

Desk Study on basic skills among adults in the Nordic region

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Desk Study on basic skills among adults in the Nordic region

2016

**Desk Study on basic skills among adults in
the Nordic region**

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Citat med kildeangivelse er tilladt

Publikationen er kun udgivet i elektronisk form
på: www.eva.dk

ISBN (www) 978-87-7958-952-0

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1 Summary

This desk study identifies the scope and content of the English-language research articles on the basic skills of adults in the Nordic region in the period 2010–2016.

The desk study shows that research articles in English on basic skills in the Nordic region have not been published widely during this period. The desk study has identified 21 articles and six publications. The 21 articles were published in a wide range of journals covering five different research topics: Education, the Labour Market, Health, Social Science & Psychology and Demographics. Most studies (48%) cover more than one skill, while one in five (22%) focuses on either numeracy or literacy.

A number of studies discuss the significance of basic skills. Most of these studies focus on the significance of basic skills for jobs (41%) or education (37%), while there is slightly less emphasis on the significance of basic skills for individual circumstances (22%), e.g. community participation or social empowerment.

Few studies (11%) look at the effect of education or other interventions, and these studies claim that little research has been conducted which specifically focuses on the effects of investment in education.

A high proportion of the studies (44%) focus on the *prevalence* of poor basic skills and/or the *reasons* for these (e.g. ethnicity, age, own and parents' educational background), while only a few studies (11%) look at the validation and testing of tools for measuring poor basic skills.

Around half of the studies (51%) look at specific solutions to the challenge of poor basic skills or discuss the current trends in policy in this area within the Nordic countries.

The studies point to the need for various measures, such as:

- Upgrading of teacher skills
- Greater use of IT in formal education
- Upgrading of IT skills among young people and adults
- Greater use of mixed ability groupings and individual support
- Monitoring of poor basic skills
- Initiation of evidence-based interventions
- More focus on the significance of diet for poor basic skills

The desk study was commissioned by the Nordic Network for Adult Learning (NVL) and conducted by the Danish Evaluation Institute (EVA) in the spring of 2016.

2 Introduction

2.1 Purpose and background

Nordic Network for Adult Learning (NVL) has asked the Danish Evaluation Institute (EVA) to carry out a desk study on research results concerning basic skills among adults in the Nordic countries. The study has been initiated during the Danish presidency in the Nordic Council of Ministers (2015) as part of the NVL work on the theme of adult basic skills, and presented at the expert seminar during the Finnish presidency in the NCM (2016), organised by the Finnish Ministry of Education in cooperation with NVL working group on Basic skills.

The need to consider basic skills has become clearer following the PIAAC results (Programme for the International Assessment of Adult Competencies) from 2013, which indicated that a sizeable proportion of adults in the Nordic countries find it difficult to read, do arithmetic and complete tasks using IT.

PIAAC showed that Denmark in particular had a problem, with a below-average ranking of 14th place for reading skills, while Finland was in 2nd place, Sweden in 5th place and Norway in 6th place on the list for the 22 countries studied. With regard to numeracy and IT, however, the Nordic countries were more evenly matched towards the top of the list, with Finland at the top and Denmark at the bottom of that specific group (SFI - Danish National Centre for Social Research, 2013).

The purpose of this desk study is to provide an overview of research into basic skills in the Nordic countries, including an overview of the variation and scope of research in this area. Among other things, the desk study provides insight into and information about research, and reveals the extent to which research is conducted into the significance of poor basic skills and whether Nordic research also focuses on the effects of specific measures implemented to address the challenges faced by the adults in question.

The memorandum provides an overview of research articles written in English on basic literacy, numeracy and IT skills in the Nordic region that were published in the period 2010–2016.

2.2 Scope restrictions

The scope of this desk study did not include literature published in the Scandinavian languages, nor did it include other relevant literature in English such as evaluations, reports, strategies for skills development, etc.

This is of course a restriction that may mean the results have to be taken with a pinch of salt. It is likely that there is or has been substantial research conducted somewhere that has not yet resulted in articles written in English. In light of this, it is worth noting that a significant period of time may pass from the start of research to the point when any results are published in one or more articles in international research journals.

