable);
- number of eligible graduates (gross sample);
- number of eligible graduates with a valid address (adjusted gross sample);
- number of participating graduates (net sample);
- response rate;
- check of representativeness (comparison with existing statistics);
- data entry and coding procedures;
- kind of plausibility checks and data cleaning applied;
- data analysis procedures (software and procedures used);
- critical reflection about the quality of the data;
- information on interview personnel (if applicable).

4.3. Structuring data records

A set of data with information given by all responding graduates needs to be arranged in a way that makes it ready for an analysis. It usually comes in tabular form with each column listing the specifications of a variable and each row representing a case (e.g. a graduate). In other words every answer by one single responding graduate finds entry in one row in a predetermined order. Several software tools dealing with the statistical analysis of tabular data are available. However, it is advisable to only use a software with a command language (a syntax) as option (in addition to) menu control. Working with a syntax has major advantages such as:

- the command syntax files can be saved;
- if inconsistencies occur after the modification of a data set (e.g. definition of new variables) ensuing syntax deficiencies can be traced and easily be healed;
- recurring data records requiring the same kind of (usually complex) analysis are economically manageable if the same syntax is repeatedly employed.

When the fieldwork phase is finished, the set of data raised might generally come in three ways:

- electronic set of data (e.g. generated by means of an online survey);
- various sets of data, since several survey methodologies were employed each generating an individual set of data;
- data collected still needs entry into a data matrix.

The last two possibilities imply that a data analysis cannot start immediately. Even an electronic set of data usually needs some editing first. It might even be a challenge to maintain an overview since a set of data often comes with large case numbers and often with several hundred variables. This is why it is highly recommended to keep the data well organized and structured. In order to do so:

- use file directory structures to keep relevant files together: Pick a directory structure that makes it easy to find each set of analyses with corresponding data and output files;
- organise your dataset before analysing the data;
- do data manipulation in syntax (cf. Chapter 4.5).

4.4. Developing an analysis plan

It was already mentioned that survey findings were of interest to various stakeholders (cf. Chapter 2.3). Stakeholder groups are our target audience, a sort of 'customer' for the knowledge we gain by conducting GTS and analysing the results. To get the most we can out of the GTS results, it is vital to satisfy these 'customers'. Easier said than done, but can be made possible by putting oneself in their shoes and considering what you would want to know if you were them. Tailoring analyses as well as the presentation of results to our stakeholders' needs will ensure that GTS results and thus the graduates' perspective have an impact. Possible stakeholder groups and knowledge interests should be identified before working out a data-analysis plan. Knowledge interests are not always easily retrieved from stakeholders, which is why GTS project members should start out by looking from a stakeholder's perspective. However, there is the possibility of starting a dialogue with stakeholders and asking them, what they want to know. Having said that, project managers should be prepared to actually get a reply. Stakeholders might not be aware of what specific knowledge from GTS might be helpful for their decision making, quality management, etc. Additionally, it is quite difficult for individuals who do not know the data to estimate, which questions could be answered. GTS project managers are privileged inasmuch as they know the results from the GTS before anyone else does. Being aware of this privilege and selling the value of results for decision making and quality management well, they are already half way there. They should make sure to only sell what they can actually deliver and provide the results on time, so decision making can be based on results instead of good instincts alone. Taking the following steps might be helpful for developing an analysis plan:

- identify stakeholder groups who might be interested in GTS results;
- step into stakeholders' shoes to identify possible knowledge interests;
- phrase knowledge interests;
- identify the appropriate variables to answer knowledge interests;
- choose appropriate methods to analyse data and answer specific knowledge interests.

An analysis plan is not of static nature and might need constant readjustments since new aspects might become of interest even during the data analysis. It can be structured along templates which should contain the following:

- 1st column: stakeholder group of specific results (write down group that you think is interested in the results; add a note if they have actually asked the question);
- 2nd column: research question / knowledge interest (as detailed as necessary);
- 3rd column: survey question (number and phrasing from questionnaire);
- 4th column: variable(s) (you can refer to your codebook regarding the variables);
- 5th column: method(s) of analysis (e.g. descriptive statistics, crosstabs);
- 6th column: comment (e.g. this interest cannot be answered by our data, are we authorised to give this result to the stakeholder group in question).

Stakeholder group of specific results	Research question/ knowledge interest	Survey question	Variable(s)	Method(s) of analysis	Comment

Table 11: Analysis plan template

4.5. Getting started in SPSS

The analysis software IBM SPSS Statistics[9], which is commercially sold but usually available for use at universities, has become a standard for data processing in the social sciences. All institutes that participated in the UNITRACE 2.0 programme also used this software. Alternatively an analysis software called PSPP which has a similar appearance and is a free replacement for the proprietary programme IBM SPSS Statistics can be of help.[10]

The following is a brief description of the SPSS structure and its data processing routines:
The so called IBM SPSS Statistics Data Editor is the initial interface when opening a set of data. It comes with two spreadsheets, namely the Data View and the Variable View. The tabs in the bottom left part of the display are for switching between both views. An active tab is highlighted in yellow. The Data View spreadsheet is meant for data input, whereas the Variable View spreadsheet contains changeable information on each variable such as its name, a label or values. Missing values might be declared here as well.
The SPSS Statistics Syntax Editor is for writing or editing the programme syntax. The right part of the window displays a whole programme code, whereas its heading can be seen on the left part. A possible syntax error appears in the lower right part. For executing a programme in part or in full, it

[9] http://www.ibm.com/analytics/us/en/technology/spss
[10] https://www.gnu.org/software/pspp

is necessary first to highlight the command(s) to be executed. A green arrow appears and a further click initiates the procedure.

