NEPS
National Educational Panel Study

Research Data

Information on Competence Testing

NEPS Starting Cohort 3 — Grade 5

Paths Through Lower Secondary School — Educational Pathways of Students in Grade 5 and Higher

Wave 8: Grade 11

LIfBi

LEIBNIZ INSTITUTE FOR
EDUCATIONAL TRAJECTORIES

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Information on testing	
Sample	Study A100, Starting Cohort 3, Grade 11, Survey wave 8, Year 2016
Test situation	Group testing, normally taking place in the classroom, 1 test instructor, normally 1 supervisory teaching staff
Test sequence	The test was held on one test day. Students were given a test on scientific literacy and had to judge their own performance (= procedural metacognition) Test sequence: scientific literacy + procedural metacognition Student questionnaire
Test duration (net processing time)	70 min (including student questionnaire 40 min)
Breaks	10 min
Administration time	approx. 105 min

Information on the individual tests				
Construct	Number of Items	Allowed Processing Time	Survey Mode	Next Measurement (until 2020)
scientific literacy	25	29 min	paper-pencil	--
Domain-specific procedural metacognition				
Regarding the scientific literacy domain	1	1 min	paper-pencil	--

Preliminary note

The development of the individual tests is based on framework concepts. They constitute overarching concepts on the basis of which education-relevant competences are to be shown consistently and coherently over the entire personal history. Therefore, the following framework concepts that served as a basis for the development of the test tools to measure the above-mentioned constructs are identical in the different studies.

Scientific literacy

Scientific literacy is the precondition for participating in world affairs marked by science and technology (Prenzel, 2000; Prenzel et al., 2001; Rost et al., 2004) and is viewed as a predictor for an economically, socially and culturally successful life. Many problems and issues we encounter in our daily life require an understanding of natural sciences and technology. Scientific topics and problems affect all people. Therefore, the current discussions of the goals of scientific education focus on the concept of scientific literacy for all people (Osborne & Dillon, 2008). Such literacy is the basis for lifelong learning, serves as a connection for further learning (OECD, 2006; Prenzel et al., 2007) and, thus, also influences professional careers.

Based on this, the NEPS definition of scientific literacy follows the Anglo-Saxon literacy concept (Bybee, 1997; Gräber, Nentwig, Koballa & Evans, 2002; OECD, 2006) that does not regard scientific competence as a simple reproduction but rather as flexible use of acquired knowledge in different situations and contexts of daily life.

In NEPS, scientific literacy is understood as the use of scientific knowledge in the environmental, technological and health contexts (Hahn et al., 2013). In addition, the concept distinguishes between content-related and process-related elements (see Fig. 1).

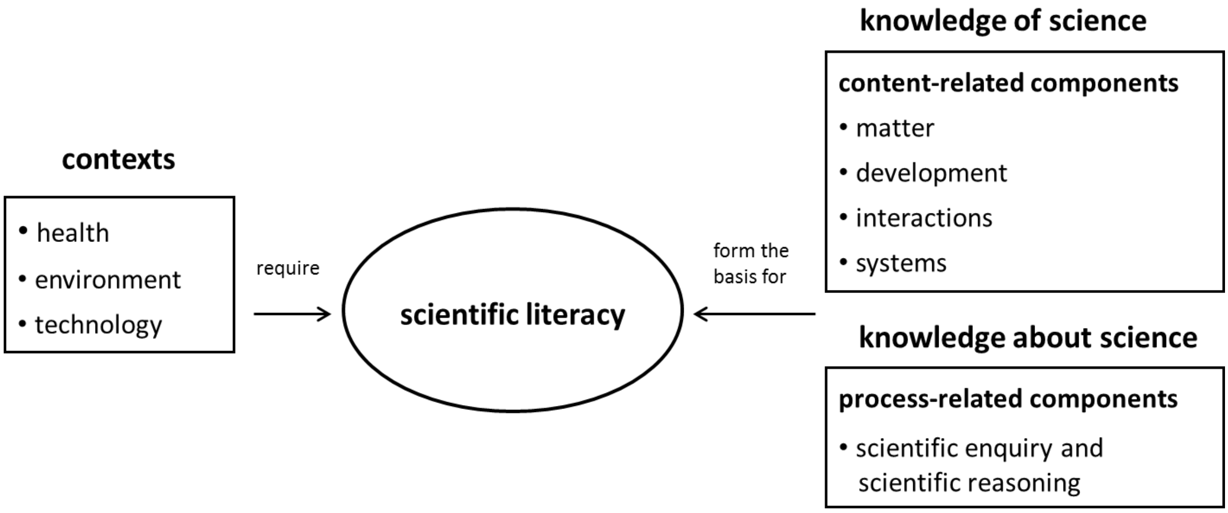

Fig.1. Application contexts as well as content-related and process-related elements of scientific literacy of the NEPS scientific test (Hahn et al., 2013).