Going forwards, it may therefore be beneficial to supplement this desk study with national literature studies that complement the desk study by providing insight into research and other relevant literature published in the Nordic languages.

2.3 Organisation and staffing

The desk study was planned and carried out by a project group consisting of:

- Chief Adviser, Michael Andersen (project manager)
- Special Adviser, Christina Laugesen
- Intern, Anders Fiil Svane
- Evaluation Assistant, Maria Riis Hedegaard

The desk study was conducted in the period from February 2016 to May 2016.

2.4 Study design and methodology

The desk study is based on a comprehensive literature study carried out by EVA in close collaboration with the Danish Administrative Library. The Danish Administrative Library is a national research library and knowledge centre with access to extensive databases of research literature and its functions include providing services to research institutions and ministries in Denmark.

The following types of articles are included in the desk study:

- Research-based articles in English
- Articles published in the period 2010–2016
- Articles concerning adults in the same age range as in PIAAC, i.e. adults in the age group 16–65 years.

The desk study includes all types of research articles with no strict requirements for publishing channels or quality assurance, e.g. special peer-review requirements, since the hypothesis was that there is limited research in this area in English.

In terms of content, one of the following search terms was included in the search:

- Adult skills
- Basic skills
- Poor skills
- Adult qualifications
- Basic qualifications
- Adult competencies
- Basic competencies
- Poor competencies
- Literacy¹
- Reading difficulties
- Numeracy

Combined with one or more of the Nordic countries:

- Denmark
- Finland
- Iceland
- Norway
- Sweden
- Åland
- Faroe Islands
- Greenland
- Nordic countries

The search resulted in 74 articles that fell within the inclusion criteria. Of these 74 articles, only 21 articles directly concerned basic skills in adults.

¹ Note: A search for the search term "literacy" in combination with the different countries gave up to 1,086 results and articles that only discuss literacy; these have therefore not been included in this study.

Since the desk study only identified a relatively small number of articles (21) published in research journals, during the literature review we also decided to include a total of six other publications on basic skills based on data from one or more Nordic countries. The publications originate from the Nordic Council of Ministers and the OECD, and one article from a book that compiles Nordic research contributions was included. Therefore, a total of 27 publications were included in the desk study. Below we use the term “publications” as a collective designation for the 21 research articles and the other six publications, while we use the designation “articles” when we are only referring to the research articles.

2.5 Categorisation strategy

Abstracts and summaries for the 80 publications in total (74 articles and the six other publications) were systematically reviewed with a view to establishing whether the publication was relevant. In cases where the abstract/summary was not sufficient to determine the relevance, the full text of the publication was used.

The publications were then categorised based on the answers to the following 11 questions:

- 1 Which country(ies) is/are included in the empirical basis for the article?
- 2 Which skills does the article look at (reading, mathematics, IT, basic skills across the board)?
- 3 Does the article look at educational interventions (complete education history, study programmes or standalone interventions, e.g. shorter training programmes or similar)?
- 4 Does the article draw on data from PIAAC?

Basic skills as a phenomenon

- 5 Does the article look at the reasons for poor basic skills?
- 6 Does the article look at the prevalence of poor basic skills?
- 7 Does the article look at how we measure poor basic skills?

The significance of basic skills

- 8 Does the article look at the significance of basic skills for labour market status?
- 9 Does the article look at the significance of basic skills for other education?
- 10 Does the article look at the significance of basic skills for individual circumstances?
- 11 Does the article look at policy development and work to find solutions to the challenge?

The following section presents the results of the desk study.

3 Desk study results

The results of the review of the publications identified on the basis of the study questions are presented below.

3.1 Only few research articles on basic skills in the Nordic region

In general, the desk study shows that English-language research articles on basic skills in the Nordic region were not widely published from 2010 up until the start of 2016. Of the 80 publications (of which 74 were articles) falling within the search criteria, only 27 contributions concern basic skills in adults. The excluded articles generally focused on e.g. lesson planning at primary-school level, continuing education for teachers, or guidance for early school leavers if they want to change their career.

The table below shows the distribution of the publications by the country(ies) contributing to the empirical basis of the article. In cases where several countries are included, the article is in either the “Cross-Nordic perspective” or the “International perspective” category.

