German Centre for Higher Education Research and Science Studies (Deutsches Zentrum für Hochschul- und Wissenschaftsforschung, DZHW), Berlin, Germany

# Report on the content and technical structure of the

# **PROFILE**

# Infrastructure

RISIS "Research infrastructure for research and innovation policy studies"

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# Report on the content and technical structure of the *ProFile* infrastructure (Task 6 of WP6)

**Table of Contents**

# 1   Basic characteristics

In general, little is known about doctoral education in Germany. Even the total number of doctoral candidates at German universities can only be estimated, official data does not exist. Therefore, reliable information on the conditions, processes and success of doctoral education is essential. Due to the insufficient data availability, the **Institute for Research Information and Quality Assurance e.V. (iFQ)[1]** has set up ProFile: A longitudinal study focussing on the situation of doctoral candidates and their postdoctoral professional careers. Since April 2009, doctoral candidates from different universities and other (funding) institutions are surveyed at regular intervals via means of an online survey (see Figure 1). ProFile aims at identifying determinants of postdoctoral career development and at providing information on conditions of doctoral education in a comparative perspective via a monitoring approach. Special attention is paid to the effects of structured doctoral programs (Graduate Schools) which have emerged increasingly during the past years. ProFile contains a number of explanatory elements which can be connected to career theories of decision making in order to explain career outcomes.

# 2   Information on substantive content of *ProFile*

A comprehensive documentation of data collection and contents of the Scientific Use File for on-site use can be found under the following URL:
http://risis.eu/profile_data_documentation/

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[1] From January 1st, 2016 on the iFQ continues its work as Department 2 "Research System & Science Dynamics" of the German Centre for Higher Education Research and Science Studies (Deutsches Zentrum für Hochschul- und Wissenschaftsforschung, DZHW)under the same address:
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This report still serves as an introduction into the basic characteristics of the project but it will no longer be updated.

## 2.1 Definition and description of observations

**Target population and unit of analysis**

ProFile aims at studying the supervision situation of doctoral candidates and careers of doctorate holders. Thus, doctoral candidates and doctorate holders are the units of analysis. Doctoral degrees are defined as advanced study ISCED-8[2] equivalent research degrees. The data covers doctoral students from all subjects with the exception of Medicine.[3]