In selecting its contexts as well as the content-related and process-related elements, NEPS uses PISA (OECD, 2006), the Benchmarks for Scientific Literacy of the American Association for the Advancement of Science (AAAS, 2009) and the education standards of the Conference of Ministers of Education for the medium-level school-leaving qualification (KMK, 2005a, 2005b, 2005c) as a guideline. The selected contexts are of personal, social and global relevance. Considering the current scientific research and the general events of the day, it is assumed that they will remain important across the entire life span. Figure 2 gives an overview of the content related components' overlap between PISA, the German educational standards and NEPS. The selected content-related and process-related elements cover central concepts of all scientific disciplines.

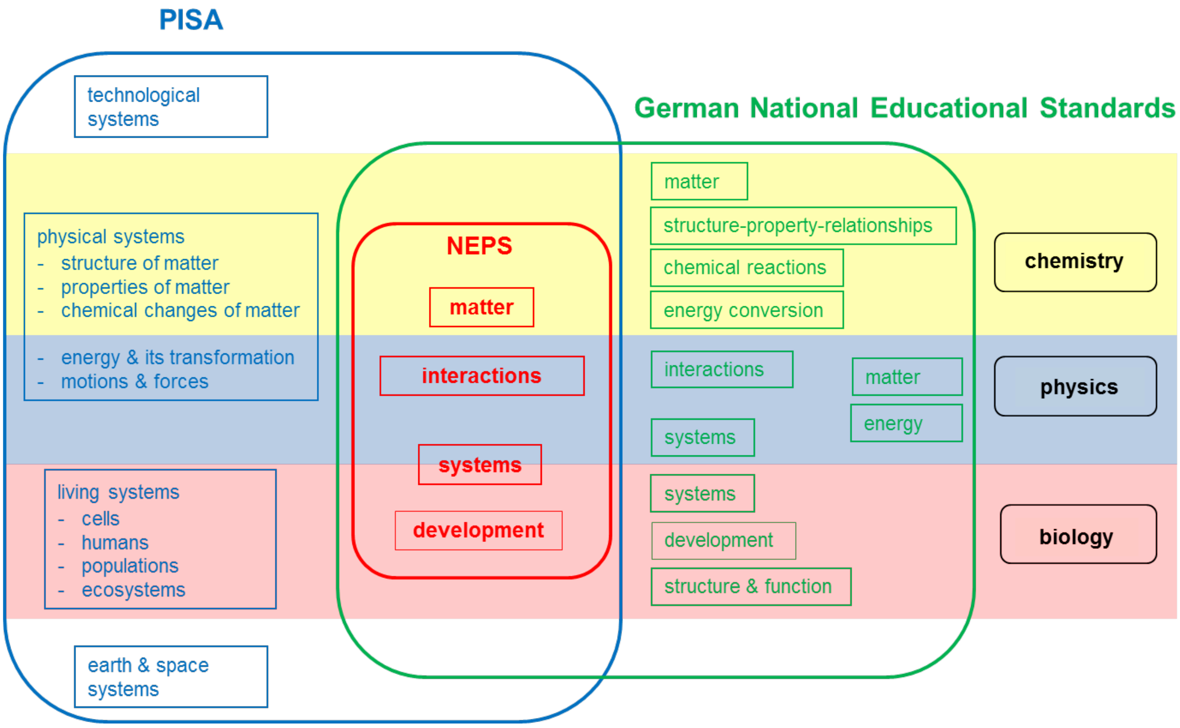

Fig.2. Overview of the content related components' overlap between PISA, the German educational standards and NEPS (Hahn et al., 2013).

The knowledge of science comprises the content-related matter, systems, development and interactions. The knowledge about science includes inquiry and scientific reasoning that deal, among other things, with checking hypotheses, interpreting findings as well as measuring principles and measuring error control (see Fig. 1).

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Metacognition

Metacognition is the knowledge and control of the own cognitive system. According to Flavell (1979) und Brown (1987), declarative and procedural aspects of metacognition are differentiated which are both covered in the National Education Panel.

Procedural metacognition

Procedural metacognition includes the regulation of the learning process through activities of planning, monitoring and controlling. Within the framework of NEPS in combination with the competence tests of the individual domains, the procedural aspect of metacognition is not assessed as a direct measure of such planning, monitoring and controlling activities but as a metacognitive judgement that refers to the control of the learning performance during (and/or shortly after) the learning phase (also see Nelson & Narens, 1990). After the study participants have taken their competence tests, they are requested to rate their own performance. They are asked to state the portion of questions presumably answered correctly.

Usually, one question is asked per domain. For competence domains that can be divided into coherent individual parts (e.g. reading competence referring to different texts), the inquiry of procedural metacognition is referred to these parts as well, which, of course, leads to a longer processing time.

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