Development of the Diagnostic Illiteracy Scale in order to reveal illiteracy among adults

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Development of the DIS-scale (Diagnostic Illiteracy Scale) in order to Reveal Illiteracy among Adults[4]

Abstract: Regarding figures of UNICEF (2008) 22% of the population of the industrialised countries is illiterate. As a result of illiteracy, citizens risk social exclusion in society. According to results of the EU High Level Group of Experts on Literacy (2012) prevention and decrease of illiteracy will be an important goal for future Europe. Still, according to the on-going problems of illiteracy, validated 'tools' are required to define if one risks illiteracy. The field of lifelong learning should be more equipped in order to diagnose literacy needs and develop literacy programs on a broad scope of the adult life-circumstances. Therefore, we proposed a validated diagnostic scale, called the DIS-scale (*Diagnostic Illiteracy Scale*), concerning illiteracy in order to support the field of lifelong learning in prevention of the current illiteracy problem in nowadays European society.

Key words: lifelong learning, illiteracy, adult education, social inclusion, diagnostic instrument, language learning.

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[4] This research has been subsidised and initiated by the Stichting Lezen & Schrijven in the Netherlands. Use of the diagnostic scale, called the DIS-scale (Diagnostic Illiteracy Scale) is for free but only possible by mentioning the name of the organisation, which initiated the development, namely Stichting Lezen & Schrijven and after informing Stichting Lezen & Schrijven by e-mail of using it by sending an e-mail to: info@lezenenschrijven.nl due to the copyrights on this developed scale.

Background

Regarding figures of UNICEF (2008) 22% of the population of the industrialised countries is illiterate, who experience problems with reading and writing in functional, daily settings besides problems with using digital ways of communicating, like e-mail. As a result of illiteracy, citizens risk social exclusion in society. According to results of the EU High Level Group of Experts on Literacy (2012) prevention and decrease of illiteracy will be an important goal for future Europe. The current labour market increasingly requires better reading and writing skills. Furthermore, the European society confronts an on-going digitalisation and increase of mobility cause of migration (EU High Level Group of Experts on Literacy, 2012).

According to Houtkoop et al. (2012) in the Netherlands still over one million citizens (or 10% of the labour force) is illiterate. In comparison with former years (based on results of the *European Adult Literacy and Life Skills Survey* - ALL) this figure has not been significantly changed (*ibid.*). If society is lacking special interventions in order to prohibit an on-going increase of illiteracy, these figures are unlikely to change. According to the results of the ALL survey illiteracy appears to influence the economic status, state of welfare and societal participation of the Dutch citizens (*ibid.*). Illiteracy occurs more among unemployed people and increase of literacy skills will influence the wages paid (*ibid.*). Besides this Houtkoop et al. (2012) argue that when literacy skill levels increase, citizens feel more happy and healthy, and are more active in society. Therefore it could be relevant to reduce the rate of illiteracy in order to increase social inclusion. In this perspective social inclusion can be defined as a multidimensional process referring to 'a process where individuals try to control and cope with resources and services, take part in society and its activities, connect to and have social relationships and feel included in the (local) area (De Greef et al, 2011: 358).

Investments in programs reducing illiteracy is likely to contribute to increased social inclusion in combination with positive effects on the health and the labour market. The first step in prevention and decrease of illiteracy is the detection of illiteracy problems. Though several countries invest in illiteracy interventions (UNESCO Institute for Lifelong Learning, 2011), to our knowledge, there is no validated diagnostic instrument to detect illiteracy by self-reporting. In this contribution, we propose the 'Diagnostic Illiteracy Scale' (DIS) in order to explore the rates of illiteracy among adult citizens by self-reporting. The validated scale can be used to diagnose if a citizen is likely to risk illiteracy.

Four criteria of the 'Diagnostic Illiteracy Scale' (DIS)

In order to use a validated scale in diagnosing risk of illiteracy, four criteria are considered important:

1. Using literacy in daily life
2. Diversity in language skills
3. Heterogeneity of the target group
4. Threshold of illiteracy

These four criteria are the basic guidelines for the development of the DIS, which will be explored underneath.