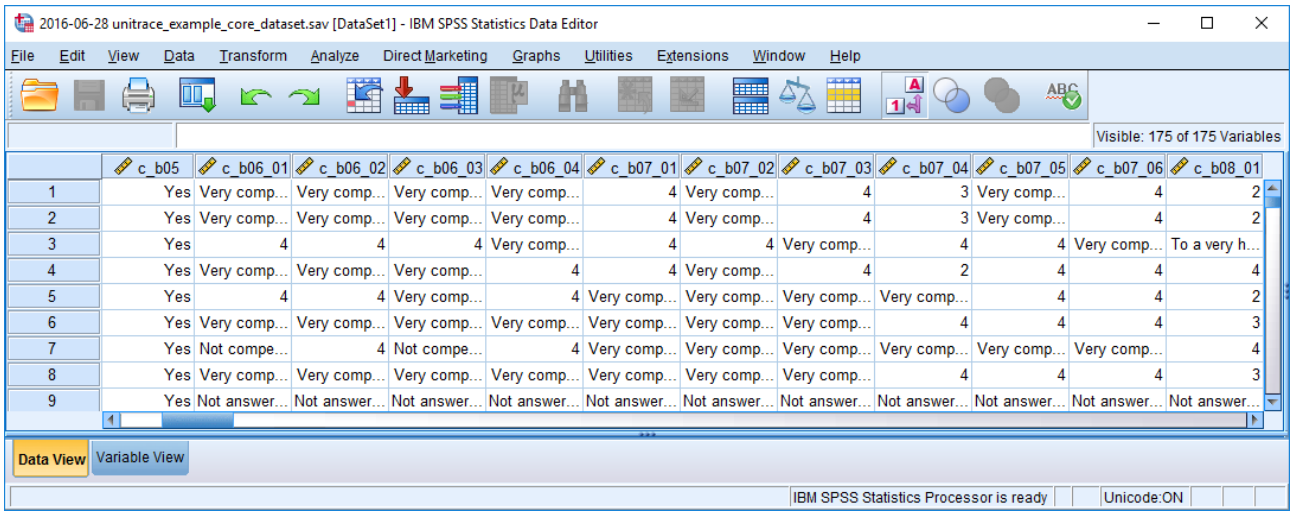


Figure 19: SPSS Statistics Data Editor - Data View

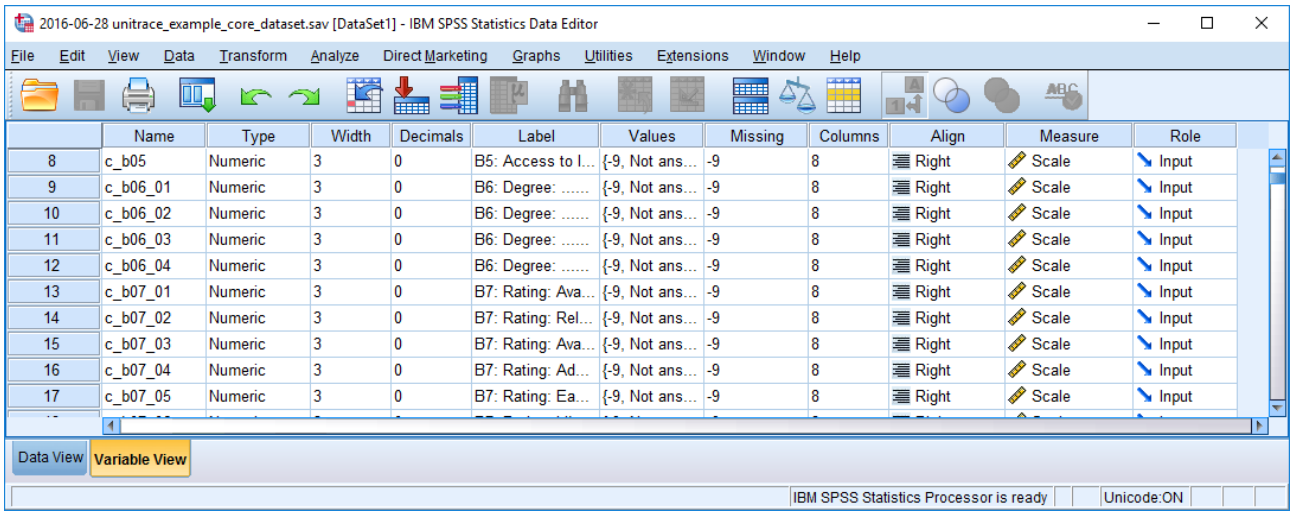


Figure 20: SPSS Statistics Data Editor - Variable View

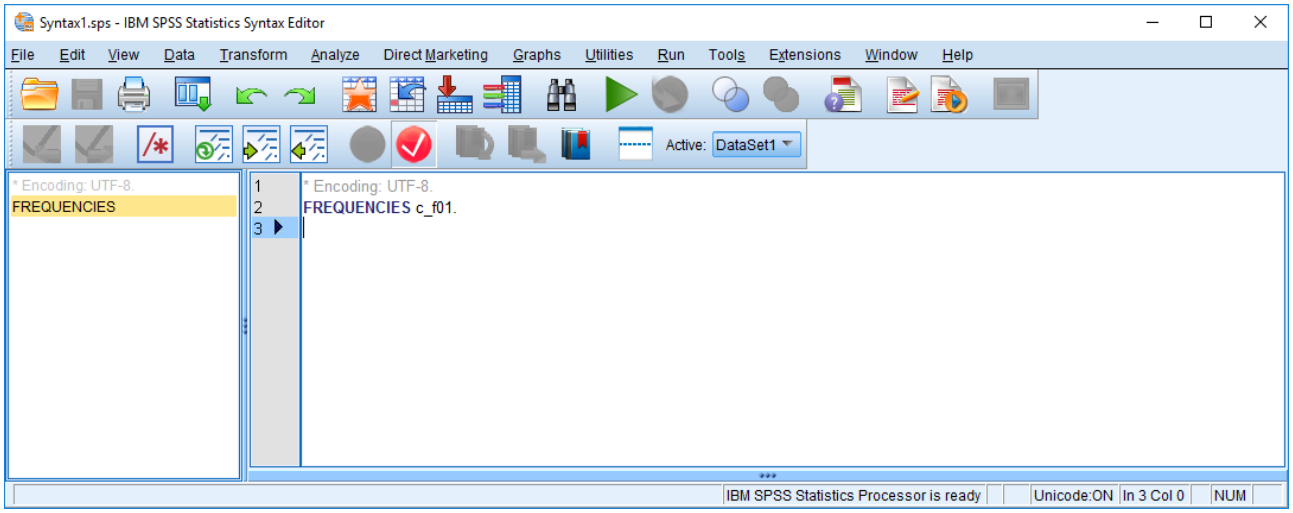


Figure 21: SPSS Statistics Syntax Editor

The exemplary programme syntax above is to create a frequency table for the variable *c_f01*. Upon its execution a new window, the so called output, opens with a table containing the requested and ancillary information on display.

F1: Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	196	39.,6	39.6	39.6
	Male	299	60.4	60.4	100.0
	Total	495	100.0	100.0	

Table 12: Example of a frequency count

Some basic syntax commands are being introduced in this chapter, however, the following has to be observed when they are applied:

- SPSS does not distinguish between upper and lower case letters. However, in order to keep a good overview, it is conventional to use upper case letters for syntax commands and lower case letters for variables.
- It is important to know that statistical procedure commands (e.g. to create a frequency table) are immediately executed when starting the syntaxes. In contrast to that are commands for the transformation and analysis of data which always end with an EXECUTE programme code.
- Every command must begin on a new line and has to end with a full stop.
- Indents should be applied if a single command syntax goes over several lines.
- Text and character strings must be in apostrophes (‘Text’).
- If the syntax allows for a blank space the command code may continue on a new line after the blank.

The `RENAME VARIABLES` command prompts a change of single or multiple variable names into newly defined names. Its application makes sense since changes are documented, which is not the case if variables are renamed manually. The general programme syntax is as follows:

```
RENAME VARIABLES varname = varname.
```

The execution of a syntax such as

```
RENAME VARIABLES A008 = c_a06_y.
```

would change the name of a variable from *A008* into *c_a06_y*. Values and labels remain unchanged as well as the declaration of missing values. Only the variable name is switched.

The `VARIABLE LABELS` command assigns a label to a variable. The general programme syntax is as follows:

```
VARIABLE LABELS varname 'label'.
```

with varname being the variable which gets a label assigned.

The execution of a syntax such as

```
VARIABLE LABELS c_a06_y 'A6: Year of admission'.
```

would assign the label *A6: Year of admission* to the variable *c_a06_y.*

The `VALUE LABELS` command assigns a value or a code to a variable. The general programme syntax is as follows:

```
VALUE LABELS varname value 'label' value 'label'.
```

The execution of a syntax such as

```
VALUE LABELS c_a06_y -9 'Not answered' 1 '2016' 2 '2015' 3 '2014'4
'2013' 5 '2012' 6 '2011' 7 '2010' 8 '2009' 9 '2008' 10 '2007' 11
'2006' 12 '2005' 13 '2004' 14 '2003' 15 '2002' 16 '2001' 17 '2000'.
EXECUTE.
```

would assign the label *not answered*, *2016*, *2015*, etc. to the variable *c_a06_y -9*.

The `MISSING VALUES` command declares a missing value or missing code. The general programme syntax is as follows:

```
MISSING VALUES varname (value).
```

The execution of a syntax such as

```
MISSING VALUES c_a06_y (-9).
```

would assign the value or code *-9* to the variable *c_a06_y*.

The `COMPUTE` command is used to create a new variable which might be necessary for example in order to copy the contents of an existing variable into a new variable. The command is also applicable if the aim is to calculate new variables on the basis of an existing variable or if a new variable with dummy values is created for recalculation at a later stage. The general programme syntax is as follows:

```
COMPUTE target name = expression.
```

The execution of a syntax such as

```
COMPUTE var_new_01 = 0.
EXECUTE.
```

would create a new variable named *var_new_01* which would always assume a *0* value.

The `RECODE INTO` command recodes existing variables, or to be precise their values or codes. The general programme syntax is as follows:

```
RECODE varname_old (value_old = value_new) INTO varname_new.
```

```
EXECUTE.
```

For example a Likert scale of 5 needs to be reduced to a scale of 3 by condensing each two fringe categories.

	To what extent are you competent in...					
	Not competent at all				Very competent	
	1	2	3	4	5	
1	☐	☐	☐	☐	☐	…using Microsoft office applications
2	☐	☐	☐	☐	☐	…accessing e-learning resources
3	☐	☐	☐	☐	☐	…browsing internet
4	☐	☐	☐	☐	☐	…online job applications

Figure 22: Likert items (ordinal scale)

In our example the values/codes of a variable *c_b06_01* are to be recoded and the new variable will be named *c_b06_01_cat*. The suffix '_cat' helps to quickly find those variables that have been categorized. The recoding command condenses the two bottom values (1 and 2) into a new category 1, the former middle category 3 becomes the new middle category 2 and the former top categories 4 and 5 are condensed into a new top category 3[11]. Values outside the 1 – 3 range shall receive a missing tag in the new variable. Variable and its values shall also get labels assigned. The execution of a syntax such as

```
RECODE c_b06_01 (1 thru 2=1) (3=2) (4 thru 5=3) (ELSE=SYSMIS) INTO
c_b06_01_cat.
VARIABLE LABELS c_b06_01_cat 'B6: Degree: ...using Microsoft office
applications (categorized)'.
VALUE LABELS c_b06_01_cat 1 'bottom (1+2)' 2 'middle (3)' 3 'top
(4+5)'.
EXECUTE.
```

Would generate a new variable *c_b06_01_cat* based on the existing variable *c_b06_01*.

In order to check if the recoding result is without error, a frequency table for both variables *c_b06_01* and *c_b06_01_cat* will be created:

```
FREQUENCIES c_b06_01 c_b06_01_cat.
```

It is now possible to test if values were correctly condensed. The original variable had no answer with the value 2 and seven answers with the value 1 ('not competent at all') which translates into seven answers for the category 1 ('bottom (1+2)') of the new variable *c_b06_01_cat*. The eight answers in the category 3 of the variable *c_b06_01* are also correctly recoded to category 2 ('middle (3)') in *c_b06_01_cat*. Finally the 81 answers in the category 4 together with the 384 answers

[11] It should be pointed out again that a recoding process should always result in a new additional variable leaving the original variable unchanged. A recoding of the original variable might result in a loss of primary information.

in the category 5 (‘very competent’) of the original variable c_b06_01 are correctly summed up to 465 answers in the category 3 (‘top(4+5)’) of the new variable *c_b06_01_cat*.

B6: Degree: ...using Microsoft office applications					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not competent at all	7	1.4	1.5	1.5
	3	8	1.6	1.7	3.1
	4	81	16.,4	16.9	20.0
	Very competent	384	77.6	80.0	100.0
	Total	480	97.0	100.0	
Missing	Not answered	15	3.0		
Total		495	100.0		

Table 13: Example of a frequency count based on a Likert scale

B6: Degree: ...using Microsoft office applications (categorized)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bottom (1+2)	7	1.4	1.5	1.5
	middle (3)	8	1.6	1.7	3.1
	top (4+5)	465	93.9	96.,9	100.0
	Total	480	97.0	100.0	
Missing	System	15	3.0		
Total		495	100.0		

Table 14: Example of a frequency count based on a categorized variable

4.6. Preparation of data, data analysis and reporting

4.6.1. Data input and adjustment

A data set still needs to be created if, for instance, the survey was paper-based. This means that data from the paper questionnaire needs to be entered into a data matrix according to rules laid down in a codebook. The codebook assigns a variable to every questionnaire question and a code to every possible answer. It is the base for creating a data matrix with the SPSS or PSPP software with data entries taken from the questionnaire. If several persons are entrusted with a manual data entry, the codebook is the more important for insuring a standardized data capture.

The data capturing process is also a good opportunity for eliminating possible erroneous data. Any data collection, be it on an automatic or manual basis, can include mistakes. The most common mistakes are wild codes and outliers. Wild codes are values that are outside the defined range of possible values. Let us assume a variable with values between 1 and 5. That means, 1, 2, 3, 4 and 5 are valid values. If the data matrix also includes the value 7, this is a wild code (perhaps just a literal mistake). Outliers are values that are not plausible. For example, a variable on semesters

includes a value of 85. This value would not be plausible and should be rejected from the collected data. Existing wild codes, outliers or non-responses are non-valid values that are coded with their own code (e.g. -8 = not applicable and -9 = no answer). They are also called missing values.

In case of empty or not valid fields (e.g. because no answer was given), it is important to avoid a code ‘0’ since this might be a valid code for other data base variables.

An individual review of data is necessary if a data record is susceptible to come from a lurker (cf. Chapter 2.12) or is a drop-out reply. A lurker’s answer to open-ended questions usually makes no sense. In the case of Likert scales, the lurker could for instance use meaningless answering patterns (e.g diagonal or solely one single column) thus expressing for example the same level of agreement to two excluding statements. Whereas the decision to invalidate a data record should always remain with the project managers, the online survey software often includes a tool for identifying lurkers by recording the time used for completing each questionnaire. Strong deviations from an average duration are good evidence that the questionnaire was completed by a lurker. As a rule of thumb a completion period of less than half the average should raise suspicion that questions were answered hastily and without thought. If the answering process was aborted, an online survey software usually records the page the disruption took place and calculates the percentage of questions that remain unanswered. There is no general rule when to discard an incomplete questionnaire, however, a minimum of 70% of questions (taking into account possible question filters) should have been answered to make a data record valid.