Table 1
Distribution of publications between the Nordic countries

	Number	Percentage
International perspective	7	26%
Sweden	7	26%
Finland	5	19%
Denmark	3	11%
Norway	3	11%
Cross-Nordic perspective	1	4%
Iceland	1	4%
Greenland	0	0%
Faroe Islands	0	0%
Åland	0	0%
Total	27	100%

Source: Desk study, Basic Skills, EVA 2016

As shown in Table 1, 26% of the publications have an international perspective on the data. These are usually studies based on OECD data where the Nordic countries are included, but without a specific Nordic perspective in the analysis. Only one publication included in the search has a specific Nordic perspective: the comprehensive analysis “Adult Skills in the Nordic Region – Key Information-Processing Skills Among Adults in the Nordic Region” published by the Nordic Council of Ministers in 2015.

Articles based on data from Finland, Sweden, Denmark and Norway account for two in three of the research articles (67%), while there are no articles that only look at data from Greenland, the Faroe Islands or Åland. Of the articles with a national perspective, Sweden and Finland have contributed the most articles, with seven and five articles respectively.

3.2 The articles are published in a wide range of journals

If we look at publishing channels, a wide pattern of dissemination emerges. The 21 research articles included in the desk study were published in 15 different research journals, see Table 2.

Table 2
Distribution of the articles by research journal

	Number
Adults Learning Mathematics	2
Scandinavian Journal of Educational Research	2
European Journal of Special Needs Education	2
Journal of Learning Disabilities	2
Journal of Education and Work	2
Applied Economics	1
European Economic Review	1
Scandinavian Journal of Public Health	1
Computers & Education	1
Procedia – Social and Behavioral Sciences	1
Learning and Individual Differences	1
Journal of Health Communication	1
Scandinavian Journal of Psychology	1
Demographic Research	1
European Educational Research Journal	1
Total	20

Source: Desk study, Basic Skills, EVA 2016

Note: Six publications not published in research journals are included, four of which are from OECD Publishing, one from the Nordic Council of Ministers and one from "The First Sourcebook on Nordic Research in Mathematics Education: Norway, Sweden, Iceland, Denmark and Contributions from Finland". One contribution was published on the virtual platform, Plos One.

Note: The total here is 20, since one article was published on the virtual platform, Plos One.

The 15 research journals can be divided into five interdisciplinary categories: Education, the Labour Market, Health, Social Science & Psychology and Demographics.

3.3 Article distribution by research field

As shown in the overview on the next page, research into education unsurprisingly accounts for the most contributions, while the diversity of other research fields highlights the fact that basic skills are important in a number of areas such as health, social behaviour and psychology, which are not limited to just education and the labour market.

Distribution of the journals by research area

Research into education (11 articles)

- Adults Learning Mathematics (2)
- Scandinavian Journal of Educational Research (2)
- European Journal of Special Needs Education (2)
- Journal of Learning Disabilities (2)
- Computers & Education (1)
- Learning and Individual Differences (1)
- European Educational Research Journal (1)

Research into education and the labour market (4 articles)

- Journal of Education and Work (2)
- Applied Economics (1)
- European Economic Review (1)

Research into health (2 articles)

- Scandinavian Journal of Public Health (1)
- Journal of Health Communication (1)

Research into social science and psychology (2 articles)

- Procedia – Social and Behavioral Sciences (1)
- Scandinavian Journal of Psychology (1)

Research into demographic differences (1 article)

- Demographic Research (1)

The number of articles in each journal is shown in brackets after the journal title.

3.4 Most studies look at several types of basic skills

If we take a closer look at the content of the articles, Table 3 shows that most publications (48%) look at several types of basic skills (numeracy, literacy and IT skills).

Table 3
Which types of basic skills do the publications consider?

	Number	Percentage
Two or more of the basic skills indicated below*	13	48%
Numeracy only	6	22%
Literacy only	6	22%
IT skills only	2	7%
Total	27	100%

Source: Desk study, Basic Skills, EVA 2016

** Note: These may also involve a more interdisciplinary or general look at poor basic skills*

An equal number of studies (22%) look specifically at either numeracy or literacy. The fact there are only two studies (7%) with specific focus on adult IT skills may explain why this has not specifically been searched for.

