

# **Strengths of two pilot studies into further education. Comparing PIAAC and leo. – Level One Study.**

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## **Abstract**

By international standards, the latest PIAAC results confirm the alarming data presented by the German Level One Study (leo.) carried out in 2011, which found that in Germany 14.5 per cent of the working age population are functionally illiterate. Both studies have a significant impact on current educational discussions on questions about basic education. In order to ascertain the strengths of both studies for further education, a brief overview and comparison of the research design of each study follows. The respective data regarding participation in further education is scrutinised not so much for comparability, but rather to assess how the studies complement each other.

## **1. Comparing the objectives of both studies**

Following the publication of data in the *Programme for the International Assessment of Adult Competencies* (PIAAC) on October 8th, 2013, the Organisation for Economic Co-operation and Development (OECD) was again able to demonstrate just how important it is to increase support for basic education for adults. In Germany alone for example, 17.5 per cent of the working-age population (16 to 65 years) only achieved the lowest level of competence for literacy (14.2 per cent) or even lower still (3.3 per cent). The results of the German leo. – Level One Study published in 2011 indicated that 14.5 per cent of the German working-age population could be classified as functionally illiterate. This would therefore suggest comparing the two studies, something which is discussed in this article.

The PIAAC study aimed to survey the core basic skills required for the adult population to participate in today's society, in an internationally comparable manner. Some of these skills included literacy, numeracy and the ability to solve problems in technology-based environments. These skills are considered a prerequisite before further socially relevant skills can be acquired (cf. Rammstedt 2013, p. 11). Competencies in Later Life (CiLL), a parallel study linked to the PIAAC, also investigated a sample of people in Germany up to the age of 80 to gather further information regarding retention and loss of competencies. CiLL was provided by the German Institute for Adult Education (DIE) in cooperation with GESIS (Leibniz-Institute for the Social Sciences), the Ludwig Maximilians University of Munich and the University of Tübingen. It showed a noticeable drop in performance within the older population regarding the PIAAC assessed competencies. The level of competence of 76 to 80-year-olds in Germany is almost one full proficiency level lower than those ten years younger (cf. Schmidt-Hertha et al. 2014).

The aim of the leo. – Level One Study (which only looked at the German population and focused on the competencies reading and writing alone) was to determine the scale of functional illiteracy among German-speaking adults. The competence levels examined were therefore classified at the lower end of the skills spectrum, to better comprehend and illustrate them (cf. Grotlüschen/Riekmann 2012, p. 1).

Both studies have a significant impact on current discussions surrounding basic education and literacy in Germany. The research design of both studies is depicted below in relation to each other. We will then focus on the data regarding participation in further education presented by both studies, and in the final section we will discuss the comparability of the studies and their findings.

## 2. A comparison of the research design of both studies

**Table 1: Comparison of research design between leo. – Level One Study and PIAAC**

	leo. – Level One Study (cf. Grotlüschen/Riekmann 2012)	PIAAC (cf. Rammstedt 2013)
Carried out by	Hamburg University	24 member nations (round 1) 9 further nations taking part in round 2, the results of which are planned to be published in 2016
Supported by	BMBF	OECD; BMBF/BMAS
Costs to BMBF and BMAS	1.3 million euros	9 million euros
Period carried out	Round 1, 2010, results 28.02.2011	Round 1, 2012, results 08.10.2013
Intervals	Planned for leo. 2017	10-year cycle
Random sample size	8,436 people aged 18-64 in Germany, who were capable of partaking in a German language interview (7,035 in interviews by the Adult Education Survey (AES), 1,401 working-age adults in an additional sample at the lower end of the educational scale)	5,400 people aged 16-65 in Germany, plus at least 4,500 people, randomly selected per additional nation taking part (total of 24 nations in the first round)
Survey design	Personal interviews on further education participation (CAPI) within the Adult Education Survey (30min). Followed by independently completed pen-and-paper test.	Personal interview (CAPI) via questionnaire to determine for example how competencies are used (30-45min). Followed by independently completed pen-and-paper test or computer-based test.
Assessed competencies (domains)	Reading and writing in an integrated form	Reading components, reading, numeracy, technology-based problem solving
Item control	Hamburg University	OECD and E/T/S
Evaluation method	Item Response Theory <sup>1</sup> with 5 plausible values	Item Response Theory with 10 plausible values

<sup>1</sup> In this context, Item Response Theory (IRT), also known as probability test theory, can be briefly summarized as follows. Using IRT, it is possible to calculate the probability that a person with particular underlying basic skills (ability), can complete tasks at a particular level of difficulty. Difficulty levels of tasks and personal skills can then be presented on a common scale (cf. Rost 2004). Plausible values make it possible to also characterise the abilities of larger populations. They do not present individual test values but instead provide an estimate of the area, where the abilities of a tested person 'plausibly' lie, based on as much available information as possible (cf. Mislevy/Beaton/Kaplan/Sheehan, 1992; cf. also OECD 2009, p. 93ff.; and Grotlüschen/Riekmann/Buddeberg 2012).