Since there is no information on the total population of doctoral candidates in Germany ProFile cannot claim statistical representativity for this group, but the sampling approach at least ensures representativity on the level of the partnering organisation. ProFile receives the contact data of all doctoral candidates currently working on a dissertation at selected universities and funding organisations in Germany.[4] In addition to the contact data (names email) ProFile receives subject, gender and year of birth for every person in order to assess how the sample achieved through the survey matches the total population of doctoral candidates at the respective organisation. In 2013 the partnering organisations were seven German universities alongside three funding organisations.[5] The Deutsche Forschungsgemeinschaft (German Research Foundation, DFG) left the project in 2012 after having provided contact data on doctoral candidates with membership in a Research Training Group (RTG) or with an affiliation to a Collaborative Research Center (CRC) for the years 2009 and 2010. Each ProFile cooperation partner is expected to deliver every year the contact data on the doctoral candidates who have recently started working on their dissertation or who were not reported in the previous year. In the first year, all doctoral candidates at the respective partnering organisation are reported.
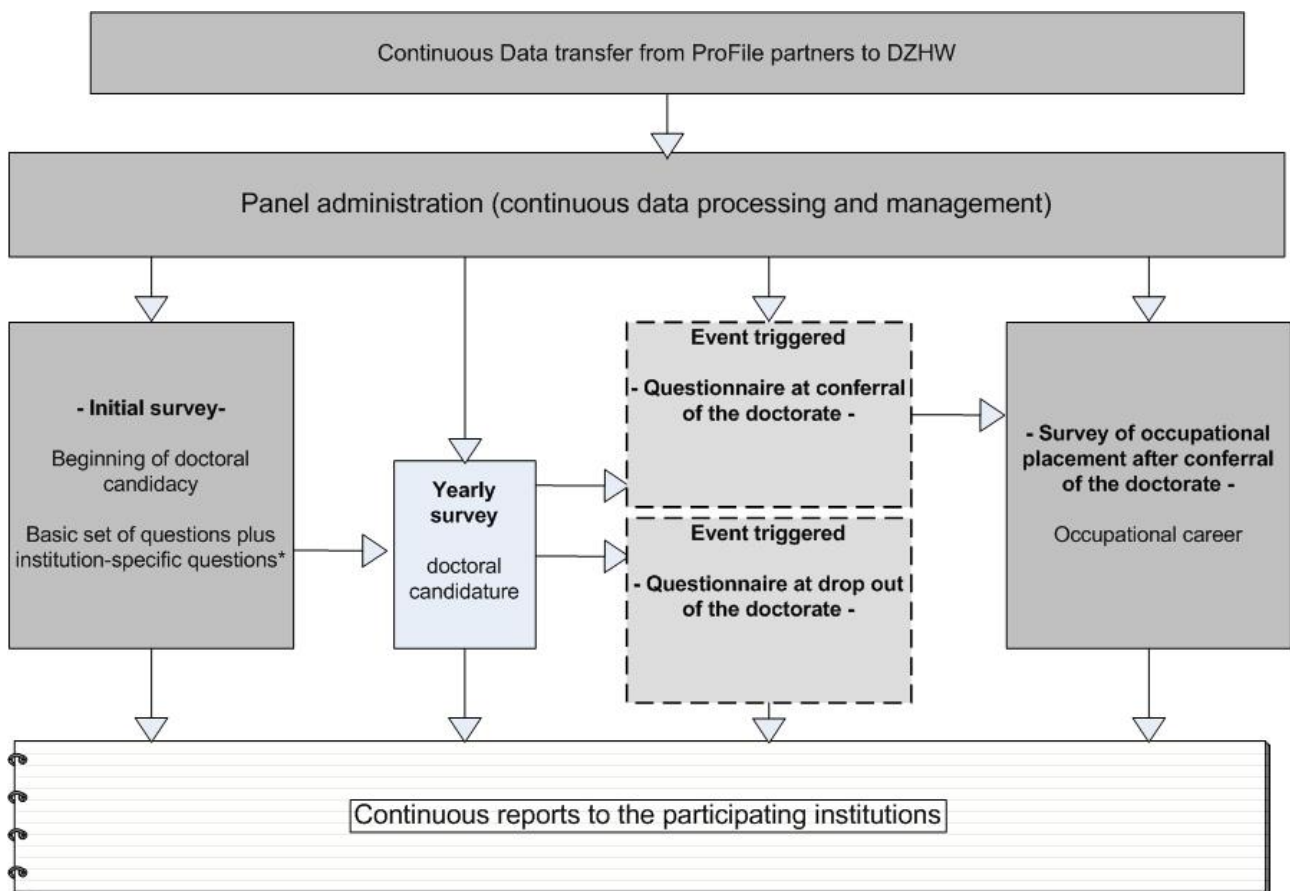
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[2] International Standard Classification of Education 2011 (ISCED), http://www.uis.unesco.org/Library/Documents/2011-international-standard-classification-education-isced-2012-en.pdf

[3] This is due to the fact that an unknowingly large share of doctoral degrees in Medicine may not be ISCED-8 equivalent degrees and that degrees are partially obtained before referral of the ISCED-7 degree.

[4] With the exception of Medicine, see Footnote 3.

[5] Humboldt-Universität zu Berlin, University of Kassel, Heidelberg University, Freie Universität Berlin, Friedrich Schiller University Jena, Leibniz Universität Hannover, University of Osnabrück, Otto von Guericke University Magdeburg, the Studienstiftung des deutschen Volkes (German National Academic Foundation), Deutscher Akademischer Austauschdienst (German Academic Exchange Service, DAAD) and the Heinrich Böll Stiftung (Heinrich Böll Foundation)

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**Figure 1 Design of ProFile Survey**

## 2.2 Data acquisition and processing (e.g. data cleaning)

The contact data undergo duplicate checks before they are imported into the panel database. The actual micro-data are then collected via a bilingual online survey hosted at DZHW. Survey languages are German and English. Due to the complexity of the data acquisition and specifics of the university system in Germany, it is possible that respondents have already completed their doctoral degree when they are invited to the ProFile survey for the first time. This is assessed within the survey.

