

INCORRECT INFORMATION, MISUNDERSTANDINGS AND APPARENT AGREEMENTS – ON THE RELEVANCE OF LANGUAGE AND COMMUNICATION FOR ERGONOMICS AND HUMAN FACTORS

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Abstract In this paper, I briefly discuss and illustrate how language and communication is relevant for ergonomics and human factors. I do this by discussing three examples of how language and communication can affect the coordination, collaboration and cooperation which underlie many work processes. The three examples concern (i) correct and relevant information, (ii) understanding, and (iii) agreement.

Keywords: Communication; ergonomics; human factors; misinformation; understanding; misunderstanding; agreement; workplace safety; multicultural communication; information accuracy.

1. LANGUAGE AND COMMUNICATION

Already in many of the definitions of Human Factors (or Ergonomics), we can see that language and communication are relevant for human factors and ergonomics. Here is an example of a definition, where all the words in italics in the definition potentially point to language and communication. The definition is a synthesized version of definitions from the International Ergonomics Association [1], and the Human Factors and Ergonomics Society (HFES) [2].

2. DEFINITION

Human Factors (or Ergonomics) is the scientific study of how people *interact* with systems, focusing on human capabilities, limitations, and behaviors to *design* user-friendly, safe, and efficient tools, tasks, environments, and organizations, ultimately optimizing well-being and performance by considering *physical, cognitive, and social aspects*. It's about making systems work *for* people, not expecting people to adapt perfectly to poorly designed systems, by analyzing factors like workload, *distractions, communication, fatigue, and equipment design*.

Language and Communication are very relevant to both cognitive and social aspects and often also through these to physical aspects. If we, in human factors work and research, are concerned with “making systems work *for* people, not expecting people to adapt perfectly to poorly designed systems and analyze factors like workload, distractions, communication, fatigue, and equipment design”, we will find that work and working life is full of communication. I have chosen to illustrate this with three examples of features in language and communication which can affect the coordination,

collaboration and cooperation which underlie many work processes and to which perhaps more research in ergonomics and human factors should be devoted. The three examples concern:

- Correct and relevant information
- Understanding
- Agreement

3. CORRECT AND RELEVANT INFORMATION

My first example pertains to misinformation, disinformation and other forms of fake news as well as malinformation and sycophantic information which are serious problems and can cause problems on most levels in working life, from management and production to sales, economy and health. See also [3]. Skewed and incorrect information have always been a problem but it has taken on new urgency with the advent of digital media where tasks are increasingly carried out by using LLM text based AI which is replacing earlier direct human work. The problem is that this kind of AI sometimes “hallucinates” and displays “sycophancy” to please the user. See [4] for a overview of different opinions on the problem.

An important research task now has therefore become the problem of how to discover and correct misinformation without malicious intent and disinformation and malinformation with malicious intent or sycophantic information which often provides “white lies” in order to please. As Ronzani [5] points out, the problems are not just limited to western industrialized world but are a global phenomenon. They are troublesome and besides attention from many other disciplines, also need attention from the ergonomics and human factors research community.

4. UNDERSTANDING

My second example concerns communication in a way that is understood. This is another very basic feature of working life, for example, in giving instructions or negotiating. Especially in multicultural, multilingual, multi sectorial or multidisciplinary situations, understanding can be a problem. People frequently do not understand each other or only partly understand each other. Sometimes they think they understand but actually don't. They have misunderstood each other. Complete or partial lack of understanding as well as misunderstanding can lead to and do lead to many problems in the work place, from conflicts because of misunderstandings to accidents because of lack of understanding of safety instructions or other instructions. See [6].

So a topic of interest for human factors could be: How do we discover, avoid and remedy lack of understanding and misunderstanding? How do we discover and correct lack of understanding and misunderstanding. A first step in pursuing the topic could be to agree on what we mean by “understanding”, “lack of understanding” and “misunderstanding”. Here are some suggestions for definitions of the three concepts, see also [7, 8, 9]:

Understanding = perceived information is related to already stored information (background information) in a meaningful way with varying degrees of awareness.

