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Hans-Peter Blossfeld

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Education Across the Life Course

Hans-Peter Blossfeld

Abstract

There is a huge demand for high-quality longitudinal educational research in Germany. In particular, there is a clear need for both analytical and methodological progress in order to understand educational pathways through the life course and how they lead to different outcomes. This paper identifies the theoretical and methodological challenges of studying education across the life course and describes the structure of the National Educational Panel Study (NEPS) in Germany.

Keywords: competence development, educational decisions, formal, informal and non-formal educational environments, returns to education, educational trajectories, life course research, longitudinal analysis, panel data

1. Research Questions

Germany, like other modern industrialized societies, has evolved into a knowledge-based economy. More than in the past, today, education is a lifelong process in which individuals continually learn in formal, nonformal, and informal environments. Individuals' educational careers and competencies and how they unfold over the life course in relation to family, educational institutions, workplaces, and private life are therefore a topic of major national interest. There are several social, economic and demographic changes that make education particularly important in modern societies. Examples are:

- The dramatic decline in unskilled job positions in the course of technological change raises issues concerning the proportion of youth who leave the educational system with poor competencies and/or without a certificate. Thus there are questions like Which factors influence educational participation and achievement in educational institutions? How are basic competencies related to school success, certificates, the transition into the labor market, and job careers?
- Technological change has also led to an increase in service, professional, and engineering positions requiring a host of social, communicational, and problem-solving skills. This upgrading of the job structure has enhanced the value of education, science competencies, and soft skills on the labor market and in society as a whole. Such changes inevitably affect the contents and processes of learning in schools, vocational training systems, and universities, triggering questions such as: What do students learn and which kind of competencies do individuals need in a knowledge society? How can we engender motivation and interest in reading, mathematics, and science? How is the development of reading, mathematical, and science competencies affected over the life course by different learning environments such as school, work, home, and community? How can we quantify the economic and social benefits of these competencies?
- The new information and media technologies are having an increasing impact on our daily lives and work. They are demanding an ability to communicate and share information. This raises questions about how far the educational system provides the relevant ICT literacy, social competencies, and personal skills to meet these demands.

- Increasing worldwide competition and globalization are stepping up the pace of social and economic change and making it necessary for individuals to exhibit greater flexibility and adaptability at their workplace and in society. The ability to learn new skills and to adapt has become an important requirement for getting jobs and being a successful citizen. Therefore, the question is how does initial full-time education influence the skills of learning and the attitudes toward educational institutions, further learning, and learning situations over the life course? How can we improve self-regulated learning so that individuals realize opportunities to take on challenging tasks, practice their learning and develop a deep understanding of a subject matter?
- Germany is also undergoing considerable demographic changes: There is a fertility decline, an ageing population, an increasing diversity of ethnic background, and a rising level of instability in family life. All these changes have direct consequences for individual educational processes (e.g., the impact of parental divorce on the educational careers of children and their competence development) and the educational institutions as a whole (e.g., when Hauptschule and Realschule are combined because of the declining number of students, or when older workers have to increase their participation in education during late adulthood). The capacity to follow individuals through the life course and to observe how educational experiences, competencies, and behavior are influenced by the formal, nonformal, or informal contexts in which they find themselves grants longitudinal studies a major role in understanding the role of education in modern society.
- Empirical studies such as PISA demonstrate that the quality and quantity of schooling that individuals acquire still depend to a large extent on the advantages or disadvantages that their parents confer throughout their childhood, adolescence, and adulthood. However, most of these educational inequalities are only documented on the basis of cross-sectional data. The causal mechanisms that produce primary and secondary outcomes as well as the cumulative processes over the educational career are still subject to considerable controversy in the literature on educational inequality – and can only be studied reasonably on the basis of longitudinal data. In particular, the complex and subtle role that schools, vocational training institutions, universities, and further education play in the maintenance of inequality and the allocation of persons to unequal positions in Germany across generations and within the life course is still not well understood.

2. Status Quo: Data Bases and Access

National and international school performance studies/student assessment studies such as TIMSS, PISA, PIRLS, or DESI have developed competence tests in different domains (mainly in the domains of reading, mathematical, and science literacy or in English as a second language). These studies provide information on the distributions of competencies within the Federal Republic of Germany in comparison with other countries as a function of school type attended, social background, and student's gender. However, they are cross-sectional and therefore only a snapshot of different students at a particular point in their educational careers. Successive snapshots in a series of cross-sectional surveys highlight the changes in the structure as a whole. Yet, they do not show the changing (and sometimes) unchanging experiences of individual students as their educational careers progress.