## 2.3 Information on all variables/indicators

**Preliminary remark on scales used in the surveys**

Many of the questions in the questionnaire are assessed on a five point Likert Scale with an adequate wording. There are few exceptions to this rule. Some questions ask for (non-) applicability via a checkbox and a couple of questions provide the possibility to indicate a so called don't know, or not applicable option in addition to the five point Likert scale. Usually only the first and last choice options of the scales are labelled.

**Description of variables/indicators**

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Table 1 lists the questionnaire topics. The questionnaire has remained rather unchanged over the years 2009-2012. In 2013 revisions were made and additional blocks were incorporated into the questionnaire. What follows below is a more detailed description of the topics covered in the questionnaire.

**Table 1 Questionnaire topics**

| |
|---|
| Assessment of current dissertation status |
| Interruptions |
| Educational biography of respondents |
| Current dissertation attempt |
| Retrospective information on the doctorate |
| Information on successful completion of the doctorate |
| Job search during doctoral candidacy |
| Structural doctoral program (Graduate School, Research Training Group) |
| Scientific output |
| Research stays abroad |
| Supervision during the doctorate |
| Courses offered during the doctorate |
| Financing of the doctorate |
| Vocational goals and aspirations |
| Personality |
| Skills and abilities |
| Socio-demographics |

## Assessment of current dissertation status

The initial questionnaire section in every survey is dedicated to the current status of the dissertation endeavour. According to the choice made respondents are categorized into different groups:

- persons currently working on the dissertation (doctoral candidates)
- persons who have handed in their thesis and are waiting for final exam (doctoral candidates)
- persons who have currently interrupted the work on their dissertation (for at least two months, doctoral candidates)
- persons who have stopped working on their dissertation (drop outs)
- persons who graduated successfully (doctorate holders)

From 2013 on, it is also possible to indicate "I never intended to do a doctorate./I have not started to work on my dissertation yet." These persons are immediately filtered to an exit page in the survey and do not receive any further questions in the questionnaire.

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**Interruptions**

Persons who state to have currently interrupted work on their dissertation do receive detailed questions on reasons for interruption but are treated as doctoral candidates throughout the rest of the questionnaire. All persons (with the exception of dropouts) who do not state at the beginning of the questionnaire to have interrupted works on their dissertation at the moment are asked whether they have interrupted work on their dissertation in the last 12 months/during the course of the dissertation respectively. Reasons and duration are assessed in the same way as for those who have are current interrupters.

**Educational biography of respondents**

This section of the questionnaire deals with educational degrees which were obtained prior to the current dissertation endeavour. All respondents run through this section once. Emphasis is put on university degrees of which a maximum of two can be named. Information is gathered on grades, subjects, source of financial support during studies, name and location of the universities as well beginning and completion date. In addition, information is gathered on previous dissertations attempts, vocational training degrees and school exam (Abitur, the qualifying degree for university studies). In case of aborted dissertation attempts, the reasons are assessed. Information on degrees is filtered on applicability.

**Current dissertation attempt**

All doctoral candidates are asked at which university they intend to hand in their dissertation (name of university and country). The subject of the dissertation is captured by an open ends answer. The questionnaire asks for reasons for the beginning of the doctorate and the choice of the university, difficulties which had to be managed before starting the dissertation work, the institutional affiliation of the dissertation topic and the starting date of the works on the dissertation.