3.5 Publication date with focus on use of PIAAC

As Table 4 shows, between 2010 and 2013 two to four English-language publications on basic skills in the Nordic region were published annually. Five publications were published in 2014, and eight in 2015. Since only the first months of 2016 are included in the desk study, this number should not be compared with the previous years.

Table 4
In which year were the publications published?

	Number	Percentage
2010	4	15%
2011	2	7%
2012	2	7%
2013	4	15%
2014	5	18%
2015	8	30%
2016	2	7%
Total	27	100%

Source: Desk study, *Basic Skills, EVA 2016*

The increase in the number of publications in 2014–2015 may give rise to a hypothesis that the publication of the PIAAC study in November 2013 led to more focus on adults' basic skills and thus an increase in the number of studies covering basic skills in the Nordic region.

This hypothesis is supported by the fact that seven of the publications look at PIAAC data, i.e. around half of the 15 publications published in 2014–2016. Of the seven publications, two were published by the OECD: 1) *Skills and labour market performance in Sweden*, and 2) *Adults, Computers and Problem Solving: What's the Problem?*, and one was published by the Nordic Council of Ministers, a publication called *Adult Skills in the Nordic region*.

Yet if we only look at the research articles, just four articles published in the period 2014–2016 refer directly to or analyse PIAAC data. These articles are as follows:

- Borgoni and Pokropek (2016): *Education and Self-Reported Health: Evidence from 23 Countries on the Role of Years of Schooling, Cognitive Skills and Social Capital*
This article investigates the significance of human capital (including reading skills) on self-reported health using PIAAC data.
- Hämäläinen et al. (2015): *Education and working life: VET adults' problem-solving skills in technology-rich environments*
This article investigates adults' IT skills in relation to problem-solving using the Finnish part of the PIAAC results.
- Hanushek et al. (2014): *Returns to Skills around the World: Evidence from PIAAC*
This article uses PIAAC data to investigate the significance of basic skills on salary levels.
- Cort and Larson (2015): *The non-shock of PIAAC – Tracing the discursive effects of PIAAC in Denmark*
This article investigates how Danish media and various stakeholders reacted to the publication of the PIAAC data.

Taken together, this indicates that the publication of PIAAC has had a certain, although relatively limited, impact on Nordic research.

The last of the four articles, *The non-shock of PIAAC – Tracing the discursive effects of PIAAC in Denmark*, discusses exactly this phenomenon and states that the publication of the PIAAC results did not result in any national "shock", unlike the publication of the PISA (Programme for

International Student Assessment) results. The article’s analysis of Danish media coverage and subsequent reactions from various stakeholders also shows that the basic skills of adults are not considered a top priority in the media or on the political agenda compared to primary and lower secondary education. Cort et al. also state in their article that they were only able to find evidence of one researcher (apart from the researchers who were directly involved in the Danish part of PIAAC) commenting on the PIAAC results in the media immediately after their publication. Danish researchers focusing on adults’ skills have thus only to a limited extent participated in the national debate in Denmark on the significance of the PIAAC results and the solutions arising in the wake of their release (Cort 2015).

3.6 Main focus on the significance of basic skills on jobs and education

In addition to considering the basic facts, such as year of publication and publication channel, we also looked more closely at the content of the 27 publications when we categorised the articles. As described in the introduction, we divided the publications into two main categories: basic skills as a phenomenon and the significance of basic skills.

If we start with the significance of basic skills, the desk study shows that there is specific focus on the significance of basic skills on labour market status and/or education.

Table 5
Proportion of articles looking at the significance of basic skills for jobs, education and individual circumstances (n=27)

Does the article look at the significance of basic skills for:	Number	Percentage
Labour market status?	11	41%
Other education?	10	37%
Individual circumstances?	6	22%
None of the above?	7	26%
Total	34	126%

Source: Desk study, Basic Skills, EVA 2016.

Note: These categories are not mutually exclusive. This is why the percentages add up to more than 100%.

As Table 5 shows, 41% of the publications focus on the significance of basic skills for the individual’s labour market status, while 37% focus on the significance of (other) education. There is less focus on the significance of basic skills for individual circumstances; 22% of the publications focus on this. Examples of topics from articles with this focus include the correlation between learning difficulties and diet (Øverby et al. 2013), or the correlation between improved mathematics skills and social/personal empowerment (Hassi et al. 2010).