Thresholds	62 per cent	67 per cent
Background questionnaire	Demographic characteristics such as AES variables and AlphaPanel variables in the additional random sample	Demographic characteristics such as for example formal, non-formal and informal further education and variables in use and requirements of competencies
Data transparency	All 10,493 booklets are stored at the Hamburg University and available for analysis. The records are saved and available to view as Scientific Use Files in the GESIS data archive.	The international Public Use Files and the International Data Explorer are available at: <a href="http://www.oecd.org/site/piaac/publicdataandanalysis.htm">http://www.oecd.org/site/piaac/publicdataandanalysis.htm</a> . There is also a comprehensive German Scientific Use File saved in the GESIS data archive.

Although the *reading* domain was tested in both studies, how it is defined differs widely. In the leo. – Level One Study, reading is understood, under the general term literacy, as the ability to read information so that the sense is understood and also the ability to be able write at a similar level<sup>2</sup>. Whereas for PIAAC, reading is defined as the ability to understand, evaluate and use written texts in a range of contexts to participate in society, achieve goals and develop knowledge and potential. The three aspects which PIAAC differentiates between when it comes to literacy in order to develop tools are to an extent closely interlinked. They are: (a) the contents, i.e. the different characteristics of texts, (b) the cognitive processes needed to master different reading requirements, and (c) the contexts, which cover a wide range of reading situations (cf. Rammstedt 2013, p. 31).

In the PIAAC test, people at the poorest literacy level were given an additional Reading Components test. This method was adopted for adults with very poor literacy, in order to gain a more accurate picture of competence profiles at the lower end of the literacy spectrum. These Reading Components assessed the basic skills required to read and comprehend text. These are: (a) word recognition and word comprehension, (b) ability to process meaning at sentence level, and (c) and fluency in reading longer passages of text and the ability to understand their meaning (Sabatini/Bruce 2009).

The leo. – Level One Study on the other hand followed the “Lower Rungs” approach devised in England (Brooks/Davies/Duckett et al. 2001). In other words this meant classifying the lower competence levels of the International Adult Literacy Survey (IALS 1994/1998), operationalised in Alpha Levels and displayed in a hierarchized manner according to level of difficulty, so that small differences in learning status could also be measured. (cf. Dluzak/Heinemann/Grotlüschen 2009).

The two studies also differ in terms of **background information** available. In the leo. – Level One Study, tests were carried out to record literacy levels in the German-speaking population as an additional module to the Adult Education Survey interviews. There is therefore plenty of information concerning participation in further education, which makes it possible to establish correlations with the competence data. The comprehensive background questionnaire within the PIAAC survey covered the following five areas:

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<sup>2</sup> The leo. – Level One Study refers here to the statistical advice of UNESCO from 1978 and the more precise Alfabund definition from 2010 as well as its operationalisation with the help of Alpha Levels for writing and Alpha Levels for reading (cf. Grotlüschen/Riekman/Buddeberg 2012, p. 18f.).

- *Socio-demographic background*: for example age, household structure, language background and whether people came from migrant families
- *Training and further education*: for example qualification and field of study, where people dropped out, participation or barriers to further education,
- *Employment status, work history and professional characteristics*: for example current or most recent employment (job, sector, company size etc.), job satisfaction, income and unemployment information,
- *Social participation, attitudes and health*: for example voluntary work, social confidence, influence on political process and self-assessment of health status,
- *General tasks and activities in work and everyday life*: for example frequency of various reading and writing activities, problem solving, IT and power of discretion in the workplace (Rammstedt 2013, p. 172f.).

As such, the findings of the PIAAC study indicate important links between competence and social participation, and in particular, economic participation. The background questionnaire also enables us to establish connections between school education, vocational training and further education systems and their importance in acquiring key competences. Learning in the workplace is also found to be of significance. Core variables in the background questionnaire are based on those from the International Adult Literacy Survey (IALS) and Adult Literacy and Lifeskills Survey (ALL), in order to ensure comparability (Rammstedt 2013, p. 171).

