How to Design Work Related Information for Low-literate Employees?

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Abstract – A relatively high percentage of the workforce has lower literacy levels, which means that these employees have problems understanding written text. We have designed a brochure for a specific occupational group: landscape workers, people who work in urban and rural green spaces. This group bears a high risk of tick bites and, therefore, of contracting Lyme disease. The text and lay-out of the brochure are adapted according to the European Standards for making information easy to read and to understand. Four different versions of this brochure are designed and tested to investigate the effects of adding pictograms and a motivational agent to the adapted text. It was expected that these additions would be beneficial for low-literate landscape workers. The results of the study show that the participants appreciated the brochure, that they comprehended the brochure quite well and that they intended to perform the described protective measures. However, no positive effects of adding pictograms or a motivational agent are found. So, it seems to be more important to adapt information according to existing guidelines for easy to read text than to try to help low-literate readers by adding extra information.

Index Terms – Design process, low literacy, motivational agent, pictograms, workplace literacy.

INTRODUCTION

Low literacy in the workplace is a complex problem. In the Netherlands, about ten percent of the people between 16 to 65 years old are low-literate [1]. This means that they have difficulties to read and write. More precisely, low literacy is defined as having problems using printed and written information to function in society, to achieve one’s goals, to develop one’s knowledge and potential [2]. The group of low-literate people in the Netherlands is very heterogeneous. Women, elderly, and people with lower educational levels are relatively often low-literate. The same applies to people who are non-native speakers of Dutch; about one quarter of the low-literate people in the Netherlands is a non-native speaker [1]. About half of the low-literate people in the Netherlands have a job. Low literacy is related to a variety of problems on the work floor. Although a recent study shows that lower literacy skills do not always have a negative effect on production [3], other research has shown that low literacy is related to lower levels of occupational health and safety behavior [4]. Comprehensible risk communication for every employee is important to improve compliance to safety measures.

Here, we report on a study that was executed to design risk information for a specific occupational group: landscape workers, people who work in urban and rural green spaces. This group bears a high risk of tick bites and, therefore, of contracting Lyme disease, which is a severe illness. In the Netherlands, as in a number of other countries, the prevalence of this disease is steadily increasing [5] and it has been shown that a large percentage of this group of professionals has been bitten by a tick and treated for Lyme disease [6]. Among this target group, there are many people with limited literacy skills who are not able to understand the available written risk information.

The need for tailored information on this topic is expressed in the literature [6] and this need is confirmed by work centers that provide employment opportunities to individuals with disabilities. The supervisors working in these work centers told us that they have problems to effectively inform the employees about work-related risks, such as tick bites. A tailored brochure would be helpful for them. So, the primary goal of this study was to design and test a tailored brochure.
DESIGN OF THE BROCHURE

The content of the brochure is based on the official information formulated by the Dutch National Institute for Public Health and the Environment, but the text is adapted according to the European Standards for making information easy to read and to understand. These guidelines are available on the website of Inclusion Europe in several European languages [7]. In short, adapting the text to these guidelines means that we, as much as possible:

- Used easy to understand words;
- Used easy to understand headings;
- Used easy to understand photographs;
- Used no percentages and big numbers;
- Used short sentences and active language;
- Spoke to the readers directly (“you”);
- Used a sans-serif font;
- Used a rather large writing;
- Used no italics or underlining;
- Used one sentence on a line or cut the sentence where readers logically pause;
- Aligned the text to the left;
- Did not justify or indent the text;
- Left space between paragraphs.

Apart from following the guidelines for easy to read texts, the literature distinguishes a variety of measures used to adapt information for people with lower literacy levels. The most common is to add visual information. Recent research has shown that pictograms, if carefully designed, can be beneficial for low-literate readers [8, 9]. In our study, we added pictograms to the instructive information in the brochure; protective measures that the target group should take to minimize the risk of a tick bite and the risk of Lyme disease were not only described but also visually depicted. A pretest showed that the target group comprehended the meaning of the pictograms.