A range of studies investigates the significance of basic skills for both labour market status and education, while some studies look at the significance in terms of all three topics. The results from the PIAAC study are an example of the latter, where attempts have been made to measure the significance of basic skills in relation to both employment and participation in adult education and continuing training, but also in relation to other individual circumstances such as health, self-confidence, political influence and understanding. Although basic skills are far from the only thing that affect e.g. political influence, PIAAC shows that basic skills are important for social confidence, political influence and understanding.

In general, the studies included in the desk study that investigate the significance of basic skills indicate that poor basic skills increase the likelihood of unemployment (e.g. Lundetræ 2010a, OECD 2015, Bussi 2015), a lower salary (e.g. OECD 2015, Hanushek 2013, Sakellariou 2012) and a lower level of education (e.g. Hakkarainen 2016).

Some studies look at the significance of poor basic skills in combination with social and behavioural problems. For example, in the article *The impact of learning difficulties and*

socioemotional and behavioural problems on transition to postsecondary education or work life in Finland: a five-year follow-up study, Hakkarainen et al. state that poor reading skills in combination with behavioural problems increase the likelihood of upper secondary education ending later in life than is normally the case for the majority of students (Hakkarainen 2016).

3.7 Only few studies look at the significance of specific interventions for skill level

It is one thing to state that poor basic skills are a challenge for the individual and for society, and it is something else to discuss possible solutions to the problem, including investigating specific interventions and their effect, or outlining policy development in this area. Below we will look more closely at the extent to which the studies in the desk study focus on specific interventions to improve adults' basic skills.

Just three studies look at the effect of interventions; some covering the entire education pathway in basic skills, while other interventions are more short-term².

Two studies investigate the effect of limited interventions. In one case, Dahlin 2013 investigates the effect of computer-based working memory training for young adults with concentration difficulties and, with certain reservations in relation to the study design and generalisability, finds that the training increases reading comprehension among the treatment group (Dahlin 2013).

The second example with this focus is Svensson's study from 2011: *Reading and writing disabilities among inmates in correctional settings*. This is a meta-study that, among other things, maps effective reading and writing interventions for inmates in secure institutions and prisons for young offenders. Svensson states that only a few studies have been carried out in this area worldwide (Svensson 2011).

The 2013 article *Investment in Second-Chance Education for Adults and Income Development in Sweden* by Nordlund et al. looks at the significance of full educational interventions for adults, including study programmes specifically targeting adults with poor basic skills. The article investigates the correlation between investment in adult education among early school leavers in Sweden and salary progression over a 12-year period. The results show a markedly positive long-term effect on salary levels after completing Second-Chance Secondary Education. Part of the effect is linked to the completion of further education as an extension of Second-Chance Secondary Education. Nordlund et al. state in continuation of this that Second-Chance Education in Sweden is an effective tool for improving financial opportunities for early school leavers, not least through the opportunity for early school leavers to start educational pathways (Nordlund et al. 2013).

This article also points out that there is limited research into this area that looks specifically at the long-term effects of investment in education.

3.8 Prevalence and reasons more widely discussed than measuring technique

Below, we look more closely at the extent to which the *phenomenon* of poor basic skills is a domain in the research. We will examine whether the research considers the following three aspects:

- 1 Prevalence of poor basic skills
- 2 Reasons for poor basic skills
- 3 Measurement of poor basic skills, including the consequences of different measuring methods

² One explanation for this could be that the literature search's restriction to basic skills does not necessarily capture study programmes or interventions aimed at addressing this issue, unless basic skills as a concept is dealt with directly in the publication.

Table 6 shows that just under half of the articles (44%) focus on the *prevalence* of and *reasons* for poor basic skills respectively.

Studies that look at the phenomenon's prevalence are often based on data from either PIAAC's categorisations of skill levels or data from the Adult Literacy and Life Skills Survey (ALL).

Studies on the reasons for poor basic skills highlight in particular ethnicity, gender, age, own and parents' educational backgrounds, as well as diet. Where poor basic IT skills are concerned, differences in access to the internet and computers alongside poor basic reading and mathematics skills are among the reasons highlighted.