It was already mentioned in chapter 2.6.1 that replies to open-ended questions can be a valuable source of information. However, a time-consuming categorization of text based answers is a drawback. Qualitative data can be translated into quantitative data, when words or text are defined with a numerical value. In doing so, text-based answers or comments on questions such as ‘Please add any additional comments’, can be categorised. Each of such categories receives a numerical value (also named codes), which can be analysed statistically. Based on such coding, qualitative data is transformed into quantitative data (Trochim, 2005). The following example of a classificatory scheme shows how to proceed in principle:

ID	City of first employment (qualitative)	City of first employment (quantitative)
1001	NAIROBI	2
1002	Nairobi	2
1003	eldoret	1
1004	Nairobi	2
1005	ELDORET	1

1006	Arusha	3
1007	nairobi	2
1008	Nairobi	2
1009	Nairobi	2
1010	NAIROBI	2

Table 15: Example of a classificatory scheme

As part of the GTS questionnaire, graduates were asked which city they found their first employment. Since giving a choice of answers was not feasible, a text-based answering possibility was selected when designing the questionnaire. The answer thus comes in a qualitative, non-numerical form which needs to be transformed into a numerical value if for example frequencies are to be computed. As a solution each city mentioned was given a unique numerical code – even if the spelling of some cities was not always uniform.

4.6.2. Dealing with missing values in a descriptive analysis

Missing values should be excluded from a descriptive data analysis. Statistical analysis software such as SPSS or PSPP allows a code to be declared as a missing value. A frequency table might then look as follows:

B8: Extent: Lectures					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all	29	5.9	6.0	6.0
	2	60	12.1	12.5	18.5
	3	108	21.8	22.5	41.0
	4	139	28.1	29.0	70.0
	To a very high extent	144	29.1	30.0	100.0
	Total	480	97.0	100.0	
Missing	Not answered	12	2.4		
	System	3	.6		
	Total	15	3.0		
Total		495	100.0		

Table 15: Example of a frequency count based on a Likert scale incl. missing values

- the heading in the first row shows the label of the variable analysed;
- the first column lists the valid and missing categories. ‘Not answered’ means that the question was deliberately skipped. ‘System’ means that a filter jumped the question or that an answer is missing since the questionnaire was terminated before completion;

- the second column lists the variable codes or rather their labels in ascending order. It is split into two sub-groups, e.g. ‘valid’ and ‘missing’ or invalid;
- the third column shows the frequencies of each code. Code 5 for instance, which is labelled ‘To a very high extent’ has a frequency of 144 in the underlying set of data;
- the fourth column shows the percentage distribution of all answers, including the answers defined as missing. A frequency of 108 related to all 495 answers thus computes to a percentage of 21.8%;
- the fifth column shows the percentage distribution of all valid answers, e.g. excluding the answers defined missing. A frequency of 108 related to 480 valid answers thus computes into a percentage of 22.5%;
- the last column shows the cumulative percentage values of the previous column. For instance 18.5% of responding graduates chose the answering option 1 or 2 to the question text ‘To what extent were the following modes of teaching and learning emphasized in your study?’ of the Likert item ‘Lectures’.

4.6.3. Data analysis

After the survey data eventually has been captured, prepared and tested, the most interesting part of the GTS process is due, namely the data analysis usually followed by a presentation of findings and a project report. Findings should be clearly arranged and must be easily understandable. This is why a project report usually compacts a set of statistical data into tables and/or diagrams and graphs or presents ‘condensed’ measures. This technique is also called descriptive statistics. This chapter gives a rough overview on statistics and measures often used in the analysis of survey data, their usage and their interpretation.

The generation of a so called frequency distribution (cf. Chapter 4.6.3) of numerical, e.g. coded or quantitative, variables is a standard routine for statistical analysis software such as SPSS or PSPP. It usually draws a table which shows the absolute as well as a percentage distribution. It is highly recommended to draw frequency tables for every single variable last not but least since input errors such as wild-codes or outliers (cf. Chapter 4.6.1) are more easily identified.

Metrical data, such as income, could also be computed into measures of central tendency (Dietz & Kalof, 2009), which is a compact way to present information. Central tendency measures, which can easily be generated with SPSS, are for instance calculations of the most frequent value (the mode), the central value (the median) or the average value (the mean) in a frequency distribution. A mode can be generated even from variables on a nominal scale whereas a median needs ordinal variables for calculation. It is the value that separates the higher half of a data sample from the

lower half or is, in simple terms, the ‘middle’ of a data set. Calculating a mean strictly speaking requires an interval-scaled variable, however, this measure is also generated from ordinal scaled variable. Its computation divides the sum of all variable values by the number of replies. The mean is also commonly known as average and has some shortcomings for interpretation since it levels down extreme values the frequency distribution might have. The so called standard deviation measures how values are spread around a mean. Or in other words, whether they cluster together or are widely dispersed. It is the square root of the sum of the squared deviations from the mean divided by one less than the sample size.

The following example will further illustrate central tendency measures. The data set includes a variable c_d10_01 which relates to the average monthly income generated from the major job. The execution of a syntax such as:

```
FREQUENCIES VARIABLES=c_d10_01
 /STATISTICS=MODE MEDIAN MEAN STDDEV
 /ORDER=ANALYSIS.
```

would create a frequency table together with the central tendency measures such as the mode = $ 450 with the highest count of 149 answers, the median = $ 900 meaning this value represents the middle of the income range and the mean = $ 1.283,95 with a standard deviation of $ 1.167,02 which is quite high. The high standard deviation means that individual incomes scatter in a wide range around the average of $ 1.283,95 which makes the mean less representative for the whole survey population. As pointed out before, most graduates have a monthly income of $ 450 and half of surveyed graduates only up to $ 900 which is considerably less than the mean value.

Statistics		
D10: Approx. gross monthly income in US Dollars: Major job		
N	Valid	392
	Missing	103
Mean		1,283.95
Median		900.00
Mode		450
Std. Deviation		1,167.020

Table 16: Example of central tendency measures

D10: Approx. gross monthly income in US Dollars: Major job					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	450	149	30.1	38.0	38.0
	470	15	3.0	3.8	41.8
	500	8	1.6	2.0	43.9
	700	8	1.6	2.0	45.9
	760	7	1.4	1.8	47.7
	780	8	1,6	2.0	49.7
	900	30	6.1	7.7	57.4
	1000	16	3.2	4.1	61.5
	1100	7	1.4	1.8	63.3
	1200	38	7.7	9.7	73.0
	1250	7	1.4	1.8	74.7
	1500	6	1.2	1.5	76.3
	2000	21	4.2	5.4	81.6
	2400	8	1.6	2.0	83.7
	2500	12	2.4	3.1	86.7
	3250	8	1.6	2.0	88.8
	3800	10	2.0	2.6	91.3
	3900	12	2.4	3.1	94.4
	4000	14	2.8	3.6	98.0
	4500	8	1.6	2.0	100.0
	Total	392	79.2	100.0	
Missing	Not answered	103	20.8		
Total		495	100.0		

Table 17: Example of a frequency count based on a metrical variable

A frequency count usually includes the answers from the whole basic population. It leads to statements such as ‘the average income is … $’ or ‘…% of graduates found a job’. Those findings are of course important and true, however, sometimes a more differentiating analysis of sub-groups might be desirable. So-called contingency tables or cross-tabs can be generated in order to analyse the frequency distribution of two variables (e.g. the variable with the label ‘gender’ and the *code c_f01* together with the categorized variable *c_e01_02_cat* which informs about ICT skills at graduation. The execution of a syntax such as:

```
CROSSTABS
 /TABLES=c_e01_02_cat BY c_f01
 /FORMAT=AVALUE TABLES
 /CELLS=COUNT
```

```
/COUNT ROUND CELL.
```

would create a cross-tab for both variables. Such a table - shown below - displays the frequency distribution of ICT skills for each gender category separately.

E1: Extent: Competencies at graduation: ICT Skills (categorized) * F1: Gender Cross-tabulation

Count

		F1: Gender		
		Female	Male	Total
E1: Extent: Competencies at graduation: ICT Skills (categorized)	bottom (1+2)	24	7	31
	middle (3)	21	42	63
	top (4+5)	151	235	386
Total		196	284	480

Table 18: Example of a cross-tab (absolute distribution)

The numbers in this table are known as the observed frequencies. They tell us a lot about our data. For instance,

- we have an entire sample of n = 480 respondents;
- we have 196 female respondents;
- we have 284 male respondents;
- we have 386 respondents with top ICT skills.

Although our cross-table is a great starting point, it does not really show us whether ICT skills and gender are related. This question is answered more easily from a slightly modified table as shown below. It is created by execution of the following syntax:

```
CROSSTABS
 /TABLES=c_e01_02_cat BY c_f01
 /FORMAT=AVALUE TABLES
 /CELLS=COLUMN
 /COUNT ROUND CELL.
```

E1: Extent: Competencies at graduation: ICT Skills (categorized) * F1: Gender Cross-tabulation

% within F1: Gender

		F1: Gender		
		Female	Male	Total
E1: Extent: Competencies at graduation: ICT Skills (categorized)	bottom (1+2)	12.2%	2.5%	6.5%
	middle (3)	10.,7%	14.8%	13.1%
	top (4+5)	77.0%	82.7%	80.4%
Total		100.0%	100.0%	100.,0%

Table 19: Example of a cross-tab (percentage distribution)

This table shows -for each gender separately- the (column) percentages of respondents that fall into each ICT skills category. If we inspect the first row, we see that 12.2% of female and 2.5% of the male respondents have low ICT skills. We can also see that 77.0% of female and 82.7% of the male respondents have good ICT skills. In short, male respondents seem to have better ICT skills than female respondents.

A chi-square test examines if a significant statistical correlation between two variables exists. Test statistics that follow a chi-squared distribution arise from an assumption of independent normally distributed data. A chi-squared test can be used to attempt rejection of the null hypothesis that the data are independent thus confirming their correlation indirectly. The existence of a correlation between two variables does not necessarily lead to a causal relationship which needs still to be proved. A detailed explanation of chi-square test procedures and the calculations in SPSS would go beyond the scope of this manual. For further reading Bryman (2004), Dietz & Kalof (2009) and Howitt & Cramer (2014) are highly recommended.