Another strategy that is found to be beneficial is motivating people to process the information carefully. Especially for people with low literacy, interventions that increase their motivation to process information can have positive effects [10]. While they still must read the text, which is a difficult task for them, if they are motivated they might be more likely to succeed. But how to motivate this group? Previous research has shown that adding motivational elements to instructions is beneficial for specific target groups such as the elderly and students [11, 12]. A motivational agent, a fictitious peer user, stimulates and persuades the users to process the information and to perform the actions described. We investigated if such an agent would be beneficial for low-literate landscape workers. A pretest showed that the agent that was added to the brochure was appreciated and accepted by the target group as a potential colleague.

FIGURE 1. PART OF THE BROCHURE WITH A MOTIVATIONAL AGENT (1) AND PICTOGRAMS (2) ADDED.

Apart from the primary goal to design and test a brochure suitable for low-literate employees, the second goal of this study was to investigate to what extent adding a motivational agent and adding pictograms would be beneficial for the target group. To be able to measure the effects of adding pictograms and a motivational agent, four versions of the brochure were designed:

1) A version with a motivational agent and pictograms.
2) A version with a motivational agent, without pictograms.
3) A version without a motivational agent, but with pictograms.
4) A version without a motivational agent and without pictograms.

Figure 1 shows (part of) the brochure with a motivational agent and with pictograms added.

TESTING THE BROCHURE

The four different versions of the brochure were tested in work centers which provide employment opportunities to individuals with disabilities. Data were collected by means of oral, face to face sessions to avoid any problems with reading the questions or writing down the answers. We tested the brochure in individual sessions with 110 low-literate participants who were employed to work in municipal parks and gardens. They were selected by their supervisors. The most important selection criterion was that the employees should not be illiterate but that they had difficulties with reading Dutch text. We tested the participants’ health literacy level with the NVS-D, a validated test for measuring health literacy [13]. The results of the test showed that almost all participants had severe reading problems.
Each session started with an introduction, in which the participants were told that the goal of the study was to design a good brochure about tick bites and were told what they were expected to do during the session. The topic of low literacy was not mentioned in this introduction. After this, each participant was asked to read one version of the brochure. They were given as much time as they needed. Then, they were asked to answer questions on their appreciation for the brochure, their text comprehension and their intention to perform the actions described in the brochure.

The appreciation of the brochure was measured by an open question and a number of closed questions. The participants had to indicate their opinion on a five-point scale. This was a pictorial scale (smileyys indicated the different answer options) with simplified language for the answer options. Comprehensibility was measured by a number of open questions. Intention was measured by asking the participants if they intended to perform the protective measures while working outside. If they could explain why they intended or not to perform the measures. Each individual session took about 30 to 45 minutes. All sessions were audio-taped.

After the sessions, the answers to the open questions were written out. These qualitative results were analyzed by the first and the second author of this paper. The second author also interviewed the participants, the first author was not involved in the interviews. They analyzed the qualitative results independently from each other. The quantitative results were statistically analyzed. We performed analyses of variance to measure the effects of adding a motivational agent and pictograms on appreciation and comprehension of the brochure and on the intention to perform the described actions. An extensive description of the study method and the statistical results can be found in [14].

RESULTS AND DISCUSSION; WHICH VERSION OF THE BROCHURE IS PREFERRED?

I General results

Overall, the participants responded positively to the four versions of the brochure. Their mean score on the appreciation scales was above 4 on a 5 point scale. Answers to the open questions show that they considered the information as easy to read and to understand:

- “No posh words are used, but it is easy and simple. Some pictures added …” (participant #61)
- “In some brochures, a lot of text is used to explain something small. This is easy to understand and short.” (participant #72)
- “If you use difficult words, I don’t understand it. But I can read a little bit. Something like this is comprehensible for me.” (participant #103)
- “It is divided in small blocks, so very nicely explained where you should pay attention to.” (participant #106)

As expected, for people with reading difficulties it seems favorable to use brochures with plain language and small information blocks with comprehensible headings. It can be concluded that adapting the text to the existing guidelines for easy to read text [7] results in a text that is appreciated by this target group. The participants did not only appreciate the text, they also perceived the brochure as relatively easy to comprehend.