Several longitudinal studies have already been carried out in Germany that broaden the knowledge derived from cross-sectional studies by providing more information about causes of established competence developments and educational decisions. The available longitudinal studies can be assigned to the following four areas: (1) childhood development, (2) transitions and competence developments in elementary and secondary school, (3) transitions from school to vocational training and university, and (4) life-course research with a strong emphasis on educational and employment careers and family-related processes:

- The studies concerning childhood development are national (DJI child panel) or regional longitudinal studies (BiKS, LOGIK) on competence and personality development in children and on the transition from kindergarten to elementary school.
- The majority of longitudinal studies were carried out on educational development within schools. Among these regionally designed longitudinal studies, we can differentiate two types: The first concentrates on competence development within one level of education (SCHOLASTIK, BeLesen, and Hannoversche Grundschulstudie in elementary school; PALMA in the lower secondary school), whereas the second predominantly examines transitions between two stages of education (BiKS in Hesse and Bavaria, KESS in Hamburg, Koala-S in Bavaria and Saxony). However, some studies have a strong focus on competence development as well as on transitions (ELEMENT in Berlin, BIJU in Mecklenburg-Western Pomerania, Saxony-Anhalt, North Rhine-Westphalia, and Berlin). Only two

nationwide studies have a rudimentary longitudinal character: TIMSS 1995 and PISA 2003. TIMSS 1995 has tested students in the 7th grade (1994) and one year later (1995). PISA 2003 has been expanded by a second wave (PISA-I-plus). Ninth graders from the intermediate and academically oriented track were tested one year later at Grade 10 in order to analyze how they had progressed in mathematics and sciences and what the determining factors were.

- For the participation in university and the labor market entries of academics, the HIS has conducted national longitudinal studies in which, however, no performance-based competence measurements were included. One of the HIS panels covers a cohort of school leavers qualified for higher education, follows their transition into university or vocational training and their subsequent educational career for a period of three and a half years after leaving school. The HIS graduates survey concentrates on the transition from university to the labor market and the further professional career. The DJI transition panel focuses on the transition of “disadvantaged” students who have finished the lower school track, and follows their paths into the vocational training system and their entry into the labor market (no competence tests have been conducted). There is also the ULME study in Hamburg that is testing competence development from the start to the end of a course at vocational school, independent of whether the vocational school is full- or part-time.
- The following longitudinal studies differ from those previously summarized because of their focus on a longer time span. The study of former grammar school (Gymnasium) students’ careers (starting at 10th grade) examines college and professional education as well as gainful employment in North Rhine-Westphalia over a period of 28 years. In addition, the GLHS collected data retrospectively from several birth cohorts on their previous educational and employment career as well as their family history in Germany. No competence tests were included in the GLHS. Since the beginning of the 1990s, individual biographies of East Germans have been surveyed in order to obtain detailed information on lives before, during, and after reunification. Finally, the SOEP, a general public survey carried out every year in Germany since 1984, includes large samples of West and East Germans as well as various groups of immigrants. The SOEP combines retrospective data on the work and family-related event history with prospective panel data on, amongst others, job and income mobility, educational participation,

family status, and life satisfaction in different domains.

This short overview of available longitudinal studies conducted in Germany reveals that there is only one genuine nationwide panel study, the SOEP. However, this study includes no detailed data on changes in educational contexts and no information on the development of competencies. Regarding the other longitudinal studies measuring competencies, only limited conclusions can be drawn. They either confine themselves to a certain region within Germany or concentrate primarily on one stage of education or a specific transition in the educational career. These studies make it impossible to understand how the competencies of individuals develop over the life course, how they interact with educational decisions at various critical transitions in their careers, and how competencies are influenced by the family and the arrangements of teaching and learning processes in kindergarten, school, professional education, and university. It is also unclear how competencies are related to the achievement of educational qualifications, and which competencies are responsible for labor market success and a successful private and social life.

Other European and North American countries have a longer tradition in conducting educational panel studies that include the assessment of competencies, skills, or intelligence components. Kristen et al. (2005) provide an extensive overview of studies conducted in Canada, France, the Netherlands, Sweden, the United Kingdom, and the United States. In these countries, different approaches have been chosen to obtain longitudinal information on education. These are mainly either long-running cohort studies that collect data on an individual's life over a long period or short-term studies on a specific stage of the educational career.

