

The National Educational Panel Study:
A long-term assessment of competence development and educational careers

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Paper presented at the
ONS UKCeMGA and NIESR International Conference on Public Service Measurement
11-13 November 2009, SWALEC Stadium, Cardiff

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Abstract

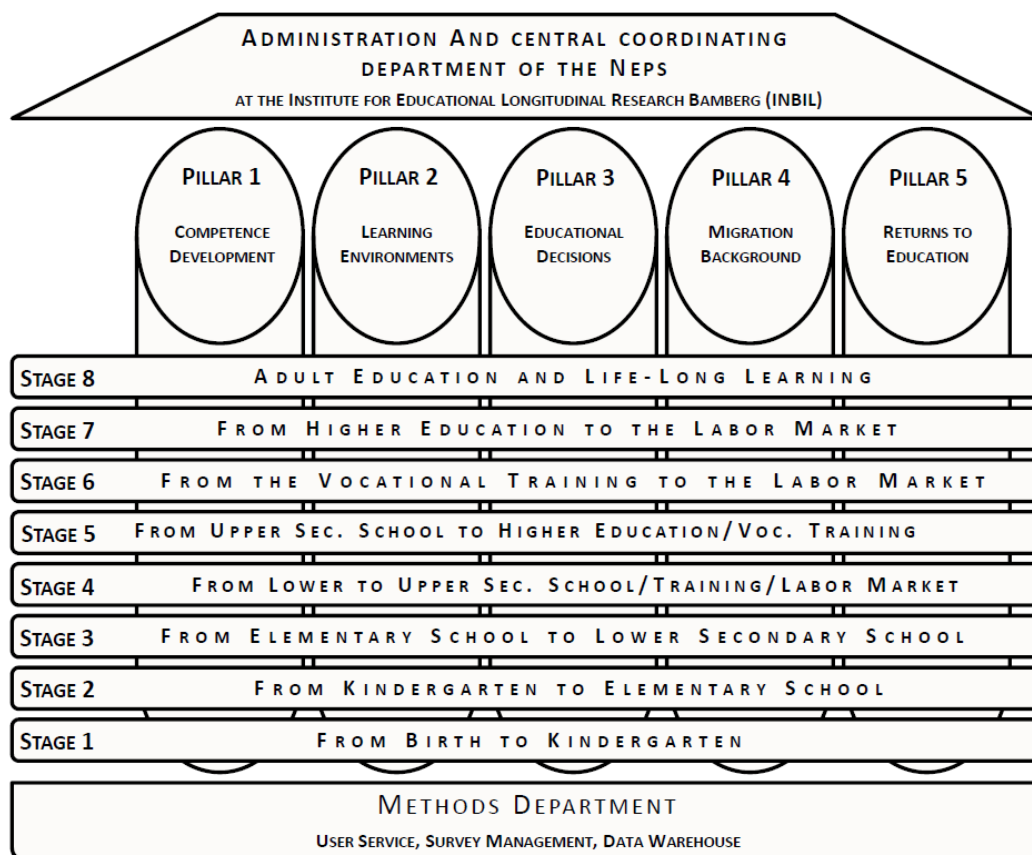
The National Educational Panel Study (NEPS) has been set up to find out more about how education is acquired, to see how it impacts on individual biographies, and to describe and analyse the major educational processes and trajectories across the lifespan. We are collecting longitudinal data on the development of competencies, learning environments, the effects of social inequality and migration, and returns to education throughout the lifespan. The goal is to provide a rich source of potential analyses for the various disciplines concerned with educational and training processes, and to set up a basis for major improvements in educational reporting and the provision of expert advice for policymakers in Germany. All NEPS data will be made available to the national and international scientific community. To ensure high-quality user support, we are investing in modern methods of data documentation and data dissemination. This paper gives a general overview of the NEPS project, focusing on how our data will help us to better understand the German educational system. As the success of the project depends on the data usage, the paper also sketches our plans for developing high-quality user services.

