

Use and Effect of Motivational Elements in User Instructions: What We Do and Don't Know

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Abstract - Literature shows that there are two views on how user instructions should stimulate the users' motivation to read the instructions to be able to work with the accompanying device, system or program. Advocates of the first view state that users will be motivated by correct instructions that enable them to perform tasks effectively and efficiently. Promoters of the second view think that facilitating correct task performance is not enough to motivate users. They consider it a function of user instructions to facilitate positive experiences while performing tasks, and they expect that adding motivational elements would be beneficial. We conducted four studies to investigate the effects of motivational elements in user instructions. These studies were based on the ARCS model, which provides strategies focusing on four objectives – Attention, Relevance, Confidence and Satisfaction – to make instructions motivational. We measured the effects of motivational elements focusing on those objectives, on usability and on the users' motivation and confidence. We particularly studied elements that were expected to promote confidence (e.g. personal stories). In general, the results of the studies show that confidence-enhancing elements positively affect the effectiveness of task performance and users' persistence in trying to complete a task.

Index Terms - Confidence, motivation, motivational elements, usability, user instructions

INTRODUCTION

In instructive texts such as software manuals, user instructions or online help, many different information types are included. The most important information type is procedural information: descriptions of the actions that the users have to perform. There is no discussion about the need for procedural information in instructive texts; without descriptions of the actions, users would not be able to work with the device, system or program. According to Farkas' streamlined step model, descriptions of actions are the only mandatory part of instructions [1].

Another information type that is often present in instructive texts is declarative information. This information type, also referred to as conceptual information, system information, or principles, describes the internal working of the system or device. The primary function of declarative information is to enhance the users' mental representation of the system. Much is still unknown about the effects of declarative information and what its effects are [2, 3]. Although some minor negative effects of including declarative information were found [4], the common opinion is that including declarative information is advisable, or at least that there are no sound arguments yet for excluding this information type.

According to [5], since about the year 2000, a third type of information can be found in instructive texts: motivational information. This information is aimed at facilitating positive experiences while performing tasks. Examples of instructive texts with lots of motivational information are the well-known *For Dummies* books, which "are written for those frustrated and hard-working souls who know they're not dumb, but find that the technical complexities of computers and the myriad of personal and business issues - and all the accompanying horror stories - make them feel helpless" (<http://www.dummies.com>), and Field's book on statistics entitled "Discovering statistics using SPSS (and sex and drugs and rock 'n' roll)" [6].

Literature shows that there are two conflicting views on whether it is advisable to include motivational information in instructive texts. According to some researchers, trying to motivate users is not necessary, e.g. [7]. They advocate the view that when instructions are correct, and thus enable users to perform tasks effectively and efficiently, users will be motivated more or less automatically because of the satisfying process of performing the tasks. However, advocates of the second view think that providing users with correct instructions is not sufficient to motivate them and to keep them motivated. Even though the instructions may be correct, users are expected to be confronted with setbacks during task performance, due to many factors. Then, users should be motivated to keep on working with the device.

According to [8], instructions should encourage the user “to face the daunting spectre of neologisms, foreign terms, and abstract, technical concepts, and to continue to read the text in spite of these obstacles,” (p. 99). Ten years later, [9] stated that instructions should “engage” readers to retain their attention for more than a few paragraphs. And Horton advocated a similar view, suggesting that technical documents should motivate readers. Instead of “friendly instructions” that are just focused on enabling users to perform tasks correctly, he recommends “seductive documents” that show, teach, convince, and get read [10]. According to Horton, “friendly documents allow access to information – if a reader is motivated and tries to find it. Seductive documents go further and supply the motivation,” (p. 6).

This paper describes a series of studies that we conducted (The second author of this paper was the primary investigator. She just finished her dissertation about these studies and she was supervised by the other author). The goal of this research was to test the assumptions of the advocates of the second view. To what extent do users benefit from motivational information in user instructions?