1. Using literacy in daily life

One of the most prestigious researches among literacy is the so called PIAAC (*Programme for the International Assessment of Adult Competencies*) research as a follow-up on the ALL survey. According to the results of PIAAC, literacy can be defined as '*understanding, evaluating, using and engaging with written texts to participate in society, to achieve one's goals, and to develop one's knowledge and potential*' (*Organisation for Economic Co-operation and Development* [OECD] 2012: 20). Basic assumption of this definition is that after being literate one should be able to use written texts in daily society. According to a comparable research, called LAMP (*Literacy Assessment and Monitoring Programme*) investigating literacy in the United States of America, Canada, El Salvador, Kenya, Mongolia, Morocco, Nigeria and Palestine literacy also refers to the use of written texts in daily life. Likewise the NALS Survey (*National Assessment of Literacy Survey*) and the NAAL Survey (*National Assessment of Adult Literacy*) from the United States of America the rate of literacy can be measured (mostly by self-reporting or tests) by using the frequency of using texts in daily life (Cohen, White & Cohen, 2012). Therefore a diagnostic instrument determining the risk of being illiterate should refer to the use of texts (or better said transfer) in daily life.

2. Diversity in language skills

According to Nath (2007), literacy is a multidimensional concept referring to reading, writing, numeracy and using skills in daily life. These skills could be tested during a written assessment (*ibid.*). Aoud and Savage (2009) discern several skills:

- Reading
- Listening comprehension

- Name writing
- Letter-sound knowledge
- Phonological awareness blending task
- Nonword repetition

Besides the importance of describing variety in literacy skills for adults, for children several skills of using daily language can be discerned (Cordewener et al., 2012). These are comparable with the skills proposed by Aoud and Savage (2009). As an example of a broad scope of using language skills in daily life the new Dutch law of adult education refers to literacy (and numeracy) education based on reading, writing, speaking, listening and holding a conversation (Centre for Innovation of Education and Training in the Netherlands [CINOP], 2012). Because a diagnostic instrument of revealing the risk of illiteracy can be explained by multidimensional concept of 'language skills,' several skills have to be taken into account, for example, reading, writing, speaking listening and holding a conversation covering to the total scope of using language in daily life.

3. Heterogeneity of the target group

According to Vernooy (2010) the group of illiterate adults is diverse, taking a large variety of roles such as being a parent or a colleague. De Greef and Bohnenn (2011) state that developing a learning environment for low skilled or illiterate learners requires accounting for the large diversity of background characteristics. Low skilled or illiterate learners have several learning needs, which need to be addressed in learning programs (Chilvers, 2008). Examples are the need of learning to communicate with colleagues at work, learning to make your own decisions or learning to send a birthday card. Besides the importance of the learning needs, one cannot deny the diverse socio-economical background of adult learners like bad health, non-EU citizenship, lone parenthood, low educational qualifications, lack of full-time employment, which influence the possible learning result in terms of social in- or exclusion (Tsakloglou & Papadopoulos, 2002: 211). Likewise Verté et al. (2007) state that several socio-demographic factors, like age, marital status, number of children, gender, racial background and (un)employment can be important influentials on social inclusion of (older) adults. Therefore a diagnostic illiteracy scale could refer to possible different roles as an adult in daily society.

4. Threshold of illiteracy

Next to the importance of including daily life situations, a diversity in language skills and the heterogeneity of the target groups should be accounted for in the

DIS-Scale. This ensures meaningful results that can be used for diagnosing the risk of being illitere. The discussed instruments (IALS, ALL and PIAAC), consider someone illiterate if one reaches level 1 of the international used illiteracy scales (Houtkoop et al., 2012). Level 1 refers to the use of personal knowledge in order to localise information, based on a small comparison without a lot of distracting information. An example of possible translation of this level 1 in a diagnostic instrument of illiteracy is an instrument of health literacy, in which one is asked to discern 40 medical words of 40 nonmedical words (Rawson et al., 2009). Furthermore Wentink (2012) underlines the importance of a threshold of illiteracy for example by using the PISA (*Programme for International Student Assessment*) 2-level. Though it is not quite clear which terms can be used in order to determine if one is illiterate or not, it is still needed to develop criteria in order to determine if one risks illiteracy in order to develop the DIS-Scale. The threshold for literacy we use will be the threshold based on the PIAAC research referring to being illiterate if you can't read or write properly, which blocks functioning in daily life.

Sample

The present study draws on a sample collected in the Netherlands over a period of two weeks in September 2012 by using an online survey. To obtain a representative sample of the Dutch population, we made use of the Dutch panel of PanelClix, a professional international organisation for market research, containing over 108.000 people. This panel is believed to be a largely representative sample of the Dutch population. Members receive a very small incentive of a few cents for every survey question they answer. In total, a sample of 5000 people were randomly selected from this panel. The response rate was 20%; a total of 1008 responses were obtained. During the data collection, amendments were made to be sure to represent the Dutch population in the final sample.