1. Project overview

In modern knowledge societies, education is the decisive precondition for not only participation in democracy but also economic growth and prosperity. Increasingly rapid changes in a globalized world are making it necessary to cope with new challenges in both private and working life. The National Educational Panel Study (NEPS) is currently being set up to face these challenges by finding out more about the acquisition of education in Germany, plotting the consequences of education for individual biographies and describing as well as analysing central education processes and trajectories across the entire lifespan. The interdisciplinary NEPS consortium combines the specific expertise of a number of research institutes, researcher groups and research personalities under the management of Professor Hans-Peter Blossfeld at the Otto-Friedrich University of Bamberg, Germany. The project has been evaluated scientifically by the German Research Foundation, and is receiving both federal and state government support. It is being financed by the German Federal Ministry for Education and Research.

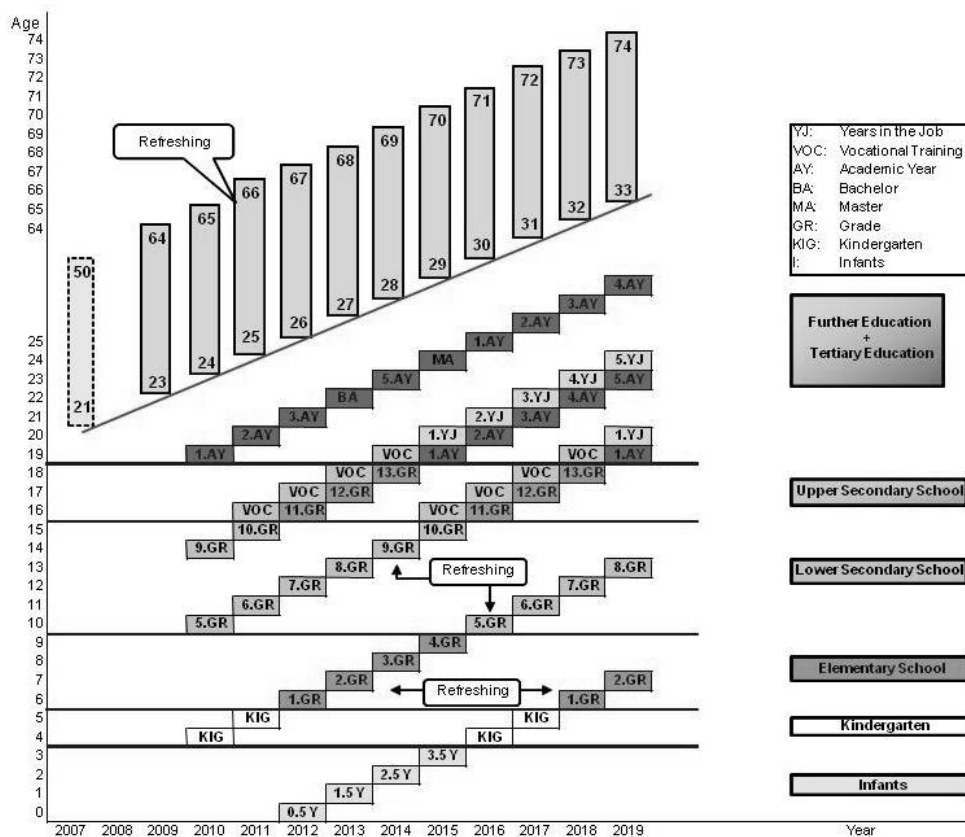
The NEPS distinguishes eight stages of education that are integrated and coordinated through a theoretical on five interlinked dimensions. These dimensions are: (1) competence development in the life course, (2) education processes in learning environments, (3) social inequality and education decisions in the life course, (4) education acquisition with migration background in the life course and (5) returns to education in the life course. While these five dimensions form the main structure of the NEPS, their content will be examined throughout the lifespan with a particular focus on the following eight stages of education: (1) from birth to early childcare; (2) from kindergarten to elementary school; (3) from elementary school to lower secondary school; (4) from lower to upper secondary school or vocational training; (5) from upper secondary school to higher education, vocational training or the labour market; (6) from the vocational education and training system to working life; (7) from higher education to the labour market; and (8) adult education and lifelong learning. These theoretical dimensions and educational stages form the framing concept for the NEPS. In addition, there are method groups dealing with central questions like sampling, non-response and mode effects.