MOTIVATING USERS

Motivation is a complex concept. It is not easy to define the concept of motivation and to predict how people can be motivated to learn, or, in the context of our research, to use a device with the help of the accompanying instructions. An influential theory related to motivation is the expectancy-value theory [11], which considers human behavior as a function of perceived probability for success (expectancy), and perceived value of the success. Based on this theory, the ARCS Model of Motivational Design was developed [12, 13]. According to the ARCS model, the following goals have to be met for people to be motivated to learn:

- People’s curiosities and interests should be stimulated and sustained (**A**ttention).
- Before people can be motivated to learn, they will have to believe that the instruction is related to important personal goals or motives, and feel connected to the setting (**R**elevance).
- Even if people believe the content is relevant and they are curious to learn it, they still might not be appropriately motivated due to too little or too much confidence, or expectancy for success. They could have well-established fears of the topic, skill, or they can be in a situation that prevents them from learning effectively. Or, at the other extreme, they might believe incorrectly that they already know it and overlook important details in the learning activities (**C**onfidence).

According to the model, success in achieving the first three motivational goals results in people being motivated

to learn. In order to have a continuing desire to learn, they must have feelings of Satisfaction (the fourth construct of motivation) with the process or results of the learning experience. In our research, we focused on the three goals that should be met to be motivated to learn, thus excluding the component of satisfaction with the process or results.

STUDIES TO INVESTIGATE THE EFFECTS OF MOTIVATIONAL ELEMENTS IN USER INSTRUCTIONS

Four studies were conducted to test our hypothesis that including motivational information in user instructions has positive effects on the users who are working with the device. The motivational elements that we included focused on users’ attention and/or on their feelings about the relevance of the tasks to perform and/or on their level of confidence to be able to perform the tasks. Effects of motivational elements on the effectiveness and efficiency of task performance were measured, and effects on satisfaction with the device and the instructions. Effectiveness, efficiency and satisfaction are components of usability, as defined in the ISO standard [14]. Apart from the effects on usability, effects on the users’ level of motivation were investigated. Motivation was measured by asking users to rate their level of motivation on a scale and by investigating their persistence in trying to complete a task. Did they give up when setbacks were met, or did they continue to try to complete the task? Thirdly, we measured effects of motivational elements on confidence-related measures, such as people’s self-efficacy scores, which are defined as “people’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances”, p. 391 [15].

I. Study 1

In our first, exploratory study, forty students volunteered to perform a number of tasks with a telephone. Half of the students were given accompanying instructions without motivational elements. The other half were given instructions with motivational elements that served different goals related to motivation. No distinction was made according to the goals formulated in the ARCS model. We included different types of motivational elements such as examples, anecdotes, and metaphors. Furthermore, we used everyday language as much as possible, and we created a tutor role by adding meta-comments to the text (e.g., “I will accompany you as well as possible in getting to know the telephone”). The last type of element that was included was a so-called personal story; a story of a fictitious user who describes his or her positive experiences while using the device. These stories may cause users to persuade themselves that if others are able to perform the task, they too have the capabilities to do so.

Several measures were used to test the collective effects of motivational elements on participants' effectiveness and efficiency of task performance, satisfaction with the text and the device, and self-efficacy. The results showed that motivational elements had little effect on the participants' mean number of correctly performed tasks (effectiveness of task performance): Of the 12 tasks, participants who used the version with motivational elements produced significantly more correct outcomes for only one specific task. Motivational elements had no effect on participants' efficiency of task performance and their satisfaction with the telephone. Due to a ceiling effect, no effects of motivational elements on self-efficacy were found. All participants scored very high on the self-efficacy questions. But for the most part, motivational elements did lead to participants' higher satisfaction with the instructions, both before and after their task performance.

From the results of this study, it can be concluded that adding a number of different types of motivational elements has limited, but positive effects on the users. See [16] for an elaborate description of this study.