Despite differences in implementation where competence models are concerned, the sampling and survey design make comparison of results worthwhile as both studies are concerned with the same kinds of questions and issues. As such, both the PIAAC study and leo. – Level One Study present data classified according to competence values regarding participation in further education in Germany.

### **3. Participation in further education at Level One**

The leo. – Level One Study had access to the data of 7,035 people regarding further education over the previous 12 months from its inclusion with the Adult Education Survey (cf. Bilger 2012). At 28 per cent, the level of participation in further education of functionally illiterate people is much lower than the participation rate for the entire working-age population (42 per cent in 2010). This seems to be in line with other further education statistics, whereby participation in further education rises in direct proportion to higher levels of education and higher professional status. Therefore, the proportion of the group participating in further education who have low-skilled jobs was 28 per cent in 2010 too, but participation in further education falls to 16 per cent for low-skilled unemployed workers (cf. Seidel/Hartmann 2011, p. 87).

For those who are functionally illiterate and attending further education courses, surprisingly few of them are in the “Basic Education/Literacy” category. As regards regular education courses, three per cent of all functionally illiterate people are still learning to become literate and basic education.

Participation in further education by those who are functionally illiterate is often due to the fact that they require a certificate for their jobs.

Functionally illiterate people who do not have German as a first language are at a disadvantage when it comes to on-the-job training. Whereas 18 per cent of those who are functionally illiterate with German as a first language take part in on-the-job training, this applies to only 8 per cent of those who are functionally illiterate whose first language is not German (in the entire sample the participation level for on-the-job training was 26 per cent). There was little variation in levels of participation for those who were functionally illiterate with German as a first language or another language as first language when it came to individual vocational or non-vocational training. The proportion of the group whose first

language is not German, presented above-average participation levels in further education in the topics of “literature, history, religion and philosophy” (the same applied to courses to learn German) and “traffic, transportation” (the same applies to driving lessons and training for specific driving licences). Further education courses for “computer use or software”, saw a below-average attendance by this group (cf. Bilger 2012, p. 261-269).

The PIAAC study also compiled data on participation in further education over the previous 12 months. Here, the level of participation for those with low levels of literacy (up to level I) in Germany is also 28 per cent. This is a very big difference compared to people who demonstrated high literacy levels (level IV/V). The latter showed a participation rate of 70 per cent (cf. Rammstedt 2013, p. 114). The link between literacy levels and participation in further education in Germany is characteristic of the recognised phenomenon of dual selectivity of the further education system. Although participation in further education is accompanied by a 28-point increase on the literacy scale, when the relevant characteristics (such as educational attainment, employment status or age) are taken into account, the figure drops to 8 points (cf. *ibid.*).

The selectivity of the German further education system becomes particularly evident when placed in an international context. In Germany, the group of people, at level IV/V on the literacy scale, was almost eight times more likely to have taken part in further education over the previous 12 months than a person below level I on the literacy scale. This substantial difference puts Germany in the lead on the international stage in this respect. Korea is in second place, where those high up on the literacy scale are ‘only’ five times as likely to take part in further education as those with the poorest literacy levels. In the Netherlands, Norway and Cyprus, the difference is statistically negligible and can scarcely be expressed as an odds ratio (cf. OECD 2013, p. 209).

However, we can conclude that although the groups of people with the lowest competencies in both studies are comparably less likely to access education, they are not resistant to education. Furthermore, both studies confirm that selectivity regarding participation in further education is linked to basic competencies.

#### **4. Confirmation not comparability**

As the design of both studies is fundamentally different, including the levels of their competence models, it is not possible to compare their results directly. However, a comparison of their data structure and calculated interrelationships is quite revealing.

One of the conclusions of the PIAAC survey is that younger people’s literacy levels are poor but significantly higher than in older people. This difference in competence is evident between the youngest birth cohort (16-24 years old) and the oldest birth cohort (55-65 years old) when relevant influence factors are taken into account (gender, education, migration status<sup>3</sup>, *social background*<sup>4</sup>, *employment status*, *computer use during leisure time and health*). *The difference in Germany amounts to 15 competence points (cf. Maehler et al. 2013, p. 83). The leo. – Level One Study also documents the correlation between advanced age and poor literacy skills (cf. Grotlüschen et al. 2012, p. 40).*

In addition, both studies confirm the link between levels of written competence and education levels or vocational qualifications attained. In the leo. – Level One Study, the intended and mutually accepted connection between level of education (indicated by school qualifications) and an individual’s reading and writing competence was proven. According to the leo. regression analysis, a person without school-leaving qualifications is 9.5 points<sup>5</sup> lower on the literacy scale than the reference group with the following parameters: gender male, age

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<sup>3</sup> First language is used as indicator.