**Retrospective information on the doctorate**
Since doctorate holders do not run through the questionnaire section "current dissertation attempt" they receive targeted questions which they are asked to answer in retrospect. The items and questions are similar to those of the doctoral candidates. Subject of the dissertation, enrolment/registration as a student during the time of writing the dissertation, the institutional affiliation of the doctoral project are assessed. Moreover, reasons why a specific university was chosen are asked alongside the reasons for starting the work on the dissertation and difficulties which had to be managed before dissertation work. The beginning and end dates of the dissertation are assessed, where the completion date equivalent to the date of the final exam (and not the publication date of the doctoral thesis).

For the period of the doctoral degree, the range of courses offered and taken, information on supervision situation as well as the significant support persons are gathered. Retrospective assessments and perceived burdens are assessed, too.

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## Information on successful completion of the doctorate

Doctorate holders are asked detailed questions on the name of the university for their final exam, the type of dissertation (cumulative, which means a series of peer-reviewed articles versus a monograph), grade, thesis language and whether the thesis has been published already.

## Job Search during doctoral candidacy

Doctorate holders and dropouts receive questions on job-search activities during candidacy. The source of job offers (personal networks vs. systematic search) as well branch of jobs are assessed.

## Structured doctoral programme (Graduate School, Research Training Group)

Doctoral candidates are asked detailed questions about membership in doctoral programs. Membership duration as well as information on reasons to join and about the selection procedure is reported. Satisfaction with the organization of the selection procedure are asked if applicable.

## Scientific output

Doctorate holders and doctoral candidates are asked about the magnitude and types of scientific output produced during their candidacy. This includes conference visits (with own contribution, poster, no contribution), research project proposals and publications (type and number). Status update surveys assess changes in the past 12 months.

## Research stays abroad

Doctorate holders and doctoral candidates are asked whether they stayed abroad or in Germany for the purpose of research. Research stays are assessed repeatedly during candidacy in the status surveys. A more detailed purpose (field work, further education etc.), duration and location for each stay are assessed.

## Supervision during the doctorate

Doctoral candidates are asked a variety of questions regarding their supervision. These questions are asked repeatedly throughout candidacy in order to gain detailed understanding of possible changes in the supervision situation throughout the candidacy. If a candidate indicates to have changed his supervisor in a status survey the reasons for the change are asked.

One block is concerned with the number of supervisors. Regarding the main supervisor (the person who supervises the candidate most intensively) a number of detailed questions are asked such as, whether the main supervisor is a professor lecturer, Post-Doc etc., whether the main supervisor is also the reviewer and whether doctoral agreements were made and, if so, of what content and type (written versus oral). Whether agreements hold or are broken is assessed as well. A number of items regarding expectations mentioned by the main supervisor are asked and doctoral candidates are asked to assess their main supervisor based on a number of items. The satisfaction with the supervision through the main supervisor as well as the supervision in general is reported.

## Courses offered during the doctorate

Course visits are assessed for doctoral candidates and doctorate holders. Type of course, and required participation is assessed alongside an evaluation of the courses taken for the works

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on the dissertation. Doctoral candidates are asked if they desire different course offers. Another section looks at different types of resources available to the doctoral candidates.

**Financing of the doctorate**
The section looks at the respondent's sources of financial income. Respondents are asked to list all their sources of income in chronological order. For each income source detailed questions are asked such as the scholarship providing organization in case of a scholarship or details regarding the occupational situation for periods of employment. For employment periods it was also asked whether there was a thematic connection between the job and the dissertation topic. Total household income is assessed in addition to the income generated through the respective income sources.

**Vocational goals and aspirations**
All respondents are asked about their future career plans. This includes the job aspired as well as an assessment of how well the respondents feel prepared for this job and how they perceive their career perspectives in general. Other questions ask how closely the respondents like to have their future career connected to certain activities such as research, teaching, management.

**Personality traits**
From 2009 to 2012 the questionnaire contained a series of items assessing domain specific control beliefs. The control beliefs were targeted to the situation of doctoral candidates and assessed how well the respondents believed they are able to influence the course of their doctorate by themselves. In 2013 items to assess the so called Big 5 personality traits were implemented.