Table 6
Proportion of articles looking at basic skills as a phenomenon (n=27)

Does the article look at:	Number	Percentage
The prevalence of poor basic skills?	12	44%
Reasons for poor basic skills?	12	44%
How we measure poor basic skills?	3	11%
None of these three aspects?	9	33%
	36	132%

Source: Desk study, *Basic Skills*, EVA 2016.

Note: These categories are not mutually exclusive. This is why the percentages add up to more than 100%.

Just 11% of the articles (corresponding to three studies) look at the measuring technique and the significance of the selection of measuring tools for desk studying basic skills. Two of these articles discuss the psychometric testing and validation of measuring tools for measuring dyslexia (Bjornsdottir 2014, Lindskog 2015), while the third discusses test and limit values when measuring reading and writing difficulties and dyslexia (Svensson 2011).

As previously mentioned, Svensson's study looks at the prevalence of reading and writing difficulties and dyslexia in Swedish prisons and institutions for young offenders. Svensson states in his meta-study that the prevalence of dyslexia among inmates in the studies investigated varies from 6% to 70%. Svensson points out in continuation of this theme that fluctuations in the prevalence of poor basic skills can be caused by different tests and limit values for when a result is defined as a problem and the extent to which the target groups are comparable, e.g. whether or not immigrants are included in the studies. In light of this, there are surprisingly few studies that discuss the implications of using a given measurement for basic skills (Svensson 2011).

3.9 One in two studies focuses on solutions

Finally, we look at the extent to which research literature indicates ways of improving poor basic skills in adults or makes reference to political debate on how the problems can be solved.

Around half of the studies included (51%) look at specific solutions to the challenge of poor basic skills or discuss the current trend in policy in this area within the Nordic countries.

The studies point to the need for a number of measures, such as:

- Upgrading of the skills of teachers in the adult education system (Jamet 2014)
- Greater use of IT in formal education (OECD 2015) and upgrading of IT skills (Hämäläinen 2015)
- Greater use of mixed ability grouping and individual support (Lundetræ 2010, Hakkarainen 2015, Hakkarainen 2016)
- Monitoring of poor basic skills and initiation of evidence-based interventions (Hakkarainen 2013)
- More focus on diet and meal patterns (Øverby 2013)

The results must, however, be considered in light of the desk study's scope restrictions, since we have only looked at articles written in English, with research journals as the primary publication channel. Discussions of specific solutions and national strategies often take place outside the scope of the research articles, including in newspaper debate features, political memos, evaluations, etc.

An example of an analysis not included in this desk study is the Danish Evaluation Institute's (EVA) analysis of Preparatory Adult Education (PAE) and poor readers in Denmark from May 2016 (EVA 2016). This is a quantitative analysis that compares poor readers, as identified through PIAAC, with participants in PAE, which is the most targeted intervention in Denmark for improving the reading skills of adult Danes. The analysis shows that the level of activity is far too low, given the extent of the problem, and that the participant profile for PAE is disproportionate to the target group's composition, particularly with regard to ethnicity, but also gender, age and employment status.

4 Bibliography

The following publications were included in the desk study:

Bjornsdottir, Gyda; Halldorsson, Jonas G.; Steinberg, Stacy; Hansdottir, Ingunn; Kristjansson, Kristleifur; Stefansson, Hreinn and Stefansson, Kari (2014): "The Adult Reading History Questionnaire (ARHQ) in Icelandic: Psychometric Properties and Factor Structure" in the *Journal of Learning Disabilities*, Vol. 47, no. 6

Borgonovi, Francesca and Pokropek, Artur (2016): "Education and Self-Reported Health: Evidence from 23 Countries on the Role of Years of Schooling, Cognitive Skills and Social Capital" in *PLOS One: Education, Health and Social Capital*

Bussi, Margherita and Pareliussen, Jon (2015): *Skills and labour market performance in Sweden*. OECD Publishing.