The online survey used specific software that checked for missing responses in which users were prompted to answer them. Pretesting of the survey was conducted with ten internet users in two rounds. Amendments were made at the end of every round based on the provided feedback. No major comments were given by the ten respondents in the second round and the survey was deemed ready for posting. The time needed to answer the survey questions was reduced to about 12 minutes. Table 1 summarizes the demographic characteristics of the respondents.

Table 1: Demographic profile of respondents (N=1008)

	N	%
Gender		
Male	510	50.6
Female	498	49.4
Age		
16-35	205	20.3
36-54	314	31.2
55+	489	48.5
Education		
Low	329	28.9
Middle	443	38.9
High	342	30.1
Employment status		
Employee	434	43.1
Employer	53	5.3
Unemployed	50	5.0
Disabled	76	7.5
Retired	269	26.7
Housemen / -wife	65	6.4
Student	61	6.1

Instrument development

The DIS-Scale is developed by our research team and cooperation with one expert in the field of language learning. First, based on the broad scope of illiteracy of the PIAAC Survey (OECD, 2012) and the interpretation of diverse language skills in the new Dutch law of adult education, the items of the DIS-Scale consider more than just one language skill. Therefore items should refer to reading as well as writing. Second, the items refer to the usage of writing and reading in daily practice according to the aforementioned transfer of language in daily life-circumstances (*ibid.*). Third, due to the diverse target group of adult learners, the items should represent different contexts. The different roles citizens can fulfil are based on most of the used contexts of the PIAAC research, namely home and family, health and safety, consumer economics, leisure and recreation and community and citizenship (*ibid.*). Finally, in order to determine if one risk illiteracy or not a Likert-scale has been used for discerning possible illiterates from literate

people. Next to the Likert-scale items, an extra question is used to identify the educational background of the respondent. It is supposed that the rate of illiteracy increases when the level of educational background decreases (Houtkoop et al, 2012). Therefore, the educational background could be an influencing factor in order to determine the threshold of being illiterate or not by relating the educational background to the needed score of the DIS-Scale.

Testing and refinement

Due to the fact that the DIS-Scale should be used in the field of adult education, re-integration, welfare and other sectors working with possible illiterate citizens, the contents and language used of the DIS-Scale should meet needs of daily practice, referring to for example communication skills at work or with relatives. Therefore, some experts reviewed both content and language of the items of the DIS-Scale. This ensured the creation of a content-valid and consist scale, based on the theoretical approaches of the four discussed criteria. The suggestions improved both unambiguousness and clearness of the items.

Method of analysis

According to the possible use in daily practice of revealing an objective judgement if one risks illiteracy, it is necessary to reduce the information of the variables into a set of weighted linear combinations. Consequently, a Principal Component Analysis (PCA) with the maximum likelihood extraction procedure, has been conducted by using SPSS 15.0. In order to define the association between the independent items and the total scale correlation analyses were conducted.

Results

In order to develop the DIS-Scale a Principal Component Analysis with a Direct Oblimin Rotation and a Maximum Convergence of .99 has been used? for describing the dependence of the items on the scale. Furthermore the Kaiser-Meyer-Olkin measure of sampling adequacy with a score of 0.955 has been confirmed to be good (Hutcheson & Sofroniou, 1999). Barlett's test of sphericity appeared significant ($p < 0.001$). Thus, the minimum standard that should be passed in order to conduct a principal components analysis are all met. As a result, Table 2 presents several items including the correlation to the total scale with a Cronbach's Alpha of 0.941.

Table 2: Overview of items DIS-Scale and correlations with total scale

Items of DIS-Scale	Correlations with total DIS-Scale
I have difficulty in reading and understanding information of the local authority	0.666[**]
It's difficult for me to read departure times of bus and train	0.758[**]
I have difficulty in filling in a form of the hospital	0.837[**]
I have difficulty in reading something out loud	0.781[**]
It's difficult for me to read and understand the telephone bill	0.835[**]
I have difficulty in writing a birthday card	0.833[**]
It's hard for me to fill in forms concerning work, benefit (social security) or Old Aged Pensions Acts	0.769[**]
I have difficulty in reading and understanding the subtitles in movies	0.846[**]
I have difficulty in reading and understanding instructions (for use) of medicines	0.809[**]
It's difficult for me to read on my banking account what has been withdrawn or credited	0.821[**]
I have difficulty in writing little notes or memos to colleagues, roommates or friends	0.827[**]

[**] Correlation is significant at 0.01 level (2-tailed).