4.6.4. How findings should be reported and interpreted

The planning, execution and evaluation of a GTS is time consuming and often costly. All these efforts are worthwhile only if the findings are adequately communicated. It is therefore highly recommended to publish a final report tailor-made for GTS stakeholders, since only then can the GTS finding have any kind of effect. There will be numerous opportunities when the GTS can be placed on the agenda and a project report can be presented in full or in extracts. University committees (e.g. the directorate or the senate) might be addressed, the report or a link might be published on the university's websites (alumni website, central website, faculty website), it could be mentioned at graduation ceremonies, etc. Participating graduates might also receive a summary of GTS findings. This might even work as an incentive if the possibility is mentioned in the invitation letter. Results of the study must be presented e.g. at the level of study programmes/ training courses if conclusions for this level are the objective. Overall results for the whole institution are less interesting in this context, but relationships within the collected data are relevant and should be checked and compared systematically (Schomburg, 2016).

Central functions of a project report are in general as follows: It describes and documents the processing with regard to data collection and data analysis, and its results. Raising survey data though cannot be an end in itself and GTS findings must initiate and kick-off a process of change. It is of upmost importance to establish panels and fora where findings can be discussed and necessary actions consequently be initiated. Decisions on consequences of the results should be based on a thorough interpretation of the findings, with consideration of the quality of the data as well as other possible interpretations (Schomburg, 2016). This is why GTS findings should be tak-

en into account and recommendations be observed if a quality management process, e.g. a PDCA-cycle (cf. Chapter 1.4), is initiated. The GTS data analysis is, after all, institutional research and should be treated as such. ‘What do I want to do with the survey results?’ is a helpful question when drawing up a GTS concept:

- Improve study programmes?
- Improve the career service?
- Use them for study programme evaluation / accreditation?
- Compare with other universities?
- Collect information about the job market?
- Stay in contact with the alumni?
- Combine them with other statistics or survey results?
- Justify the usefulness of your university‘s actions?

An adequate editorial presentation of findings is closely linked to which objectives the project report has and which stakeholders the prime recipients are (cf. Chapter 2.3.1 & 2.3.2). It must be re-emphasized that a GTS will only have a positive knock-on effect if its findings are communicated to relevant stakeholders in a tailor-made way. Possible target recipients are (Schomburg, 2016):

- decision-makers at different system levels (country, region, institution, department);
- graduates;
- staff of the education institution;
- students and their parents;
- career advisers;
- mass media;
- student counsellors;
- employers;
- education researchers.

A general report on findings might be structured as follows: (Salant & Dillman, 1994):

- abstract or executive summary (includes the most important findings);
- problem statement (explains why the survey was done);
- fieldwork report (cf. Chapter 4.2);
- findings (present results that really matter in a logical order);
- implications (draw findings together to answer original questions and explore implications for decision making);
- appendices (provide supplementary material such as questionnaires etc.).

It is of upmost importance that survey findings are filtered and customized for each stakeholder individually. Only information of relevance should be presented in an easy, simple and direct way when addressing a stakeholder - nothing more and nothing less. In other words, it is not only necessary to give an accurate account of survey findings but also to be aware which information might be of special interest for a certain stakeholder and to have a concept for disseminating the project report or excerpts of it. Both reporting concept and dissemination strategy should therefore feature in the PAP (cf. Chapter 2.4.6).

GraduateTracer Study 2012
(graduation in WS2011/2012 and SS2012)
Bachelor's and Master's Degrees

UNIVERSITÄT DUISBURG ESSEN
Offen im Denken

2 Reading help

The answers of the graduates will be reported descriptively with the help of tables and graphs. Each table or graph contains a caption showing the question from the questionnaire. In the following an overview is provided of the most important concepts and abbreviations. Additionally, helpful information for data interpretation will be given.

statistical population	In statistics, a population is a set of similar items or events which is of interest for some question or experiment. A statistical population can be a group of actually existing objects (e.g. the set of all stars within the Milky Way galaxy) or a hypothetical and potentially infinite group of objects conceived as a generalization from experience (e.g. the set of all possible hands in a game of poker). A common aim of statistical analysis is to produce information about some chosen population. The statistical population of the graduates, who graduated in 2012 contains all graduates, who finished their final examination between 01.10.2011 and 30.09.2012. For UDE all figures are based on the calculation provided by the students office.
sample	A sample is a selection out of the statistical population.
N	N is the number of respondents, who answered a specific question. Thus, it is possible, that the number of survey participants and N differ.

Figure 23: Reading help from a GTS report (excerpt)

Last but not least stakeholders should get sufficient support that enables them to fully comprehend and interpret a result. Central tendency measures (cf. Chapter 4.6.3), for example, might be unknown to some stakeholders but a reading aid briefly explaining technical terms will resolve the issue. Executive summaries that give a simple and concise overview of the most relevant findings are a great help for further reading and understanding a report.

In certain cases it is difficult to assess if a survey finding has a positive or rather negative tenor (Schomburg, 2016), in other words if it is good or not so good. It might be therefore helpful if findings from a current GTS can be compared with previous graduate surveys covering other cohorts or academic years. GTS results from other universities might be available as well. When compar-

ing two results it must be ensured, however, that peer groups are similar, circumstances are comparable and that a comparison is methodologically possible.

The following comparison is between Bachelor and Master degree graduates of the University of Duisburg-Essen (UDE) and those covered in the graduate survey cooperation project (KOAB).

GraduateTracer Study 2012
(graduation in WS2011/2012 and SS2012)
Bachelor's and Master's Degres

UNIVERSITÄT DUISBURG ESSEN
Offen im Denken

II Executive summary of results

In the following the most important results of UDE in comparison with the results from the graduate survey cooperation project (KOAB) are summarised. The results are differentiated in Master's and Bachelor's degrees.

Table 1: Summary of results

Degree	Bachelor's	Master's
socio-demographics (chapter III.1)	At UDE women proportion is at 58% and at other KOAB-universities at 49%. 54% of UDE-graduates are educational climbers[4], while 41% of KOAB-universities graduates do not have an academic family background.	At UDE women proportion is at 40% and at other KOAB-universities at 48%. 44% of UDE graduates are educational climbers, while 40% of KOAB-universities graduates do not have an academic family background.
entrance qualification (chapter III.2)	64% der UDE-graduates and 38% of KOAB-graduates acquired their entrance qualification in the region of their universities. 39% of UDE-graduates have a „very good" or „good" highschool degree. Among KOAB-graduates 63% had a „very good" or „good" highschool degree.	50% der UDE-graduates and 29% of KOAB-graduates acquired their entrance qualification in the region of their universities. 62% of UDE-graduates have a „very good" or „good" highschool degree. Among KOAB-graduates 66% had a „very good" or „good" highschool degree.
organisation of studies and study success (chapter III.3)	63% of UDE-graduates obtained a „very good" or „good" university degree, while 74% of KOAB-graduates obtained a „very good" or „good" university degree. 12% of UDE-graduates and 7% of KOAB-graduates studied part-time. 39% of UDE-graduates finished their studies in the regular study time, while 52% of KOAB-graduates finished their studies in the regular study time.	95% of UDE-graduates obtained a „very good" or „good" university degree, while 96% of KOAB-graduates obtained a „very good" or „good" university degree. 11% of UDE-graduates and 7% of KOAB-graduates studied part-time. 47% of UDE-graduates finished their studies in the regular study time, while 51% of KOAB-graduates finished their studies in the regular study time.

[4] Educational climbers are defined as students, whose parents do not have a university degree.

5

Figure 24: Executive summary of results (excerpt)

The GTS findings for UDE graduates are to be related to similar findings by HEI participating in KOAB. Many participating universities have created a set of indicator figures related to study and research such as student-lecturer ratios or student dropout ratios in certain degree courses, which might be helpful for the interpretation of similar ratios or statistics generated from the GTS analysis.

When analysing and interpreting the survey data, one additional aspect, namely labour market and employment prospects of graduates, has to be taken into account. Companies that give employment to future graduates are possible GTS stakeholders too. It is a fact, however, that on the one hand the labour market is driven by the economic environment and requirements change constantly. On the other hand, the educational programme offered by a university must be long-term oriented.

To sum up, the interpretation of results requires (Schomburg, 2016):

- critical reflection on the possibility of biased results;
- comparison of results with other studies;
- comparison of results from similar questions in the GTS;

- consideration of information about the education context, not gained through the study (such as information about the institution and the study programme/training course);
- consideration of information about the labour market, not gained through the study (such as information about unemployment, economic cycle, economic structure in a region).

Regrettably, a GTS response rate is often rather low and survey results might not necessarily be representative. If this is the case, findings should not be overrated. It also happens that graduates overrate both good and bad experiences they made at university. And there is often a bias towards remembering a bad experience whereas good things are taken for granted. If graduates are successful in their jobs, they might on the other hand retrospectively idealize their past student years. Last but not, it has to be taken into account that graduates, whilst knowing their own study experiences best, are not necessarily experts in the alignment of learning outcomes and study courses.

Despite all 'ifs' and 'buts', a GTS is after all a necessary and very useful source for the quality management process at a higher education institution. Without the graduates' evaluation, feedback and recommendation on academic conditions and without any knowledge how graduates manage the transition from university to professional employment. A higher education institution would lack even basic knowledge necessary to improve the structure and content of its degree courses.

The following is a summary of important issues to be observed when presenting GTS findings (Schomburg, 2003):

- take a look from the reader's point of view. Present your findings in a simple but concise fashion;
- the selection of topics and issues for a GTS report already is some kind of interpretation. The reasons for the pre-selection of certain findings need to be explained for example by using comparisons and/or assumptions;
- please try to avoid indefinite terms like 'many', 'several', 'few', 'some' (graduates, etc.) if you do not present the exact information in form of the statistical descriptives at the same time;
- main findings should also be presented in the form of a table or a graph (next to the information in the text). For the most part, tables and graphs contain much more information than can be given in the text. By studying them the reader is able to check the presentation of the results as well as to infer additional details about the study;
- the analysis of sub-groups should always be preceded with a look at the total survey population;
- avoid using abbreviations which may not be familiar to everybody.

The SPSS software is a comfortable tool to generate tables and graphs which can easily be transferred into word processing or presentation programmes by using the ‘copy & paste’ procedure. The following books give a good step by step introduction to: Field (2013); Howitt & Cramer (2014).