In the United Kingdom, large birth cohort studies have been carried out with educational topics. These studies started in 1958 (National Child Development Study – NCDS), 1970 (British Cohort Study – BCS70), and 2000/1 (Millennium Cohort Study – MCS). Whilst in the 1958 NCDS, the distances between the panel points fluctuated between 4 and 10 years, the Millennium Cohort Study intends to have a much smaller time span.

The Effective Provision of Pre-School Education (EPPE) project running from 1997 to 2003 is the first major study in the United Kingdom to focus specifically on the effectiveness of early-years education (EPPE 3-11 from the year 2003-2008 builds on the original EPPE study). The EPPE project is a large-scale, longitudinal study of the progress and development of children in various types of preschool education (from age 3 to 11 years).

England and Wales used a research strategy to focus on a short relevant sequence of the educational career. The Youth Cohort Study (YCS) is a repeated short panel study providing

insights into the transition from secondary school to further education and to the labor market. Another variant of a cohort study focusing on careers after completing compulsory education is the Canadian Youth in Transition Survey (YITS). This survey attempts to follow students over a longer period of time. The study started with two subsamples in 2000. The members of the first sample were 15 years old, those of the second aged 18 to 20. For the younger cohorts, only competencies were tested within the framework of PISA 2000. A similar strategy has been implemented by the Swiss Transitions from Education to Employment longitudinal study (TREE), which also started in the year 2000 and measured competencies within the PISA framework only in this first year. Recently (in 2006), the Swiss Survey of Children and Youth COCON (competence and context), also started. This study is investigating the social conditions, life experiences, and psychosocial development of children and youth in the German- and French-speaking parts of Switzerland from a life-course perspective. The longitudinal part of this study follows up two cohorts: 6-year-olds (middle childhood) and 15-year-olds (middle adolescence). In the United States, there have been a large number of different longitudinal education studies. Their main goal is to analyze the educational, professional, and personal development at different points in the educational career and to identify the role played by personal, family, social, institutional, and cultural factors (NCES 2003). Most of these cohort studies have four or five observation points, and start at Grade 10 or 12. These are high school studies focusing on the transitions to postsecondary education and on labor market entries (National Longitudinal Study of the High School Class of 1972 – NLS-72, National Education Longitudinal Study of 1988 – NELS-88, Educational Longitudinal Study – ELS 2002, High School and Beyond – HS&B). Some studies concentrate on students in tertiary education and their labor market entry (Beginning Postsecondary Students Longitudinal Study – BPS, Baccalaureate & Beyond [B&B]). In recent years, two cohort studies have commenced that focus on development at early ages. One cohort starts with the newborn; the other, with children attending kindergarten/preschool institution (Early Childhood Longitudinal Study – ECLS). The situation for US education data can be described as an additive, repeated cohort sampling. This means that different cohorts are available for children and students at a specific stage in the educational career. The complete data pattern of these cohorts delivers sequences reaching from birth up to the age of 30. However, there still remains a gap at the lower secondary level. Finally, there are international longitudinal studies on school-to-work transitions. Most of these longitudinal studies focus on educational biographies and transitions, some of them have conducted cross-sectional competence and/or skill measures (in different domains, mostly by including the

youths tested in the PISA-Studies), but only few have started to survey longitudinal competence developments.

This brief overview of different longitudinal studies using different longitudinal designs makes it clear that birth cohort studies take too much time to acquire a “complete” picture of the educational career. To study children’s development and transitions until the end of the secondary school level would take nearly 20 years. Therefore, it is more efficient to concentrate on important sequences in the educational career. Samples must be drawn for every relevant sequence. Such a multicohort sequence design quickly provides the relevant information. In order to capture the influence of educational reforms and social change, new cohorts have to be sampled repeatedly. Such a strategy is comparable to the one followed by the US-National Center for Education Statistics.

In summary, there is a huge demand for high-quality longitudinal educational research in Germany. In particular, there is a clear need for both analytical and methodological progress in order to understand educational pathways through the life course and how they lead to different outcomes.