Cort, Pia and Larson, Anne (2015): "The non-shock of PIAAC – Tracing the discursive effects of PIAAC in Denmark" in the *European Educational Research Journal*, Vol. 14, no. 6

Dahlin, Karin I. E. (2013): "A Three Year Follow-up Study: Students' Performances in Reading and Mathematics Three Years after Five-week Computerized Working Memory Training" in the *European Journal of Special Needs Education*

Hakkarainen, Airi; Holopainen, Leena and Savolainen, Hannu (2013): "Mathematical and Reading Difficulties as Predictors of School Achievement and Transition to Secondary Education" in the *Scandinavian Journal of Educational Research*, Vol. 57, no. 5

Hakkarainen, Airi; Holopainen, Leena and Savolainen, Hannu (2015): "A Five-Year Follow-up on the Role of Educational Support in Preventing Dropout from Upper Secondary Education in Finland" in the *Journal of Learning Disabilities*, Vol. 48, no. 4

Hakkarainen, Airi; Holopainen, Leena and Savolainen, Hannu (2016): "The impact of learning difficulties and socioemotional and behavioural problems on transition to postsecondary education or work life in Finland: a five-year follow-up study" in the *European Journal of Special Needs Education*, Vol. 31, no. 2

Hämäläinen, Raija; De Wever, Bram; Malin, Antero and Cincinnato, Sebastiano (2015): "Education and working life: VET adults' problem-solving skills in technology-rich environments" in *Computers & Education*, Vol. 88

Hanushek, Eric; Schwerdt, Guido; Wiederhold, Simon and Woessmann, Ludger (2015): "Returns to Skills around the World: Evidence from PIAAC" in the *European Economic Review*, Vol. 73

Hassi, Marja-Liisa; Hannula, Aino and Saló i Nevado, Laia (2010): "Basic Mathematical Skills and Empowerment: Challenges and Opportunities in Finnish Adult Education" in *Adults Learning Mathematics*, Vol. 5, no. 1

Jamet, Stéphanie and Koen, Vincent (2014): *Making the Most of Skills in Denmark*. OECD Publishing.

- Lindskog, Marcus; Kerimi, Neda; Winman, Anders and Juslin, Peter (2015): "A Swedish validation of the Berlin Numeracy Test" in the *Scandinavian Journal of Psychology*, Vol. 56, no. 2
- Lundetrae, Kjersti (2011): "Does Parental Educational Level Predict Drop-out from Upper Secondary School for 16- to 24-year-olds When Basic Skills are Accounted For? A Cross Country Comparison" in the *Scandinavian Journal of Educational Research*, Vol. 55, no. 6
- Lundetrae, Kjersti; Gabrielsen, Egil and Mykletun, Reidar (2010a): "Do Basic Skills Predict Youth Unemployment (16- to 24-Year-Olds) Also when Controlled for Accomplished Upper-Secondary School? A Cross-Country Comparison" in the *Journal of Education and Work*, Vol. 23, no. 3
- Lundetrae, Kjersti; Mykletun, Reidar and Gabrielsen, Egil (2010b): "A measure of mathematical self-concept in young adults 16–24 years old: A cross-cultural comparison with a focus on gender and numeracy" in *Adults Learning Mathematics*, Vol. 5, no. 1
- Nordlund, Madelene; Stehlik, Tom and Strandh, Mattias (2013): "Investment in Second-Chance Education for Adults and Income Development in Sweden" in the *Journal of Education and Work*, Vol. 26, no. 5
- Nordic Council of Ministers: Nordic Council (2015): *Adult Skills in the Nordic Region: Key Information-Processing Skills Among Adults in the Nordic Region*. Nordic Council of Ministers.
- OECD (2015): *Adults, Computers and Problem Solving: Whats the Problem?* OECD Publishing.
- Olofsson, Åke; Ahl, Astrid and Taube, Karin (2012): "Learning and Study Strategies in University Students with Dyslexia: Implications for Teaching" in *Procedia – Social and Behavioral Sciences*, Vol. 47
- Pareliussen, Jon; Bussi, Margherita; André, Christophe and Koen, Vincent (2015): *Skills and Inclusive Growth in Sweden*. OECD Publishing.
- Sakellariou, Chris (2012): "Central Government versus Private Sector Wages and Cognitive Skills: Evidence Using Endogenous Switching Regression" in *Applied Economics*, Vol. 44, no. 25
- Skirbekk, Vegard; Bordone, Valeria and Weber, Daniela (2014): "A cross-country comparison of math achievement at teen age and cognitive performance 40 years later" in *Demographic Research*, Vol. 31
- Svensson, Idor (2011): "Reading and writing disabilities among inmates in correctional settings. A Swedish perspective" in *Learning and Individual Differences*, Vol. 21, no. 1
- Wedeg, Tine (2010). "Adults Learning Mathematics: Research and Education in Denmark" in Sriraman, B. et al. (ed.): *The First Sourcebook on Nordic Research in Mathematics Education: Norway, Sweden, Iceland, Denmark and Contributions from Finland*. Information Age Publishing.
- Yamashita, Takashi and Kunkel, Suzanne R. (2015): "An International Comparison of the Association Among Literacy, Education, and Health Across the United States, Canada, Switzerland, Italy, Norway, and Bermuda: Implications for Health Disparities" in the *Journal of Health Communication*, Vol. 20, no. 4
- Øverby, Nina Cecilie; Lüdemann, Eva; Høigaard, Rune (2013): "Self-reported learning difficulties and dietary intake in Norwegian adolescents" in the *Scandinavian Journal of Public Health*, Vol. 41, no. 7