4.7. Further development of a graduate tracer study

In order to continuously increase the quality of a GTS, the higher education institution should carry-out its planning, process management and reviews by means of a PDCA cycle (cf. Chapter 1.4). The PDCA cycle of a GTS involves the following four steps:

1. Plan: Planning activities based on the available resources (e.g. developing individual questions and questionnaire, coordinating questionnaire content and strategies of analysis with stakeholders).
2. Do: Implementation of the planned activities (e.g. preparation of the fieldwork phase, researching and updating address data, preparing materials e.g. invitation letters, conducting the survey, analysing the data, production of reports).
3. Check: Self-evaluation of study quality (Schomburg, 2016) and assessing to what extent objectives have been reached.
4. Act: Definition of activities to improve the quality level of future GTS (e.g. allocation of additional resources, measures to improve the address data base, etc.) taking into account the stakeholders’ feedback to what extent expectations were met.

4.8. Entrenching graduate tracer studies in East Africa

The overall objective of UNITRACE 2.0 was to develop the skills of university administrators/managers and academics with the aim of enabling them to design, implement and analyse graduate tracer studies as part of their higher education institutions. Furthermore, an objective of UNITRACE 2.0 was to establish an East African network of researchers in the field of graduate studies, which can direct future national and regional training programmes. Based on this, researchers from Tanzania, Uganda and Kenya have been enabled to conduct professional GTS. It is now up to the former participants of UNITRACE 2.0, their respective HEIs and the responsible political bodies in East Africa to disseminate and to make use of results accruing for quality enhancement of study programmes and to embrace a GTS culture. Since GTS can immensely help to improve the quality of education and services in HEIs, GTS should be entrenched as a mandatory tool of quality management systems in HEIs in East Africa. It is strongly recommended that GTS researchers in East Africa share practical experiences and lessons learnt from GTS and their relevance in enhancing the quality of study programmes.

5. Appendix

5.1. Glossary[12]

Arithmetic mean: Also simply known as the mean, the total of a distribution of values divided by the number of values.

Bivariate analysis: The analysis of two variables simultaneously, for the purpose of determining the empirical relationship between them, as in contingency tables.

Census: The enumeration of an entire population. Unlike a **sample**, a census relates to all respondents in a population. Thus, if a questionnaire is sent to every graduate of a cohort, the research should be characterized as a census.

Closed question: A question employed in a questionnaire that presents the respondent with a set of possible answers to choose from.

Code, coding: Codes act as tags that are placed on data about respondents. The aim is to assign the data relating to each **variable** to groups, each of which is considered to be a category of the variable in question. Numbers (**values**) are then assigned to each.

Cohort: A group of individuals having a statistical factor (e.g. graduation in the year 2016) in common.

Concept: A name given to a category that organizes observations and ideas by virtue of their possessing a common feature.

Conceptualization: The mental process whereby fuzzy and imprecise notions (concepts) are made more specific and precise. For example, if you want to study teaching quality: What do you mean by 'teaching quality'? Are there different kinds of teaching quality? What are they?

Contingency table: Also known as cross-table. A table comprising rows and columns that show the relationship between two variables. Each cell in the table shows the frequency of occurrence of that intersection of categories of each of the two variables and usually a percentage.

Dependent variable: A variable assumed to depend on or be caused by another variable (called independent variable).

Distribution of values: A term used to refer to the entire data relating to a variable. Thus, the ages of members of a sample represent the distribution of values for that variable for that sample.

Frequency table: A table that displays the number and/or percentage of units (e.g. respondents) in different categories of a variable.

Hypothesis: An informed speculation, which is set up to be tested, about the possible relationship between two or more variables.

Independent variable: A variable that has a causal impact on another variable (= dependent variable).

Index: A type of composite measure that summarizes and ranks several specific observations and represents a more general dimension.

[12] Bryman (2004); Babbie (2004).

Indicator: A measure that is employed to refer to a concept when no direct measure is available.

Interval variable: A variable where the distances between the categories are identical across its range of categories.

Interval scale: Has the same characteristics as an ordinal scale. In addition, the distance between two values can be expressed metrically. The zero position of an interval-scale is set arbitrarily (e.g. temperature measurement on a Celsius or Fahrenheit scale).

Likert scale: A widely used format for asking attitude questions. Respondents are typically asked their degree of agreement with a series of statements.

Measure of central tendency: A statistic, like the arithmetic mean, median or mode that summarizes a distribution of values.

Median: The mid-point in a distribution of values.

Metric scale: Umbrella term for interval and proportional scales.

Missing data: Data relating to a case that is not available, for example, when a respondent in a GTS did not answer a question.

Mode: The value that occurs most frequently in a distribution of values.

Nominal variable: Also known as a categorical variable, a variable that comprises categories that cannot be ranked.

Nominal scale: A discrete classification of data in which data are neither measured nor ordered but subjects are merely allocated to distinct categories. Variables such as gender (male, female), trade union membership (yes, no) or phone numbers are measured on a nominal scale.

Non-response: A source of error that occurs whenever some respondents refuse to cooperate, cannot be contacted, of for some reason cannot supply the required data.

Objectiveness: The results of a survey methology must be the same regardless of who applies it.

Open question: A question employed in a questionnaire that does not present the respondent with a set of possible answers to choose from.

Operationalization: One step beyond conceptualization. Operationalization is the process of developing operational definitions, or specifying the exact operations involved in measuring a variable.

Ordinal variable: A variable whose categories can be ranked (as in case of interval and ration variables), but the distances between the categories are not equal across the range.

Ordinal scale: Has the same characteristics as a nominal scale. In addition data is shown in order of magnitude but there is no standard of measurement of differences. Variables such as school grade or work satisfaction (very satisfied – not satisfied at all) are measured on an ordinal scale.

Outlier: An extreme value in a distribution of values. If a variable has an extreme value, the arithmetic mean will be distorted by it.

Probability sample: A sample that has been selected using random sampling and in which each person in the population has a known probability of being selected.

Qualitative data: Data based on descriptive expression (e.g. text).

Quantitative data: Data based on numbers.

Questionnaire: A collection of questions administered to respondents.

Ratio scale: Scale of measurement of data which permits the comparison of differences of values. A ratio scale has a fixed zero value and is metric. Variables such as income, age or body weight are measured on a ratio scale.

Reliability: The degree to which a measure of a concept is stable.

Response rate: The number of people participating in a survey divided by the number selected in the sample, in the form of a percentage.

Sample: The segment of the population that is selected for research. It is a subset of the population.

Scale: A type of composite measure composed of several items that have a logical or empirical structure among them.

Simple random sampling: A sample in which each person has been selected entirely by chance. Each individual in the population has a known and equal probability of inclusion in the sample.

Snowball sample: A non-probability sample in which the researcher makes initial contact with a small group of people who are relevant to the research topic and then uses these to establish contacts with others.

SPSS: Abbreviation for Statistical Package for the Social Sciences. SPSS is a widely used computer programme that allows quantitative data to be managed and analysed.

Standard deviation: A measure of dispersion around the mean.

Univariate analysis: The analysis of a single variable at a time.

Validity: The degree to which a measure of a concept truly reflects that concept.

Variable: An attribute in terms of which cases vary.

5.2. Example invitation letter

University of Duisburg-Essen • 47048 Duisburg
Centre of Higher Education Development and Quality Enhancement
(ZfH), SK 314

The Rector

Maria Schneider
Vulcan Street 66
66521 Stindl
Germany

GRADUATE SURVEY OF THE UNIVERSITY OF DUISBURG-ESSEN

Dear Mrs. Schneider,

Herewith we are inviting you to participate in the graduate survey of the University of Duisburg-Essen (UDE). The purpose of this survey is to get an overview about your current professional situation and your career after graduating. Your experiences are of vital importance for the improvement of the quality of studies at the UDE.

Naturally, the participation in this survey is voluntary. However, in order to get meaningful results, every contribution is relevant, since a thorough analysis can only be accomplished on the basis of a high number of replies. This survey is also explicitly addressed to graduates of Bachelor degree courses, who are now studying in a Master course.

The survey will be conducted online. In order to fill in the questionnaire please go to the following website and enter your personal access code. It will take approximately 30 minutes to fill in the questionnaire.

Website: **http://udue.de/absolvent**
Your access code: **ExAp13** (Please consider capital and lower case letters)

The questionnaire is subject to strict data protection regulations and the published results cannot identify individuals. You can find detailed information regarding the data protection on: http://udue.de/absolvent. Please also note the further details on the reverse side.

For further questions please do not hesitate to contact Mrs. Hauser via phone (+49 203-379-7016) or e-mail (absol-befragung@uni-due.de).

As a token of our gratitude we raffle one Apple iPad and 2 x 100€ amongst all participants in this survey!

On behalf of the UDE, I would like to thank you very much in advance for your participation.

Yours,

Prof. Dr. Ulrich Radtke
Rector

Prof. Dr. Ulrich Radtke
Tel.: 0201 / 183 - 2000
Fax: 0201 / 283 - 3536
rektor@uni-due.de

T01 S06 C04
Universitätsstr. 2
45141 Essen

Contact person:

Alisa Hauser
Phone: 0203 / 379 - 7016
Fax: 0203 / 379 - 2210
absol-befragung@uni-due.de

Room SK 314
Keetmanstr. 3-9
47058 Duisburg

Date: 12.10.2016

Contact
47048 Duisburg
Tel.: 0203 / 379 - 0
Fax: 0203 / 379 - 3333
overnight mailbox: Gebäude LG

45117 Essen
Tel.: 0201 / 183 - 0
Fax: 0201 / 183 - 2151
overnight mailbox: Gebäude T01

Bank Details
Konto 269 803
Sparkasse Essen
BLZ 360 501 05
IBAN: DE40 3605 0105 0000 269 803
SWIFT/BIC: SPESDE 3EXXX

Public Transport
Duisburg: Straßenbahn 901
Bus 924, 962, 933
Essen: U-Bahn 11, 17, 18
Straßenbahn 101, 103, 105, 109
Bus CE45, CE47, SB16, 145, 147, 154, 155, 166, 176, 188, 196

NOTES ON DATA PROTECTION

The graduate survey of the University of Duisburg-Essen (UDE) is implemented on behalf of the rectorate of the UDE. Analyses, reports and presentations were created within the quality development of studying and teaching by the "Centre for Higher Education Development and Quality Enhancement" (CHEDQE) and will be published intramural the UDE. All publications along these lines will not allow to draw inferences about your personal information.

Taking part in the graduate survey is entirely voluntary. The survey can be terminated at any time without any reasons. There won't be any disadvantages, if you decide to cancel or do not take part in the survey.