3. Future Developments in Germany: The National Educational Panel Study

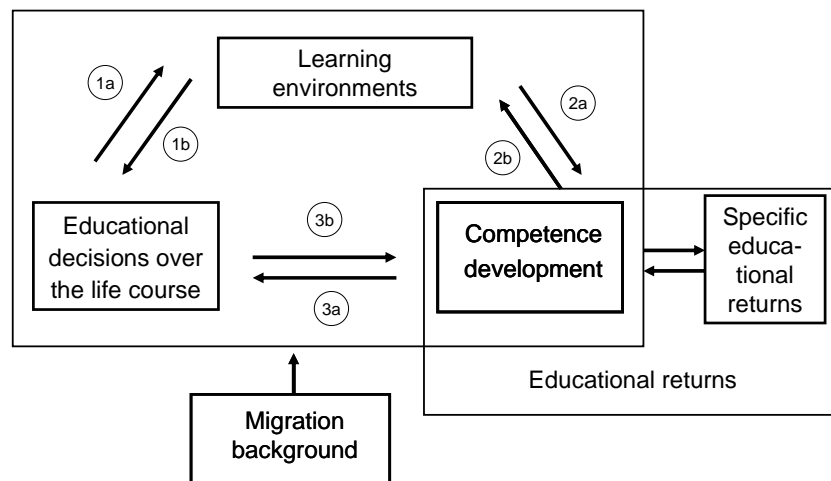
In August 2008, the National Educational Panel Study (NEPS), supported by funds from the Federal Ministry of Education and Research in Germany (BMBF), has started. The basic design and organization of the National Educational Panel Study (NEPS) can be summarized as follows:

3.1 Theoretical Frame of the NEPS

The key theoretical assumptions of the NEPS as an instrument to study education over the life course can be best summarized in a diagram. Figure 1 shows that individuals’ educational trajectories over the life course are the result of a dynamic system, creating a complex, time-related interdependence of educational decision making, educational processes within different learning environments, and competence development: (1a) Decisions (by parents, students, or teachers) determine whether and to what extent individuals participate in educationally relevant social and institutional contexts; (1b) participation in formal, nonformal, and informal learning environments, in turn, will influence further educational decision making; (2a) educational processes within learning environments are supposed to have an effect on competence development; (2b) competence development, in turn, will

influence future opportunities to participate in social and institutional contexts; (3a) competence development will also affect the processes of educational decision making; and (3b) educational decisions will influence the future competence development over the life course. Focusing on these three key theoretical dimensions and their time-dependent interaction mechanisms, which generate change and development over the life course, establishes a foundation for powerful explanations and evidence-based research in the NEPS.

Figure 1: Dynamic Interdependence of Educational Decision Making, Participation in Learning Environments, and Competence Development Over the Life Course



It is well known from several recent studies that the educational outcomes of immigrants' children differ substantially from those of their peers from native families. These differences are likely to exist across the whole life course and follow very specific theoretical mechanisms. In addition to the three main theoretical dimensions, a fourth theoretical dimension of the NEPS is therefore concerned with the educational career of immigrants and their descendants. In order to account for ethnic inequalities, it is necessary to ask which specific resources and orientations on the levels of the individual, the family, the learning environment, and the context (e.g., local community), as well as which institutional (e.g., regulations of transitions, availability of education in German as a second language), societal (e.g., acculturation orientations), and political conditions (e.g., regulations for residency status) impact systematically the success of immigrants and their descendants in the education system and the labor market. The crucial theoretical and empirical task for the NEPS is therefore to identify the particular mechanisms affecting the competence development and the educational decision processes of immigrants.

Finally, a fifth important theoretical dimension for the NEPS concerns the issue of returns to education. Given that education unfolds over the life course and a myriad of interactions and relationships is involved, the measurement and modeling of returns to education must

concentrate on the changes of these outcomes over the life course and the complex dynamic interaction processes that take place when qualifications, competencies, and educational certificates at certain points in the life course are turned into future economic and non-economic returns. Thus, at least three aspects are important for returns of education over the life course: The first is that education is a lifelong and cumulative process, and that the educational events and experiences in earlier life stages have consequences for later educational processes and competencies. In other words, from a life-course perspective, later educational participation and competence development are themselves returns to earlier educational investments (see Figure 1). Second, educational events, considered in causal process models as being the causes of economic and non-economic returns, are shaped, to a large extent, by these returns. Finally, the importance of the different non-economic and economic returns strongly varies over the life course, because they are often associated with certain development stages or are connected to specific life-course transitions. The NEPS will focus on three economic dimensions: (a) reconsidering the effects of education in classic estimates of monetary returns to years or level of education, job opportunities, and job mobility rates; (b) returns to educational reforms; and, most importantly, (c) returns to specific school institutions. Apart from the monetary economic returns and the returns in terms of later education, the NEPS will include additional nonmonetary returns to education in several areas. Nonmarket returns may come most notably in the form of (a) health, (b) family and fertility behavior, (c) reduced crime and deviance, (d) increasing political and social participation, and (e) subjective well-being.