**Skills and abilities**
A number of questions regarding key qualifications as well language skills are asked based on a self-assessement. The skills are assessed in the initial survey and in the survey after referral of the doctorate for those who are observed at least twice. Therefore, it is possible to assess change in skills over the course of the candidacy. Doctorate holders are asked which skills where required for the successful completion of their doctorate.

**Socio-demographics**

All respondents run through this section and are asked the following:

- gender
- parent's educational background
- marital status
- citizenship and country of birth
- children and number of persons in the household

## 2.4 Sectorial, temporal and geographical coverage

**Classification of research fields / subject areas**

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ProFile makes use of a range of classification schemes for a number of different topics. First, the classifications of research fields used in ProFile are the classification scheme of the German Statistical Office (DESTATIS Studienbereiche) and the Subject Classification of DFG (DFG Subject Areas). ProFile includes doctoral candidates and doctorate holders from all research fields. Only Medicine is covered to a lesser extent which is due to the specifics of the German doctoral degree in Medicine.

**Temporal coverage**

Data collection in ProFile started in 2009. The persons surveyed in the first survey have started the work on their dissertation partially way before 2009 but there are a few individuals with a candidacy much longer than that. Starting from the second year of partnership with the university or funding organisation the partner provided only the contact data of the new doctoral candidates for the specific year. ProFile therefore looks every year at the cohort of newly beginning doctoral candidates. All doctoral candidates are invited to the yearly status survey until they indicate that they have obtained their doctoral degree or that they have dropped out from their doctoral candidacy without obtaining the degree (dropping out from doctoral training).

**Geographical coverage**

Geographical coverage is limited to doctoral candidates with supervisors at German universities regardless of their place of residence.

## 2.5  Quality and accuracy of data

**Representativity of data with regard to the population of doctoral candidates in Germany**

As there is no official data on the number of doctoral candidates in Germany, it can hardly be assessed how accurately the ProFile data represents the general population of doctoral candidates in Germany. ProFile therefore does not claim to be a representative sample of doctoral candidates in Germany. However, due to the large range of partners ProFile does include all types of doctoral candidates in Germany ranging from stipends, scientific employees at universities to so called external doctoral candidates, e. g. those working on their degree in industry. ProFile regularly checks how well the sample generated from the survey represents the total population of doctoral candidates at the partnering organisations in terms of subject area, gender and age, because this information is provided by the partners. What can be found there is that women are slightly overrepresented in the survey data when compared to their share at the respective university/funding organisation. The differences in the share of subject areas in the sample and at the institution (total population) are small. With the exception of Medicine, (see comment under 2.4) all subject areas are represented in ProFile. Therefore, the ProFile data are not biased systematically in terms of gender and subject area from the

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known total population at the partnering organisations. Comparisons with the few existing data (estimates and enrolment data[6]) have revealed good coverage so far.

Another method of ensuring data quality is a sophisticated duplicate check management tool. Since it is theoretically possible (and in fact observed in reality) that one and the same doctoral candidate is reported from two different organisations, e.g. one university and one funding organisation, extensive duplicate checks are applied to the data at import. These duplicate checks make sure that the same person is not invited twice to the ProFile survey.

Not all doctoral candidates are observed repeatedly over the course of their candidacy. If one candidate skipped one status update survey he/she will be invited to the next survey.

**Response rates**

Response rates differ substantially between the types of organisation providing the data. Stipends from foundations are more likely to participate in the survey than doctoral candidates reported from universities. All persons receive up to three reminders to participate in the survey before the survey is closed.

**Documentation of missing values**

The number of missing values depends on the type of missing values. Types of missing values include the following types:

- item-non-response due to not answering the question,
- item non response due to filtered (skipped) questions,
- item non-response due to technical error,
- item non response due to earlier drop out of the questionnaire,
- item non response due to "don't know" answer or
- unit non-response in follow up studies.

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[6] Since enrollment for doctoral candidacy is not mandatory this data is biased in favor of educational migrants for whom enrollment is usually expected as proof by their funding organizations.