The survey is being conducted on behalf of the UDE as part of a nationwide project titled "Kooperationsprojekt Absolventenstudien" (KOAB) which is being coordinated by the International Centre for Higher Education Research (INCHER), located in Kassel. During the survey phase, your answers will be initially saved in a database on a server at Kassel University's computer center. The survey data is transmitted in encrypted connection. Names, addresses and survey data will not take place at any time. After the completion of the survey INCHER Kassel will generate a global, cross-university dataset that complies the answers from all graduates surveyed at the participating universities. As part of the academic and graduated research the data is used exclusively for scientific purpose. No INCHER Kassel publication will contain any references that could be traced back to individual persons.

Due to Registration Regulations of the UDE your address data was electronically collected and saved. For the purpose of the survey this data will be transmitted to competent authorities of the Center for Higher Education and Quality Development. In case of some obsolete 2-3 year old address data saved by the University, the given addresses will be updated where necessary. The address data is only used for the purpose of inviting and reminding the participants to take part in the survey. Address data will be processed exclusively by employees of the team data management of CHEDQE. All employees who have access to personal information within the project are subject to applicable the current data protection laws. In this context the disclosure of data is strictly prohibited notwithstanding the case that these employees are no longer work at the University.

In order to participate in the raffle, we kindly ask for your email address. The data won't be linked to any survey data. The participation in the survey and the indication of your data is fully voluntarily.

At any time, all graduates can require the consent to the temporary storage of the data for this survey and the email address data for the raffle. In case of revocation you have to write an email to: absol-befragung@uni-due.de or call +49 203-379 7016. For queries concerning data protection of the survey by INCHER Kassel please contact Dr. Tim Plasa: plasa@incher.uni-kassel.de.

The previous described procedures were reconciled with the Protection Supervisor of the UDE.

5.3. Example questionnaire (UNITRACE 2.0 questionnaire)

University XY invites you to complete this questionnaire, in order to enable the University to collect data for the Graduate Tracer Study. We would like to thank you in advance for taking part in this study, and for your time to complete this online questionnaire. Please read each of the following statements and select (click) the category of response that represents your level of agreement with the statement. Your individual answers will not be associated with your name(s) or identification(s) in anyway. All your views are very important even if they are very different from the ideas of others and we request you to complete the questionnaire as honestly as possible. Should you need further information, please contact us via email at: xxxxx@xxxxx.xx or call us on: +xx -xxxx-xxxxxxxxxx

A YOUR STUDY AT UNIVERSITY XY

A1 In which faculty/ college were you at the UNIVERSITY XY? (OPTIONAL / INDIVIDUAL)

1 Faculty/college: .....

(please specify)

A2 From which degree programme did you graduate from XY UNIVERSITY? (CORE)

1 Degree programme: .....

(please specify)

(please specify)

A3 In which campus were you at the UNIVERSITY XY? (OPTIONAL / INDIVIDUAL)

1 Campus:.....

(please specify)

A4 What was your mode of study at the UNIVERSITY XY? (OPTIONAL)

1 ☐ Full – Time

2 ☐ Part – Time (Evening, weekend)

3 ☐ Distance Education, online learning, school based (*delete or adjust, if necessary*)

4 ☐ Other:.....

(please specify)

A5 Which month and year did you graduate? (CORE)

1 ☐☐ Month ☐☐☐☐ Year

A6 What was your month and year of admission into the programme at UNIVERSITY XY? (CORE)

1 ☐☐ Month ☐☐☐☐ Year

EDUCATION AND WORK BEFORE STUDY

A7 What was your highest level of education at the time of admission to the university for the degree in question A2? (OPTIONAL)

1 ☐ PhD
2 ☐ Masters
3 ☐ Bachelors
4 ☐ Diploma
5 ☐ Advanced Level Certficate
6 ☐ Ordinary Level/ Form Four Certificate
7 ☐ Other: .....

(please specify)

A8 Which type of high school/ college/ university did you graduate from prior to joining the university? (CORE)

1 ☐ Public
2 ☐ Private
3 ☐ Other: .....

(please specify)

A9 Did you have any work experience before commencing your higher (university) education? (OPTIONAL)

1 ☐ Yes
2 ☐ No → *Please skip to A11.*

A10 Which work experience did you have? (OPTIONAL)

1 Please state the work experience: .....

(please specify)

A11 How many months did you spend on the following activities between <u>obtaining the entry qualification</u> and your <u>first enrolment</u> to higher education? *Please state only the major activities.* **(OPTIONAL)**

1 ☐☐☐ Employment/self-employment
2 ☐☐☐ Child rearing, family care
3 ☐☐☐ Military or civilian service
4 ☐☐☐ Not employed, seeking employment
5 ☐☐☐ Other (please specify) .....

(please specify)

B STUDY CONDITIONS, PROVISIONS AND EXPERIENCES TEACHING AND LEARNING CONDITIONS

B1 Did you complete your degree programme in the standard period of time? (OPTIONAL)

1 ☐ Yes → *Please skip to B3.*

2 ☐ No

B2 To what extent did the following reasons cause the delay in completion of your degree? (OPTIONAL)

	Not at all 1	2	3	4	To a very high extent 5	
1	☐	☐	☐	☐	☐	Financial reasons
2	☐	☐	☐	☐	☐	Failed examinations (Retakes/Resits/Carry-Overs)
3	☐	☐	☐	☐	☐	Writing thesis/dissertation
4	☐	☐	☐	☐	☐	Family reasons
5	☐	☐	☐	☐	☐	Health
6	☐	☐	☐	☐	☐	Other:.....

(please specify)

B3 During your study at the university, most of the time you lived… (OPTIONAL)

1 ☐ alone in university dorm

2 ☐ alone in a private apartment

3 ☐ with my parents

4 ☐ with my guardians/relatives

5 ☐ with my family (spouse, partner, children)

6 ☐ shared hostel/apartment (with friends)

7 ☐ Other:.....

(please specify)

B4 How was your university education financed? *Multiple responses accepted.* (OPTIONAL)

1 ☐ Full scholarships

2 ☐ Partial scholarship

3 ☐ Higher education loans board

4 ☐ Parents/Family

5 ☐ Own funds

7 ☐ Other:.....

(please specify)

8 ☐ Spouse (OPTIONAL)

B5 Did you have access to ICT facilities at your university? (CORE)

1 ☐ Yes

2 ☐ No → *Please skip to B7.*

B6 To what extent do you feel competent in... (CORE)

	Not competent at all 1	2	3	4	Very competent 5	
1	☐	☐	☐	☐	☐	…using Microsoft office applications
2	☐	☐	☐	☐	☐	…accessing e-learning resources
3	☐	☐	☐	☐	☐	…browsing internet
4	☐	☐	☐	☐	☐	…online job applications

B7 How would you rate the library facilities at UNIVERSITY XY? (CORE)

	Very bad 1	2	3	4	Very good 5	
1	☐	☐	☐	☐	☐	Availability of study materials in your field of study
2	☐	☐	☐	☐	☐	Relevance of the study materials
3	☐	☐	☐	☐	☐	Availability of e-resources
4	☐	☐	☐	☐	☐	Adequacy of library space
5	☐	☐	☐	☐	☐	Ease of access to library materials
6	☐	☐	☐	☐	☐	Library time (opening and closing)

B8 To what extent were the following modes of teaching and learning emphasized in your study? (CORE)

	Not at all 1	2	3	4	To a very high extent 5	
1	☐	☐	☐	☐	☐	Lectures
2	☐	☐	☐	☐	☐	Demonstrations
3	☐	☐	☐	☐	☐	Participation in research projects/ project based
4	☐	☐	☐	☐	☐	Practical exercises/ fieldwork
5	☐	☐	☐	☐	☐	Internship
6	☐	☐	☐	☐	☐	Mentorship
7	☐	☐	☐	☐	☐	Discussion
8	☐	☐	☐	☐	☐	Integration of ICT in teaching
9	☐	☐	☐	☐	☐	e–learning

B9 How would you rate the following study facilities and services? (CORE)

	Very bad 1	2	3	4	Very good 5	
						STUDY FACILITIES
1	☐	☐	☐	☐	☐	Lecture halls/rooms
2	☐	☐	☐	☐	☐	Accommodation
3	☐	☐	☐	☐	☐	Catering facilities
4	☐	☐	☐	☐	☐	Health facilities
5	☐	☐	☐	☐	☐	Recreational facilities
6	☐	☐	☐	☐	☐	Student centere
						STUDY SERVICES
7	☐	☐	☐	☐	☐	Mentorship (counseling & guidance)
8	☐	☐	☐	☐	☐	Scholarship/work-study
9	☐	☐	☐	☐	☐	Variety of academic programmes offered
10	☐	☐	☐	☐	☐	Co-curricula activities

B10 How do you rate the following study experiences? (OPTIONAL)

	Very bad 1	2	3	4	Very Good 5	
1	☐	☐	☐	☐	☐	Classroom environment (lectures & tutorials)
2	☐	☐	☐	☐	☐	Internship programme (field course /practicum)
3	☐	☐	☐	☐	☐	Community service and outreach
4	☐	☐	☐	☐	☐	Conducting field research
5	☐	☐	☐	☐	☐	Research supervision
6	☐	☐	☐	☐	☐	Student organization
7	☐	☐	☐	☐	☐	Participation in extracurricular activities
8	☐	☐	☐	☐	☐	Social relations (peers, friends)
9	☐	☐	☐	☐	☐	Formal relations (teaching and non-teaching)
10	☐	☐	☐	☐	☐	Counselling & guidance

C JOB SEARCH AND TRANSITION TO WORK

C1 Have you looked for employment since graduation? (CORE)

1 ☐ Yes → *Please skip to C3.*

2 ☐ No

C2	What was your main reason for not looking for employment? (CORE)
1 ☐	I started my own business
2 ☐	I continued with my studies
3 ☐	I already had a job
4 ☐	I am yet to look for a job
5 ☐	Other:.....
	(please specify)

→ ***Please skip to C13.***

C3	When did you start looking for employment? (CORE)
1 ☐	Prior to completion of my studies
2 ☐	At the time of completion of my studies
3 ☐	After completion of my studies
4 ☐	I did not look for employment

C4	How long did it take you to find employment after graduation? (CORE)
1 ☐☐	Months

C5	How did you look for your first job after graduation? *Multiple responses accepted.* (CORE)
1 ☐	Media (radio, newspaper, TV)
2 ☐	Networking
3 ☐	Alumni
4 ☐	Friends/ peers
5 ☐	Relatives
6 ☐	Employment agencies
7 ☐	During internship / placement
8 ☐	Career Office
9 ☐	Online services
10 ☐	Government posting
11 ☐	Not applicable