How to use the DIS-Scale in daily practice

Despite the sense of urgency of investment in literacy programs, the field of life-long learning risks cutting subsidies due to the economic crisis in Europe. Life-long learning programs should be shortened and professionals of lifelong learning have less time for defining learning needs or coaching adult learners. Strong and short 'tools' are necessary to reduce time and reveal the possible risk of being il-literate of a future learner. Using the proposed DIS-Scale helps saving time; it makes diagnosing the risk of being illiterate much easier. In the Netherlands the DIS-scale will be implemented from the beginning of June by several communities. To date, in the Dutch situation one could use the DIS-Scale as a tool in recognising illiteracy if one is for example unemployed and need to ask for social security at the local authority. More concrete a score of 23 points or higher means that the (potential) learner experience problems with reading and writing in daily life and risks being illiterate. On the other hand, in order to prevent health problems of vulnerable adults, professionals like a doctor could use the DIS-Scale in order to define (health) illiteracy. Then, proper usage of instructions of medicines is ensured. Next to the field of reintegration in the labour market and the field

of care teachers could use the DIS-Scale in order to define if a potential learner is risking illiteracy and need to be transferred to a group with special attention to literacy problems. For example at the beginning of a course in order to define if one experience problems in both writing and reading and to develop a 'tailor made' course for each learner. Overall, the DIS-Scale can be used in different settings and contexts in order to reveal if an adult risks illiteracy and consequently needs additional support in using language in daily life.

Restrictions of the DIS-Scale

Though the DIS-Scale is validated among a large group of respondents with a diverse and representative background of the Dutch population several limitations should be taken into account. First, the individual results of the DIS-Scale will not represent the rate of illiteracy of an adult, but just the fact if one risks being illiterate. So it indicates if one risks illiteracy. Provided that the risk of illiteracy is there, further testing is necessary in order to define which learning program is necessary to improve the necessary language skills. Second, the results of an individual score should be interpreted with caution. Due to the fact that the DIS-Scale represents a self-report measure, one should explain the individual score as a possible threat of being illiterate by the adult learner him- or herself. Finally, the contents of the items are based on the Dutch situation. If one is to use this scale in different countries, cross-cultural validation is necessary to provide reliable and validated results.

Still, according to the on-going problems of illiteracy, validated 'tools' are required to define if one risks illiteracy. The field of lifelong learning should be more equipped in order to diagnose literacy needs and develop literacy programs on a broad scope of the adult life-circumstances. Therefore, we proposed a validated diagnostic scale concerning illiteracy in order to support the field of lifelong learning in prevention of the current illiteracy problem in nowadays European society.

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Razvoj DIS skale (Skala za utvrđivanje nepismenosti) u cilju otkrivanja nepismenosti kod odraslih[8]

Apstrakt: Kada pogledamo cifre koje je objavio UNICEF (2008), 22% populacije industrijskih zemalja je nepismeno. Kao posledica nepismenosti javlja se rizik od socijalne isključenosti u društvu. Prema rezultatima Visoke grupe eksperata za pismenost Evropske unije (2012), prevencija i smanjenje nepismenosti će u budućnosti biti važan cilj za Evropu. Međutim, trenutni problemi vezani za nepismenost zahtevaju da se definišu „načini' za utvrđivanje da li je određena osoba u riziku da ostane nepismena. Polje celoživotnog učenja zahteva bolje mehanizme za dijagnostikovanje potreba kada su u pitanju programi opismenjavanja u okviru širokog dijapazona životnih okolnosti jedne odrasle osobe. Stoga predlažemo validnu dijagnostičku skalu procene, tzv. DIS skalu (Skala za utvrđivanje nepismenosti). Ova skala koristi se za procenu nepismenosti u okviru podrške celoživotnom učenju a u cilju prevencije nepismenosti u evropskom društvu danas.

Ključne reči: celoživotno učenje, nepismenost, obrazovanje odraslih, socijalna inkluzija, dijagnostički instrumenti, učenje jezika.

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[8] Ovo istraživanje je subvencionisao i inicirao Stichting Lezen i Schrijven u Holandiji. Korišćenje dijagnostičke skale, DIS - skala (Skala za utvrđivanje nepismenosti) je besplatno, ali samo ako se pominje ime organizacije koja je inicirala razvoj ove skale, odnosno Stichting Lezen i Schrijven i nakon informisanja Stichting Lezen i Schrijven putem e-mejla o korišćenju skale na: info@lezenenschrijven.nl zbog autorskih prava.