These five theoretical dimensions are called “pillars,” because they will help the consortium to integrate the multicohort sequence design of the NEPS in terms of content, theory, and method and provide a unified mold for the NEPS. In organizational terms, these five theoretical key perspectives are represented by five substantively focused expert groups. Since the NEPS is hosted at Bamberg University, the five pillars will be coordinated and integrated by experts from the Institute for Empirical Education Research Bamberg (INBIL). In addition, two expert groups will support the NEPS: An expert group that will take care of the most important methodological issues of the NEPS such as sampling design, data cleaning, data archiving, data dissemination, as well as methodological analysis and training; and an expert group on technology-based assessment (TBA) that will support the NEPS with respect to issues involved in computer- and Internet-based assessments.

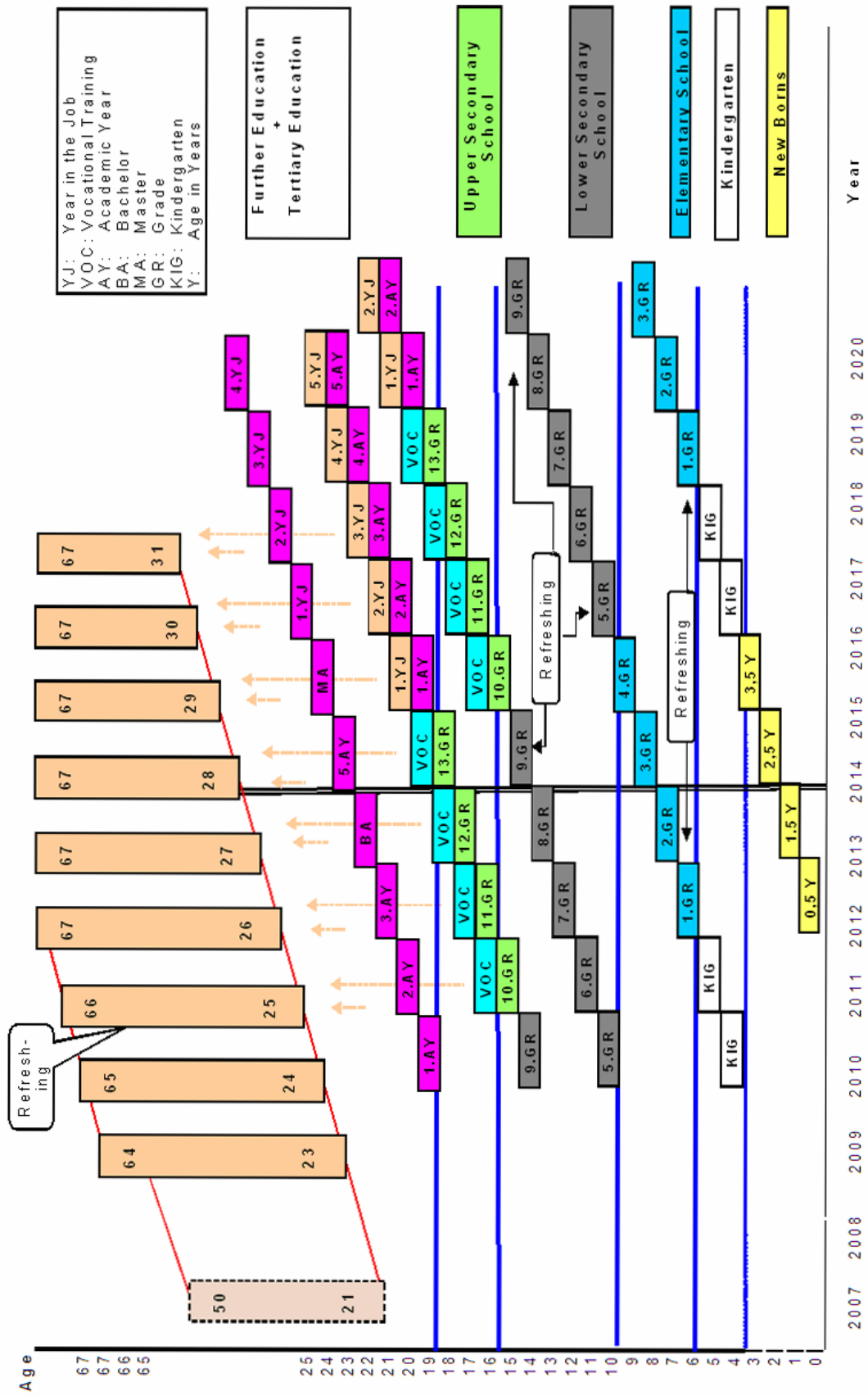
3.2 The Multicohort Sequence Design of the NEPS