C6	How did you get your first job after graduation? (OPTIONAL)
1 ☐	Interview
2 ☐	Retention
3 ☐	Applications
4 ☐	Others:.....
	(please specify)
5 ☐	Relative/friend (OPTIONAL)

C7 How many positions did you apply for before you were successful? (OPTIONAL)

1 ☐☐☐☐ Applications

C8 How many responses did you get regarding the applications? (OPTIONAL)

1 ☐☐☐☐ Responses

C9 How many interviews did you attend before getting employment? (OPTIONAL)

1 ☐☐☐☐ Interviews

C10 What prompted you to apply for your first job? *Multiple responses accepted*. **(CORE)**

1 ☐ Salary
2 ☐ Benefits (housing, transport, medical, retirement package, opportunities for further studies, etc.)
3 ☐ Location
4 ☐ Passion
5 ☐ Peer influence
6 ☐ Relevance to skills acquired
7 ☐ Only option/ availability of the job
8 ☐ Other:.....
(please specify)
9 ☐ Family influence (OPTIONAL)
10 ☐ Career counsellors (OPTIONAL)

C11 What challenges did you encounter during your job search? *Multiple responses accepted*. **(CORE)**

1 ☐ Inadequate experience
2 ☐ Insufficient qualifications
3 ☐ Limited jobs in my field of specialization
4 ☐ Inadequate networks
5 ☐ Corruption
6 ☐ Gender discrimination
7 ☐ Other:.....
(please specify)

C12 If employed, how important were the following in influencing you were chosen? (CORE)

	Not important at all 1	2	3	4	Very important 5	
1	☐	☐	☐	☐	☐	Field of study
2	☐	☐	☐	☐	☐	GPA / GRADE
3	☐	☐	☐	☐	☐	Networks
4	☐	☐	☐	☐	☐	Relevance of programme
5	☐	☐	☐	☐	☐	Reputation of my institution of higher learning
6	☐	☐	☐	☐	☐	Lack of competition
8	☐	☐	☐	☐	☐	Personality
8	☐	☐	☐	☐	☐	Additional traning after graduation
9	☐	☐	☐	☐	☐	Other:.....
						(please specify)

C13 Did you take any other courses to improve your chances of employment? (CORE)

1 ☐ Yes

2 ☐ No → *Please skip to D1.*

C14 What were the course(s)? *Multiple responses accepted*. **(CORE)**

1 ☐ ICT

2 ☐ Accounting

3 ☐ Languages

4 ☐ Entreptreneurship

5 ☐ Leadership

6 ☐ Other:.....

(please specify)

C15 How useful were the courses in assisting you to find employment? (CORE)

	Not useful at all 1	2	3	4	Very useful 5
1	☐	☐	☐	☐	☐

D EMPLOYMENT AND WORK

D1 Are you currently employed (including part-time employment and self-employment)? (CORE)

1 ☐ Yes → *Please skip to D3.*

2 ☐ No

D2	**What describes your current situation?** *Multiple responses accepted*. **(CORE)**
1 ☐	I am studying/continuing my higher degree or professional courses
2 ☐	I am married/I am busy with family and children
3 ☐	I am looking for employment
4 ☐	Other:.....
	(please specify)

D3	**Which of these applies to you? (OPTIONAL)**
1 ☐	Self-employment
2 ☐	Part-time employment
3 ☐	Full- time employment

D4	**How many hours per week do you work on average? (OPTIONAL)**
1 ☐☐☐	Contract hours of my major assignment
2 ☐☐☐	Additional working hours of my major assignment (paid and unpaid overtime)
3 ☐☐☐	Working hours on other assignments (second occupation, side jobs etc.)
4 ☐☐☐	Total working hours (for self-employed only)

D5	**Please state the kind of your current employer/institution. (OPTIONAL)**
1 ☐	Public employer
2 ☐	Non-profit organization/ NGO
3 ☐	Private employer
4 ☐	Self employed
5 ☐	Other:.....
	(please specify)

D6	**What is your current job position? (CORE)**
1	Current job position: .....
	(please specify)

D7	**What was your previous job position? (OPTIONAL)**
1 ☐	I did not have a previous job.
2 ☐	Previous job position: .....
	(please specify)

D8	**What are your major tasks at work? (CORE)**
1	Major tasks at work: .....
	(please specify)

D9	**If you are self-employed: Which of the following characteristics are applicable to you?** *Multiple responses accepted*. **(CORE)**
1 ☐	Not applicable; I am not self-employed
2 ☐	I am serving a single contractor
3 ☐	I took over an existing firm/office etc.
4 ☐	I established a new firm/office etc.
5 ☐	I was asked by my former employer to work self-employed
6 ☐	I am working at home
7 ☐	I have employees
8 ☐	I have a partnership with friends/relatives
9 ☐	Other:.....
	(please specify)
10 ☐	Engaged in casual labour (OPTIONAL)

D10	**What is your approximate gross monthly income? (CURRENCY COUNTRY SPECIFIC) (CORE)**
1 ☐☐☐☐☐☐☐☐☐	Major job
2 ☐☐☐☐☐☐☐☐☐	Other jobs
3 ☐☐☐☐☐☐☐☐☐	Over time etc.

D11	**What is your approximate net monthly income? (CURRENCY COUNTRY SPECIFIC) (OPTIONAL)**
1 ☐☐☐☐☐☐☐☐☐	Major job
2 ☐☐☐☐☐☐☐☐☐	Other jobs
3 ☐☐☐☐☐☐☐☐☐	Over time etc.

E WORK AND COMPETENCIES, RELATIONSHIPS BETWEEN STUDY AND WORK

E1 At the time of graduation:
A) To what extent did you have the following competencies?
B) To what extent did the university contribute to the following competencies?

	To what extent did you have the following competencies? (CORE)						To what extent did the university contribute to the following competencies? (OPTIONAL)					
	Not at all				To a very high extent		Not at all				To a very high extent	
	1	2	3	4	5		1	2	3	4	5	
1	☐	☐	☐	☐	☐	Knowledge of your field(s) or discipline(s)	☐	☐	☐	☐	☐	1
2	☐	☐	☐	☐	☐	ICT skills	☐	☐	☐	☐	☐	2
3	☐	☐	☐	☐	☐	Critical thinking	☐	☐	☐	☐	☐	3
4	☐	☐	☐	☐	☐	Research skills	☐	☐	☐	☐	☐	4
5	☐	☐	☐	☐	☐	Communication skills	☐	☐	☐	☐	☐	5
6	☐	☐	☐	☐	☐	Working independently	☐	☐	☐	☐	☐	6
8	☐	☐	☐	☐	☐	Time management	☐	☐	☐	☐	☐	8
8	☐	☐	☐	☐	☐	Problem solving skills	☐	☐	☐	☐	☐	8
9	☐	☐	☐	☐	☐	Working under pressure	☐	☐	☐	☐	☐	9
10	☐	☐	☐	☐	☐	Team work ability	☐	☐	☐	☐	☐	10
11	☐	☐	☐	☐	☐	Adaptability	☐	☐	☐	☐	☐	11
12	☐	☐	☐	☐	☐	Leadership	☐	☐	☐	☐	☐	12
13	☐	☐	☐	☐	☐	Foreign language	☐	☐	☐	☐	☐	13

E2 To what extent has your study programme at the university been a good basis for ….? (CORE)

	Not at all				To a very high extent	
	1	2	3	4	5	
1	☐	☐	☐	☐	☐	Starting work
2	☐	☐	☐	☐	☐	Performing your current work tasks?
3	☐	☐	☐	☐	☐	Potential/future career(s)?
4	☐	☐	☐	☐	☐	Your personal development?
5	☐	☐	☐	☐	☐	Development entrepreneurships skills

→ ***If you are currently unemployed, please skip to F1.***

E3 To what extent are the following competencies utilized in your work? (CORE)

	Not at all 1	2	3	4	To a very high extent 5	
1	☐	☐	☐	☐	☐	Knowledge of your field(s) or discipline(s)
2	☐	☐	☐	☐	☐	ICT skills
3	☐	☐	☐	☐	☐	Critical thinking
4	☐	☐	☐	☐	☐	Research skills
5	☐	☐	☐	☐	☐	Communication skills
6	☐	☐	☐	☐	☐	Working independently
7	☐	☐	☐	☐	☐	Time management
8	☐	☐	☐	☐	☐	Problem solving skills
9	☐	☐	☐	☐	☐	Working under pressure
10	☐	☐	☐	☐	☐	Team work ability
11	☐	☐	☐	☐	☐	Adaptability
12	☐	☐	☐	☐	☐	Leadership
13	☐	☐	☐	☐	☐	Foreign language

E7 To what extent do the following aspects apply to your current job situation? (CORE)

	Not at all 1	2	3	4	To a very high extent 5	
1	☐	☐	☐	☐	☐	Work autonomy
2	☐	☐	☐	☐	☐	Clear and regulated work tasks
3	☐	☐	☐	☐	☐	Possibilities for applying acquired competencies
4	☐	☐	☐	☐	☐	Job security
5	☐	☐	☐	☐	☐	Social status and recognition
6	☐	☐	☐	☐	☐	Good work atmosphere
7	☐	☐	☐	☐	☐	Possibilities of further professional advancement
8	☐	☐	☐	☐	☐	High salary
9	☐	☐	☐	☐	☐	Possibility for providing social influence

E8 How satisfied are you with your current job situation? (CORE)

	Not satisfied at all 1	2	3	4	Very satisfied 5	
1	☐	☐	☐	☐	☐	Work satisfaction

F SOCIO-BIOGRAPHIC CHARACTERISTICS

F1 What is your gender? (CORE)

1 ☐ Female

2 ☐ Male

F2 What is your year of birth? (CORE)

1 ☐☐☐☐ Year

F3 What is your country/ region/ district of birth? (OPTIONAL)

1 Country/ region/ district of birth: .....

(please specify)

E4 To what extent does your previous field of study relate to your current area of work? (CORE)

	Not at all				To a very high extent	
	1	2	3	4	5	
1	☐	☐	☐	☐	☐	Study work relation

E5 What is the most appropriate level of academic qualifications required for your employment/work? (CORE)

1 ☐ PhD
2 ☐ Master's degree
3 ☐ Bachelor degree
4 ☐ Diploma
5 ☐ Other academic qualifications
6 ☐ No academic qualification necessary

E6 If you consider your current employment as not befitting or linked to your education, why did you take it up? *Multiple responses accepted*. **(CORE)**

1 ☐ Not applicable; my job is closely linked to my studies
2 ☐ I have not (yet) been able to find a job more appropriate
3 ☐ Better career prospects
4 ☐ Work interest
5 ☐ Social prestige
6 ☐ Job provides security
7 ☐ Higher income
8 ☐ Work flexibility
9 ☐ Other: .....