Figure 1: The framing concept of the National Educational Panel Study



Methodologically, the NEPS is based on a multicohort sequence design. Six starting cohorts – newborns, Kindergarten children, 5th graders, 9th graders, first-year university undergraduates and adults – are being recruited between 2009 and 2012. These will contain a total of more than 60,000 participants who will be surveyed regularly over an extended period of time. Their competencies will also be assessed at set intervals. To document and analyse historical changes in the way people pass various transitions into, within and out of the education system, new starting cohorts will also be recruited and integrated into the study in later years (creating a succession of cohorts). The data collected for the NEPS will be subjected to prompt and strict quality controls before being processed and documented in a user-friendly way. While complying strictly with personal data privacy requirements, this will grant researchers in Germany and abroad the opportunity to analyse the data as exhaustively as possible, thereby contributing to the greatest possible progress in education research.

Figure 2: The multicohort sequence design



The NEPS will deliver innovative impulses for basic research on developmental processes and trajectories. In the mid- to long-term, the NEPS concept will help answer numerous questions including:

- How do competencies develop over the life course?
- How do competencies influence decision-making processes at various critical transitions in educational careers (and vice versa)?
- How and to what extent are competencies influenced by opportunities to learn in the family, the peer group and the following learning environments: Kindergarten, school, higher education, vocational training and further education?
- Which competencies are decisive for obtaining educational qualifications, which for lifelong learning, and which for a successful personal and social life?
- How do political reforms influence the acquisition of competencies or equal opportunity in the education system?

In sum, the NEPS is expected to decisively improve the framing conditions for empirical education research in Germany, provide an empirical basis for advising policymakers, make a major contribution to promoting the careers of young scientists, and lead to a marked improvement in the international standing of German education research.

2. The NEPS Data

The survey design of the NEPS will provide an abundance of research opportunities. However, this abundance is accompanied by enormously complex data structures: Eight stages and five pillars are developing instruments for different study units. In the schooling stages, data will be collected from the target persons, their parents, teachers and heads of schools. All questionnaires and competence tests together result in a database with numerous dependencies between the different types of data. These dependencies are both content-specific and time-specific, because the NEPS will soon be providing a longitudinal database. The surveys will be carried out in settings of immense institutional and individual diversity. As a result, instruments need to vary both between and within educational stages in order to effectively record the manifold educational pathways of the study population. Each unit under study requires a specially adapted instrument in each year of the survey. Conversely, all

variation and diversity must be embedded within an integrated panel database that will allow researchers to analyse all types of data together. At the individual level, the target persons will be the main units of such data merging. As all data can be traced back to these units, it can be combined for microlevel analyses. This includes all contextual information and the mapping of a multilevel structure (children in school, schools in counties, etc.). However, the database must also comply with research interests in, for example, mode effect studies, data fusion and attrition analyses. Accordingly, the NEPS database will carry numerous identifiers to cover all possible data combination and segmentation options.

In sum, the NEPS surveys will deliver a very complex longitudinal database. Yet, this database must provide convenient access for all researchers interested in working with the data, and not be confined to a small group of experienced users. Users with different backgrounds and from different disciplines (such as sociology, educational science, psychology or economics) must be accommodated to ensure not only equal research opportunities but also high-quality analyses. The challenge of reconciling a complex survey design with convenient data usage calls for extensive user support. Unlike many previous studies, the NEPS project is investing in high-quality user services including on-site researcher training; thorough documentation; easy-to-use tools for searching, retrieving and preparing the data; and modern means of data access.