If the perceived information and the background information are true, the understanding is correct and valid. This means there can be understanding of information that is not true, for example in

understanding the made-up story in a novel. So, if we want correct and valid understanding, it can be affected by problems concerning whether what we want to understand is correct and relevant information. In addition, it is important to note that understanding is not the same thing as acceptance. People may understand something without accepting it and they may accept something without understanding it. This can also lead to problems in the workplace, for example concerning registration of complaints or understanding of safety instructions.

Lack of understanding = perceived information cannot be related to already stored information (background information) in a meaningful way for one or more of the following reasons:

- (i) Lack of perception
- (ii) Lack of relation
- (iii) Lack of background information

The definition gives several causes or reasons for lack of understanding which can all occur in working life. Lack of perception can occur because of auditive or visual disturbances but can also occur because of lack of competence in a language. Difficulties in finding a relation to stored memory information could occur because of lacking cultural or professional competence or because there is no clear relation. Background information can be insufficient. This can also occur because of lacking cultural or professional competence. Several of the causes can be present at the same time.

Misunderstanding = perceived information can be related to already stored information (background information) in a meaningful way, but the perception may have been a misperception, the wrong kind of link to background information may have been made or the wrong kind of background information may have been selected, resulting in a feeling of understanding that does not correspond to the intended message. If in Germany, somebody wishes you good luck by saying: “Hals und Beinbruch” and your German cultural background is lacking, you might partly understand but misunderstand the purpose of the wish. Again, several of the causes can be present simultaneously.

As already noted, understanding is not acceptance and lack of understanding or misunderstanding is not necessarily non-acceptance. This explains that expression like “lack of understanding” and “misunderstanding” often can be used for diplomatic purposes to hide lack of acceptance and conflict. So, a statement of lack of understanding or misunderstanding is perhaps not always negative but can sometimes prevent more serious problems.

In view of the importance of understanding, another important research task in ergonomics and human factors, is how to ensure better understanding and how to prevent (real) lack of understanding and misunderstanding in working life. I suggest that a possible starting point could be in the definitions given above. To ensure understanding we have to ensure that correct perception is possible, the people have the required professional and cultural background information and the competence to link in an appropriate way to this.

5. AGREEMENT

The third example, I want to discuss are agreements. Agreements are another important feature of working life. We coordinate collaboration and cooperation by agreeing with others and by entering into agreements and commitments with them. One might claim that agreements are part of the cement of social life, especially working life. I now want to briefly mention and discuss some problems related to agreement and some types of disagreement.

It may sometimes happen that we think that we agree or disagree with other persons about issues we are debating or things we are planning to do, but it turns out that the agreement or disagreement is only apparent.

When it comes to apparent or seeming agreements, we realize that we have interpreted what was said or written and done in a different way than our counterpart has. This might be because the expressions used actually have several meanings or because what was said or written has a common superficial meaning but different implications for the agreeing persons. The underlying causes are not always so easy to discover.

A related but different case can involve disagreements. We think we disagree with other persons, but it turns out that the disagreement is only seeming or apparent. Here the reason might be that although we are using different terms or other linguistic expressions, what we are saying actually refers to the same underlying concepts. It might also be that even though we on the surface have different opinions, the implications of what we are saying are similar and we are really, on an implied, perhaps deeper, level suggesting the same thing.

Since both apparent agreements and apparent disagreements can be problems in working life, this motivates the question of how we can discover and correct them. The problems can become especially difficult to manage in a multilingual and multicultural environment. Both of the goals of discovery and correction can be turned into research tasks.

6. CONCLUSION

The main conclusion is that it seems that there is research work to do on language and communication in the field of ergonomics and human factors. In discussing (i) correct and relevant information, (ii) understanding and (iii) agreement, I have given three examples of areas where such work could be done. But there are many others, not least in multinational and multisectorial work. In very many cases the research should be done by interdisciplinary teams.

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