The aim of the NEPS is to provide fast and up-to-date information on educational processes in the various parts of the educational system. Thus, it cannot start with a single birth cohort and then follow it up for 20 years until some of the cohort members eventually leave university. Instead, the consortium has decided to start with several well-chosen cohorts at the same time and to follow these cohorts over longer time spans in their lives. The cohorts will be selected around crucial educational transitions in the German educational system. The multicohort sequence design of the NEPS is shown in Figure 2. This design covers: (a) educational processes in kindergarten and the transition to elementary school, (b) educational processes in elementary school and the transition into the tracked secondary school system, (c) processes in the lower secondary school and the transition to upper secondary school, (d) processes of education in upper secondary school and the transition to university or vocational training, (e) educational processes at the university level and the transition of university graduates into the labor market, (f) vocational training and transitions into the labor market, and (g) processes of lifelong learning.

In other words, NEPS will start with five cohorts and follow them up over longer periods in the educational system (cf. Figure 2). It is suggested that four of the five cohort studies begin in the fall of 2010 and then continue with annual observations (the vertical line in Figure 2 marks the end of a first 5-year funding period). These five cohorts will be complemented by a panel survey of individuals aged 23 to 64 who have already left full-time education in order to collect data on adult education and lifelong learning. The IAB has already started this survey in 2007 (cf. Figure 2), and it will be integrated into the NEPS in 2009. This multicohort sequence design repeats its structure after some time. However, the next new cohort will not start in kindergarten age but with newly born children (at age 0;6 - see Figure 2), therefore allowing not only cohort comparisons but also the identification of age, period, and cohort effects (Schaie 1995, 30-32) – at least after some time.

In order to develop appropriate instruments for the different educational stages and transitions within the German educational system, the consortium will draw on seven expert groups. The idea is that the expert groups on the five pillars cooperate closely with the expert groups responsible for the seven educational stages in developing the necessary questionnaires and competence tests for the NEPS. The representatives of the pillars will ensure that the unified research perspective represented by the five pillars is taken into account by all stage-specific research groups and that the measurement instruments are comparable across the various cohorts of the NEPS.

Figure 2: The Multicohort Sequence Design of the NEPS



4. Some Concluding Remarks

The center of the NEPS consortium is hosted at the INBIL (Institut für bildungswissenschaftliche Längsschnittforschung) at Bamberg University. The role of the INBIL and the division of work between the INBIL, the expert groups, and the survey institutes is described in detail in the research proposal (Blossfeld 2008): In a first step, the questionnaires and test instruments for the 7 educational stages of the NEPS will be constructed in close collaboration between the INBIL and the expert groups. Because the coordinators of the pillars are members of the INBIL, it is guaranteed that the multicohort sequence studies will be integrated in terms of concepts, operationalizations, and measurements. After the measurement instruments have been constructed, the INBIL will, in a second step, commission survey institutes to carry out the random sampling and the data collection. After data collection, the survey institutes will deliver the data sets to the data center of the INBIL. The INBIL will then perform data cleaning, validation, coding, scale construction, data weighting, imputation, anonymization, data preparation, data documentation, and so forth. After collection, cleaning, and archiving, the NEPS data will be disseminated to the scientific community as quickly as possible. For this purpose, the NEPS will produce a Scientific Use File and offer training courses on how to effectively exploit the potentials of the NEPS for appropriate analyses of all forms.

In sum, the NEPS will create an excellent scientific evidence base with which to address a broad range of both basic and applied questions in the field of education, and to inform policymaking. In particular, the NEPS will provide representative data on the condition of all relevant parts of the educational system in Germany (system monitoring) and offer a better scientific evidence base for educational reforms and political consultation (system improvement).

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