3. User Services

Complex data structures create countless pitfalls. Many potential users may be discouraged and findings can easily be lost through data discovery problems, misinterpretations or technical mistakes in data preparation and analysis. The key issue for the user services is to provide sufficient, easy to obtain and clearly arranged information. Before starting any data analysis, users must be able to find the appropriate data for their research questions and understand this data. Both finding and understanding the data require metadata, that is, 'data about data'. As study designs become increasingly complex, metadata services become even more important and challenging to implement. Prospective and ongoing research require metadata that can be explored interactively and will provide information on every aspect of the surveys and their data. Thus, a thorough documentation will be supported by a metadata portal offering a rich set of online data discovery tools and web-

services. The NEPS will set up a metadata portal as soon as data becomes available for external users. Detailed documentation of the surveys will be conducted using 'DDI 3', the latest standard for documenting social science data. Documentation in DDI 3 will capture information from all development stages of the project and lead to increased accuracy, because the whole life cycle of data collection will be documented 'at source'. It avoids loss of information in an ongoing longitudinal study, facilitates the tracking of all changes and updates made in documentation, and provides the technical substructure for all metadata web-services and discovery tools. Documentation in DDI 3 also ensures connectivity to other research projects by using an equivalent standard. As one of the leading projects in educational science, the NEPS is supporting the development of 'EduDDI', a new DDI-based standard for documenting educational data.

In addition to the metadata portal, the NEPS user environment will provide services for privileged users who have registered and signed agreements on data confidentiality protection. To obtain the actual data, convenient tools will create user-defined datasets from the data warehouse that is hosting all the data from the entire project. A remote access solution will allow high-quality data access and user support while simultaneously ensuring data confidentiality. As a remote access environment, the NEPS plans to adapt the concept of a data enclave as introduced by the National Opinion Research Center (NORC) in Chicago (Bradburn et al., 2006).

A data enclave grants controlled data access ensuring a high level of confidentiality protection. At the same time, researchers can always be sure that they are working with the latest data release including all updates, editions and extensions. An encrypted connection with the enclave provides the gateway to the data for all researchers. All that is required to access the online resources of the enclave is an Internet connection and a terminal server client (e.g., Citrix). Online resources include not only the data and metadata services but also data preparation tools, collaborative space software and several statistical data processing packages like Stata, SPSS, and R. Researchers can utilize all tools and services in the enclave without having to install them on their own computers. Thus, the enclave provides an excellent environment for high-quality data use.

One core feature of NORC's enclave concept is to establish a community of well-trained and trusted users. As Bradburn et al. (2006, p. 8) note, 'it is important to develop the human as well as the physical infrastructure for the data enclave'. Before accessing any data, external researchers will be

invited to participate in training courses addressing several different aspects of the NEPS service. First, users of the NEPS data must be fully aware of their responsibilities when accessing sensitive microdata – a goal that can be achieved far more effectively through personal contact rather than just by signing contracts and ethical statements. The training modules will also provide an introduction to the study design and data structures to ensure a solid level of background knowledge that will help new users start their research projects. This includes topics such as how to work with a specific type of data, how to merge effectively, how to weight correctly and so on. Finally, the courses will train researchers in all technical aspects of using a data enclave such as how to establish a connection with it and how to use the software tools.

Another key idea of a data enclave is to create a collaborative space in which researchers can share their knowledge and experience. In turn, this will help the NEPS as the data producer to improve user support, maintain the data, and update tools. Although the enclave will provide a private workspace for every researcher that supports all data analysis requirements, most of the quantitative research in the social sciences is a collaborative activity. Team workspaces within the enclave will allow the collaborative annotation of analyses, the sharing of all results and even the development of publications such as journal articles.

The NEPS has been established as a service to provide high-quality educational data for the scientific community. This goal requires extensive user support and modern means of data access. Some of the user services currently being developed, in particular the data enclave concept, represent pioneering work for Germany. These ideas will hopefully help to set new standards of scientific user support, create synergies for future projects, and thus be of lasting benefit for the scientific community.

References

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