II. Study 2

From this study on, participants in our research were seniors, aged between 60 and 70 years. We decided to focus on senior users because they often have difficulties using technological devices and the accompanying user instructions. It is known that seniors are able to acquire the skills needed to use new technologies and that they are eager to learn, but their training times are longer and they may require more practice and assistance during training [17, 18]. So, seniors may benefit more from motivational elements than other, more technologically savvy user groups.

In this study, we investigated the effects of different types of motivational elements, based on the ARCS model. Four different versions of user instructions were constructed: one version with various elements that attracted Attention (colors, pictograms), a second version with various elements aimed at increasing the feeling that the instructions were relevant for this target group (e.g. anecdotes about how the telephone could be used in real-life situations), a third version with elements aimed at increasing confidence (e.g. explanations that no prior knowledge was needed), and a fourth version without motivational elements, that served as a control version.

Seniors were asked to perform a number of tasks with the telephone, with the help of one of the versions of the user instructions. We measured the effectiveness and efficiency of task performance, together with seniors' satisfaction with the instructions and the telephone. Motivation (persistence and self-reported level of motivation) and confidence were also measured. Seniors who used instructions with motivational elements focusing on relevance and confidence performed more

tasks correctly than the users of the instructions without motivational elements. Moreover, seniors who used the instructions with confidence-enhancing elements were more persistent than those who used instructions without motivational elements. They tried longer to perform the tasks correctly, instead of giving up. No other differences were found between the four groups of users.

It can be concluded that motivational elements have positive effects on seniors' task performance and persistence. See [19] for an elaborate description of this study.

III. Study 3

The last two studies focused on confidence-enhancing elements because these elements showed the most prominent effects in our second study. Moreover, confidence, or more precisely self-efficacy, is an important concept in relation to learning and performing tasks [20].

We investigated two specific elements: control steps and personal stories. Control steps are final steps of a procedure that describe how the target group can verify if they have performed the procedure correctly. Personal stories consist of a text combined with a picture of a fictitious user who explains to the target group that the instructions were not too complicated, and that she managed to perform the procedures correctly. We chose these two elements because they differ from each other significantly. Control steps can easily be incorporated in instructions. Personal stories, on the other hand, are eye-catching additions to instructive texts that may not be appreciated by everyone.

The goal of our third study was to provide insight in seniors' attitudes towards including these motivational elements in mobile phone user instructions. Twenty participants were asked to comment on two selected pages of user instructions. Control steps and personal stories were presented on those pages, together with procedural information. The results show that seniors consider control steps as a natural part of the instructions. Almost all participants said that they would like to see these elements included in user instructions. As expected, personal stories were not considered as a natural part of instructions, and not all participants were in favor of including those stories in instructions. However, the use of such stories was encouraged by 13 out of 20 participants. See [21] for an elaborate description of this study.

IV. Study 4

The goal of our last study was to measure the effects of the two confidence-enhancing elements on senior users' effectiveness and efficiency of task performance, on their satisfaction with the telephone and with the instructions, and on their motivation and self-efficacy scores. Fifty-nine seniors participated in this study. They were asked to

perform tasks with the telephone, using one of three versions of the instructions (with control steps, with personal stories, or a control version without motivational elements). They were also asked to answer some questions about motivation and confidence and to rate their self-efficacy level. The results showed a positive effect on task performance. Participants using either motivational version of the instructions succeeded more often at a specifically challenging task than participants using the version without motivational elements. A positive effect of personal stories on confidence was also found. The two motivational elements did not have effects on the other measures. See [22] for an elaborate description of this study.

WHAT IS KNOWN ABOUT MOTIVATIONAL ELEMENTS?