(please specify)

10 ☐ Company/office/project belongs to family/relative/friend (ease of access) (OPTIONAL)
11 ☐ Influenced by family/friends (OPTIONAL)

F4 What is your nationality? (CORE)

1 ☐ Citizen
2 ☐ Foreign: .....

(please state the country)

F5	What is your current marital status? (OPTIONAL)
1 ☐	Married
2 ☐	Divorced
3 ☐	Single
4 ☐	Separated
5 ☐	Cohabiting
6 ☐	Widow(er)
7 ☐	Other:.....

(please specify)

F6	What was your marital status while at university? (CORE)
1 ☐	Married
2 ☐	Divorced
3 ☐	Single
4 ☐	Separated
5 ☐	Cohabiting
6 ☐	Widow(er)
7 ☐	Other:.....

(please specify)

F7	What is the highest educational level attained by your parent/ guardian? (CORE)	
	Parent	Guardian
1	☐	☐ Without education
2	☐	☐ Incomplete primary school
3	☐	☐ Complete primary school
4	☐	☐ Incomplete high schooll
5	☐	☐ Complete high school
6	☐	☐ Technical level incomplete
7	☐	☐ Technical level complete
8	☐	☐ Higher education incomplete
9	☐	☐ Higher education complete
10	☐	☐ Incomplete postgraduate
11	☐	☐ Complete postgraduate
12	☐	☐ Do not know
13	☐	☐ Other (please specify) .....
		(please specify)
14	☐	☐ Incomplete secondary school (O-Level) (OPTIONAL)
15	☐	☐ Complete Secondary school (OPTIONAL)
16	☐	☐ Incomplete QT (OPTIONAL)
17	☐	☐ Complete QT (OPTIONAL)

F8 What is/are your current contact(s) address(es)? (OPTIONAL / INDIVIDUAL)

1 E-mail: .....

(please specify)

2 Postal address: .....

(please specify)

3 Telephone: .....

(please specify)

4 Cell phone: .....

(please specify)

5 Facebook: .....

(please specify)

6 WhatsApp: .....

(please specify)

7 Instagram: .....

(please specify)

8 Other social media: .....

(please specify)

9 Physical address: .....

(City/ street/ plot number/ county: please specify)

10 Workplace: .....

(City/ street/ plot number/ county: please specify)

G COMMENTS / SUGGESTIONS

G1 Taking into account your experience, which important changes would you recommend for…: (CORE)

Your higher education institution:.....

.....

1 .....

.....

.....

(please specify)

Your degree programme: .....

.....

2 .....

.....

.....

(please specify)

G2	How do you evaluate the questionnaire? (CORE)
1 ☐	The length of the questionnaire is ok, the relevant topics are included
☐	The length of the questionnaire is too short, more topics should be included: .....
	.....
2	.....
	.....
	(please specify)
☐	The length of the questionnaire is too long, some topics should be deleted: .....
	.....
3	.....
	.....
	(please specify)

G3	The questionnaire was… (CORE)
1 ☐	easy to understand and fill out.
☐	difficult to understand and fill out: .....
	.....
2	.....
	.....
	(please specify)

G4	Please provide any other information that may be relevant to this survey. (CORE)
	.....
	.....
1	
	.....
	.....
	(please specify)

Thank you for completing this questionnaire!

We would like to thank you very much for helping us.

Your answers were transmitted. You may close the browser window or tab now.

5.4. Phases and tasks of a GTS

Phases and tasks	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Phase I: Concept and instrument development												
1. Specification of aims and concept, coordination, planning, organization												
2. Questionnaire development / adaption, testing (incl. technical concept for carrying out the survey, formulation of questions/response items, formatting of questionnaire)												
3. Procuring addresses and preparation of fieldwork phase (incl. printing of questionnaires and dispatch of other material)												
Phase II: Data collection												
4. Conduction of the survey and checking of questionnaires returned (incl. training of survey team, assurance of high participation)												
5. Development of the codebook												
Phase III: Data analysis and reporting												
6. Coding of open responses, data entry and data editing (quality control)												
7. Data analysis (frequencies, tables)												
8. Report writing												
9. Presentation of results, discussion and revision												
10. Correction and revision of the publication												

adapted from Schomburg (2003)

5.5. PAP Template

Title of my project	
Objectives	
Duration	
Central responsible body	
Project team	
Stakeholders:	
Budget	
Milestones	
Potential risks	

Objective	Description of key activities to achieve the objective (work packages)	Evidence of successful implementation of the work packages (milestones)	What are the outputs?	Who is involved?	Time frame and deadline	Current state of work packages	What resources are needed? Who will provide these resources?	Who is responsible?	What obstacles have to be considered?	What solutions are possible?

References

A guide to the project management body of knowledge: (PMBOK® guide); an American National Standard ANSI/PMI 99-001-2013; [approved American National Standard ANSI/PMI 08-001-2012] (5. ed.). (2013). *PMI global standard*. Newtown Square Pa.: Project Management Inst.

Babbie, E. R. (2004). *The practice of social research* (10th ed.). Southbank [a.o.]: Wadsworth Thomson Learning.

Bryman, A. (2004). *Social research methods* (2nd ed.). Oxford [a.o.]: Oxford Univ. Press.

Cape Higher Education Consortium (CHEC) (2013). *Pathways from university to work: A Graduate Destination Survey of the 2010 Cohort of Graduates from the Western Cape Universities*. Retrieved from http://www.chec.ac.za/files/CHEC%20Graduate%20Survey%20FULL%20REPORT%20WEB.pdf

Department for Business Enterprise & Regulatory Reform (2010). Guidelines for Managing Projects: How to organise, plan and control projects. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/31979/10-1257-guidelines-for-managing-projects.pdf

Dietz, T., & Kalof, L. (2009). *Introduction to social statistics: The logic of statistical reasoning*. Chichester: Wiley-Blackwell.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method* (4th ed.). Hoboken NJ: Wiley.

Egesah, O. B., Wahome, M., Langat, E. K., & Wishitemi, B. E. (2014). University graduate tracer studies (UNITRACE): Methodological lessons and utilization of selected results in Kenya. *Journal of International Academic Research for Multidisciplinary*, *2*(8), 305–325.

Egesah, O. B., & Wahome, M. (2016). Conducting Graduate Tracer Studies for Quality Assurance in East African Universities: A Focus on Graduate Students Voices on Quality Culture. *Journal of Education and Practice*, *7*(6), 174–181. Retrieved from http://iiste.org/Journals/index.php/JEP/article/download/29105/29869

Field, A. (2013). *Discovering statistics using IBM SPSS statistics: And sex and drugs and rock 'n' roll* (4th ed.). *MobileStudy*. Los Angeles, London, New Delhi: SAGE.

Groves, R. M., Fowler, F. F., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2009). *Survey methodology* (2nd ed.). *Wiley series in survey methodology*. Hoboken NJ: Wiley.

Howitt, D., & Cramer, D. (2014). *Introduction to SPSS in psychology: For version 22 and earlier* (6th ed.). Harlow: Pearson Education.

Kumar, R. (2005). *Research methodology: A step-by-step guide for beginners* (2nd ed.). London: SAGE.

Lock, D. (2007). *Project management* (9th ed.). Aldershot, Hampshire: Gower.

Osei, C. K., & Dontwi, I. K. (2014). *Tracer study of graduates of CEMBA, CEMPA and MSC. Industrial Mathematics*. Retrieved from Institute of Distance Learning, Kwame Nkrumah University of Science and Technology website: http://ir.knust.edu.gh/bitstream/123456789/7759/1/TRACER%20study%20Final%20report2014%20-%20Copy.pdf

Pistor, P., & Stammen, K.-H. (2017). Tools and Procedures for Quality Assurance in Higher Education Institutions: Module 2. In S. Randhahn & F. Niedermeier (Eds.), *Training on Internal Quality Assurance Series.* Hamburg: tredition. Retrieved from http://dx.doi.org/10.17185/duepublico/43223

Qin, X. (2015). Project Management and Project Action Plan. (Unpublished manuscript).

Rindermann, H. (1998). Das Münchner multifaktorielle Modell der Lehrveranstaltungsqualität. Entwicklung, Begründung und Überprüfung. *Beiträge zur Hochschulforschung*. (3), 189–224.

Rindermann, H. (2009). *Lehrevaluation: Einführung und Überblick zu Forschung und Praxis der Lehrveranstaltungsevaluation an Hochschulen mit einem Beitrag zur Evaluation computerbasierten Unterrichts* (2., leicht korrigierte Aufl.). *Psychologie: Vol. 42*. Landau: Empirische Pädagogik e.V.

Salant, P., & Dillman, D. A. (1994). *How to conduct your own survey: [leading professionals give you proven techniques for getting reliable results; accurate sampling, effective questionnaires, convincing presentations, telephone, mail, and face-to-face surveys]*. New York [a.o.]: Wiley.

Schomburg, H. (2003). *Handbook for Graduate Tracer Studies* (No. Version 2). Kassel and Bonn. Retrieved from http://www.cedefop.europa.eu/files/uni_kassel_handbook_on_tracer_studies_2004.pdf

Schomburg, H. (2016). *Carrying Out Tracer Studies: Guide To Anticipating And Matching Skills And Jobs Vol. 6*. Retrieved from http://www.etf.europa.eu/webatt.nsf/0/45A4CE81F3398029C1258048005BEFB8/$file/Vol.%206%20Carrying%20out%20tracer%20studies.pdf

Shongwe, M., & Ocholla, D. (2011). *A tracer study of LIS graduates at the University of Zululand, 2000 - 2009*. 6th Biennial ProLISSA Conference, 9 -11th March 2011, Pretoria. Retrieved from http://www.lis.uzulu.ac.za/2011/Mzwandile%20and%20Ocholla%20PROLISSA%20paper%20revised%20March%2029.pdf

Trochim, William M. K. (2005). *Research methods: The concise knowledge base*. Mason, Ohio: Cengage Learning, Atomic Dog.

Wahome, M., Egesah, O., & Wanyama, M. (2015). Entrenching Quality Assurance Culture Through Graduate Tracer Studies In East Africa: Lessons Learnt, Challenges And Prospects From Mutrace. *International Journal of Education Learning and Development*, *3*(2), 15–24.