Other literature used:

The Danish National Research Centre for Social Research (SFI) (2013): *Færdigheder i læsning, regning og problemløsning med it i Danmark [Reading, mathematics and problem-solving skills using IT in Denmark]*, SFI 13:28

Danish Evaluation Institute (EVA) (2016): *FVU og de svage læsere i Danmark – En kvantitativ analyse af deltagerne på trin 1 i læsning på Forberedende Voksenundervisning (FVU) [PAE and poor readers in Denmark – A quantitative analysis of participants at reading level 1 in Preparatory Adult Education (PAE)]*

5 Search strategy

A multi-string search strategy has been employed in two databases: PrimoCentral and ERIC.

PrimoCentral is a database provided by library supplier ExLibris that contains indexed articles from the majority of content providers in the world. The database contains millions of entries from thousands of suppliers, with entries and suppliers constantly being added. The content comes from publishers such as Taylor & Francis, Wiley and OECD iLibrary.

ERIC is one of the most extensive teaching theory bibliographies in the world with references to journal articles, books, conference papers, papers, etc. within all aspects of teaching theory and other literature related to the theory of teaching. ERIC contains more than 1,400,000 references and links to more than 321,000 full-text documents dating from 1966 onwards.

Searches in PrimoCentral

1. (Adult skills OR basic skills OR poor skills OR adult qualifications OR basic qualifications OR adult competencies OR basic competencies OR poor competencies OR literacy OR reading difficulties OR numeracy) AND (Denmark OR Finland OR Norway OR Sweden OR Iceland OR Åland OR Faroes OR Greenland OR Nordic)

Restricted to:
2010–2016
Journal articles
English

2. Adult education AND (adult skills OR basic skills OR poor skills OR adult qualifications OR basic qualifications OR adult competencies OR basic competencies OR poor competencies OR literacy OR reading difficulties OR numeracy) AND (Denmark OR Finland OR Norway OR Sweden OR Iceland OR Åland OR Faroes OR Greenland OR Nordic) NOT (child* OR young* OR primary school OR preschool)

Restricted to:
2010–2016
Journal articles
English

Searches in ERIC

1. (Adult skills OR basic skills OR poor skills OR adult qualifications OR basic qualifications OR adult competencies OR basic competencies OR poor competencies OR literacy OR reading difficulties OR numeracy) AND (Denmark OR Finland OR Norway OR Sweden OR Iceland OR Åland OR Faroes OR Greenland OR Nordic)

Restricted to:
2012–2016
Journal articles
English
Decrypter = adults

2. (Adult skills OR basic skills OR poor skills OR adult qualifications OR basic qualifications OR adult competencies OR basic competencies OR poor competencies OR literacy OR reading difficulties OR numeracy) AND (Denmark OR Finland OR Norway OR Sweden OR Iceland OR Åland OR Faroes OR Greenland OR Nordic)

Restricted to:

2012–2016

Journal articles

English

Education level = adult education

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