The goal of our studies was to provide insight in the possible benefits of motivational information in instructions. Looking at the results of the studies, this is what is known about the effects of motivational elements in user instructions:

- Motivational elements are appreciated by users. This is shown in the first study, but more clearly in the third study. The participants in the third study encouraged the use of control steps, and a majority of these participants were in favor of including personal stories, which are less common and stand out more.
- Motivational elements aimed at enhancing relevance and confidence sometimes result in more effective task performance. The results of the second study showed positive effects of relevance-enhancing elements on task performance, but this result was not replicated in the fourth study. Both the second and the fourth study showed positive effects of confidence-enhancing elements on task performance.
- Motivational elements aimed at enhancing confidence sometimes result in more persistence, particularly when tasks are challenging. The second and the fourth study showed comparable effects of confidence-enhancing elements on persistence. This means that users are more motivated as a result of the motivational information in the instructions. Participants in both studies were also asked to rate their level of motivation. These scores did not result in differences between participants who used instructions with and without motivational elements. Probably, it is quite difficult to rate one's own motivation.
- Motivational elements do not seem to have clear effects on the users' confidence level. It was hypothesized that motivational elements would improve participants' self-efficacy scores, but

the results of the studies do not show any clear differences as a result of the presence of motivational elements.

WHAT IS NOT YET KNOWN ABOUT MOTIVATIONAL ELEMENTS?

The results of our studies are promising. However, it is impossible to predict to what extent these results are generalizable to other user groups, other types of instructions or other devices. Secondly, we do not yet know how to design motivational elements in order to be optimally beneficial.

I. Generalizability of the study results

Three out of the four studies were focused on the effects of motivational elements on a specific target group: seniors. It is not known yet if motivational elements will have comparable effects on other, more technologically-savvy audiences. Even these people will sometimes have to deal with the effects of ever-developing technology in products. And even they might need some reassurance in the form of confidence-enhancing elements, or from motivational elements in general.

The four studies were conducted with relatively simple telephones. Effects of motivational elements in user instructions may be larger in situations that require more effort and thus more motivation from the users. Not only user instructions for more complex devices can be taken into account, but also user instructions in other contexts. It may be interesting to study instructions accompanying administrative documents or forms, or instructions requiring a routine change, such as safety instructions. These instructions are primarily preventive in nature, aimed at avoiding severe risks. Motivational elements might be of special interest for these types of documents.

II. Design of motivational elements

Based on the ARCS model, the motivational elements in the second, third and fourth study were aimed at enhancing attention, relevance, or confidence. This classification is somewhat artificial, since the categories are in fact majorly interrelated. Motivational elements aimed at one category are likely to fall into one or more of the other categories as well. For instance, personal stories were aimed at increasing users' confidence, but inherently touched upon attention and relevance aspects as well. It is not known yet what the benefits and drawbacks are of designing elements that are either focused on one specific goal or on stimulating motivation in general.

Furthermore, it is not clear yet what the optimal amount of motivational information in instructions is. In our second study, we incorporated more motivational elements and more types of elements in the instructions

than in our last study. Both studies showed some positive effects on the users. More research into the amount of motivational information is recommended.

RECOMMENDATIONS FOR PRACTICE

Definitely, more research is needed to investigate the effects of motivational elements in user instructions. The results of the studies showed some positive effects, but these effects were not consistent across studies. However, our studies do not show any negative effects of motivational elements, apart from some critical remarks about personal stories by some participants in the third study. So, especially for user groups who are not confident about their own abilities to be able to use a device with the accompanying instructions, motivational elements seem to be beneficial.

We would advise to use motivational elements that can be incorporated into the procedures naturally, such as control steps. We would advise to clearly distinguish motivational elements like personal stories and other larger elements, from the other informational parts in the instructions. People who are technologically savvy may probably benefit less from motivational elements. But when these elements are visually isolated from the procedural parts of user instructions, users can skip them when they do not wish to read them. Moreover, distinguishing motivational elements from the necessary procedural parts allows technical communicators to rather easily incorporate motivation in existing user instructions.

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