The positive comments on the brochure are partly in line with the participants’ scores on the comprehension questions. On average, the participants answered more than half of the questions correctly, but they gave a wrong answer to a substantial number of questions. The results show large differences between participants’ scores.

It is difficult to interpret the results on the comprehension questions. No questions were answered significantly worse or better than other questions. This means that we could not detect specific parts of the brochure that were more difficult than other parts. Since some participants seemed to be nervous when they had to answer questions and since some of them gave wrong answers, but spontaneously told about what they had read in the brochure later on in the session, we assume that the non-optimal and varying scores on the comprehension test are caused by a combination of personal characteristics and reading skills.

In addition to appreciation and comprehension, the intention to perform the described protective measures was measured. The results show that the intention was high. Four groups of related actions were mentioned in the brochure. One group of actions was focused on protection, one on checking for tick bites, one on removing ticks and one on what to do after removing a tick. In total, 24 actions were distinguished. Participants told us that they were intending to perform on average 21 out of these 24 actions. This is a promising result.

Participants told us that they considered minimizing work-related risks very important and that they found it very important to stay healthy. As a result of this, they were willing to take a variety of protective measures. However, good intentions do not always result in the desired behavior.

II The effects of adding pictograms

Contrary to our expectations, adding pictograms to the described protective measures the target group should take did not have any effects. When the participants were asked to orally evaluate the brochure, they did not comment at all on the pictograms. A number of participants commented on the pictures in the brochure in general, but none of them said something explicitly about the pictograms.
Furthermore, the quantitative results do not show any effects of adding pictograms. The mean scores of the participants who read a brochure with pictograms did not differ from the scores of the participants who read a brochure without pictograms. Although a pretest showed that the target group comprehended the meaning of the pictograms, they did not have an added value. These results are not in line with the existing literature on adding visual information to text for people with lower literacy levels [8, 9]. In this study, the pictograms had the same meaning as the accompanying text. It may be that when the text is easy to comprehend, redundant visual information is not beneficial. More research to investigate this is needed.

III The effects of adding a motivational agent

Based on earlier research results, it was expected that adding a motivational agent would have positive effects and that this would be an eye-catching addition. However, when participants were asked about their meaning of the brochure, they did not spontaneously comment on the presence of this fictitious colleague. Only one participant said: “Everything in the brochure is very clear; especially that man, who says “Hi, I’m …”” (participant #114).

Not only did the participants not comment on the motivational agent, the presence of this agent did not have any effects on the appreciation of the brochure and on the intention to perform the described actions. The mean scores of the participants who read a brochure with a motivational agent did not differ from the scores of the participants who read a brochure without a motivational agent. With regard to comprehensibility, the mean scores of the participants who read a brochure with a motivational agent were even somewhat lower than the scores of those who read a brochure without a motivational agent. It can be concluded that adding a motivational agent is not beneficial for this target group. An explanation may be that for low-literate people, adding more information (although easy to comprehend and motivating) has always negative effects, because they have to read more text and reading is a difficult task for them.

IMPLICATIONS FOR THE DESIGN OF INFORMATION FOR LOW-LITERATE EMPLOYEES

The results of this study show that adapting a text to the existing guidelines for easy to read text can result in a brochure that is appreciated and quite well comprehended by a target group of low-literate employees. Although we did not compare a text that was not adapted to the guidelines with the adapted brochure, many participants told us that this brochure was much easier to read for them than other brochures and documents that they were given at their workplace. So, we would advise to follow the guidelines for easy to read text, such as the European Standards [7], carefully.

Our second advice would be to not add any extra information unless a user test has shown that this information is beneficial for the target group. Although the results of a pretest showed that members of the target group understood the meaning of the pictograms and that they appreciated and accepted the motivational agent, these additions did not have positive effects. It seems that if a text is comprehensible for the target group, extra information has no added value. However, this assumption needs to be tested.

Since early spring, the brochure is available for the target group, we hope that the brochure will help decreasing tick bites and Lyme disease.

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