<sup>4</sup> Parents’ educational background is used as indicator.

<sup>5</sup> This is greater than the range of an Alpha Level (cf. *ibid.*).

40-49 years, intermediate school-leaving certificate, first language German, parents completed intermediate level secondary education, employed (cf. Grotlüschen et al. 2012, p. 41). In addition, an even stronger correlation between literacy and vocational training is established (cf. loc. cit., p. 32). In the PIAAC study, the highest school leaving qualification and, if applicable, highest vocational or higher education qualification of a person were considered together as the highest level of education. For people without a vocational qualification, the results confirm the expectation that the higher the level of secondary level education is, the higher the average literacy level. These variations in competence remain unchanged, including when other characteristics are taken into account (such as birth cohort, gender, migration status (language), social background, employment status, computer use in leisure time and health). Excluding people, who were still in education at the time of the study, the PIAAC survey also demonstrates that completion of secondary education or vocational training is linked to higher levels of literacy and numeracy (cf. Maehler et al. 2013, p. 101).

As also expected, both studies confirm the link between a lower command of German and poorer levels of German literacy. Using regression analysis, the leo. – Level One Study found that when the first language was other than German, this resulted in a value of -8.4 points on the competence scale (from 0-100) (cf. Grotlüschen et al. 2012, p. 42). After adjustments were taken into account, the PIAAC study also shows a negative effect. It indicates that people who do not have German as a first language achieve on average 25 competence points fewer on the scale (0-500) than people whose mother tongue is German (cf. Maehler et al. 2013, p. 119).

One area where the results of the two studies do not concur is the link between literacy and gender. In the leo. – Level One Study, men scored on average 2.6 points fewer on the literacy scale than women with otherwise identical characteristics (age, education, first language, employment status, parents' education) (cf. Buddeberg 2012, p. 192). The findings of the German PIAAC report showed the opposite gender difference where literacy of the whole population is concerned. Men scored on average 5 points more in literary proficiency than women. However, after taking into account adjustments for birth cohort, education, migration status (language), social background, employment status, computer use in leisure time and health, the difference remains negligible (cf. Maehler et al. 2013, p. 92). PIAAC also found relatively little gender differences in either direction for the competencies tested on an international scale. This could in part also be explained by other factors. Therefore, we can reasonably interpret that the remaining results are due to socio-cultural issues (cf. loc. cit. p.95; Grotlüschen et al. 2012, p. 24). Nonetheless, the assumption that literacy requires extra support when it comes to young people and men in particular, is no longer confirmed by the adults taking part in the PIAAC survey. The data from the leo. – Level One Study could possibly be attributed to the inclusion of writing competence – it could be that men's on average lower competence is less evident in their reading skills than it is in their writing. It also remains to be seen whether the method in which the PIAAC tests were carried out on a computer might have resulted in gender variations.

## **5. Conclusion: Complementary study structures and desiderata**

The structures that were used for the PIAAC and leo. – Level One Study proved to be complementary when compared. The PIAAC survey was more focused on establishing basic education standards (literacy, numeracy and problem solving in technology-rich environments) throughout the entire population and allowing international benchmarking. The aim of the leo. – Level One Study concentrated specifically on the issue of classifying the lower levels of literacy and examining its effect in Germany.

The similarity in research interests of both studies lends itself to discussing results that corroborate with each other or which are controversial and where appropriate investigating them further. In this respect, the European Literacy Network (Elinet) is currently carrying out

EU-wide evaluations with the results of the PIAAC survey and holding discussions with experts in each of the countries. In addition, the Reading Components of the PIAAC survey are being evaluated and its results examined. Last but not least, there are also several thematic reports pending from the OECD, including a report on Low Skilled Populations in an international context.

The different goals of both studies do however have significant consequences when it comes to finances and the time required to carry them out. The leo. – Level One Study was faster, cheaper and more straightforward to implement. One advantage of the PIAAC study however is the international comparability of its results. A second leo. – Level One Study is currently being prepared for Germany in 2017. Its purpose is to gather information on a wider range of competence domains in addition to reading and writing skills so that the issue of migration can be specified in greater detail and the way can be prepared for international comparisons of Alpha Levels.

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