

Chatbot as a support tool for accessing information on PPE – pilot

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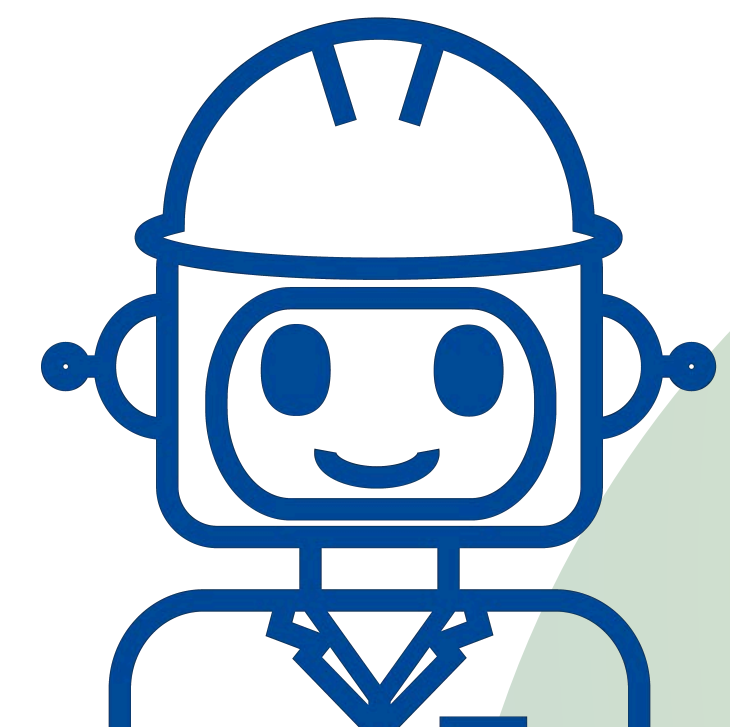
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Preliminary version of the chatbot

Currently, we are working on creating a chatbot that would allow easy access to the information on Personal Protective Equipment (PPE).

Key features of the preliminary version of our chatbot:

- it focuses on clothing that protects against chemicals and infective agents,
- it is available only in Polish language,
- its main target users are manufacturers and users of PPE,
- it was designed with prioritizing user's needs, goals and feedback,
- all of its answers are verified by experts.



Our motivation

There are few factors that led to the start of working on a chatbot:



the lack of quick access to reliable information on PPE



inconsistency and obsolescence in information found on the Internet



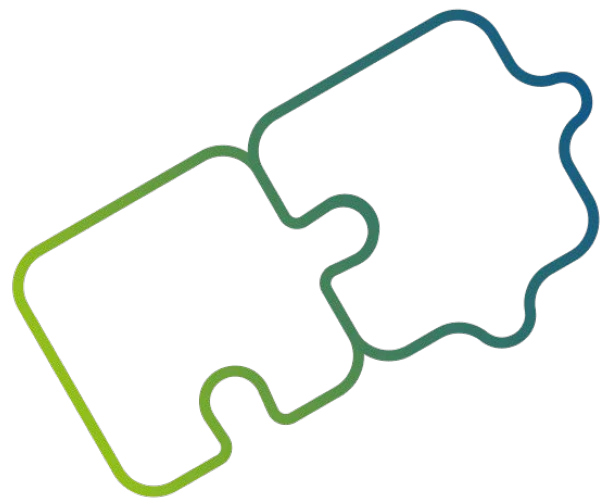
difficulty in finding information verified by experts

How does it work?

Based on surveys with PPE users and manufacturers, a database containing questions and answers about PPE verified by experts was developed.



Developed chatbot is a simple tool working by matching user's prompt with predefined sets of questions and answers from the database.



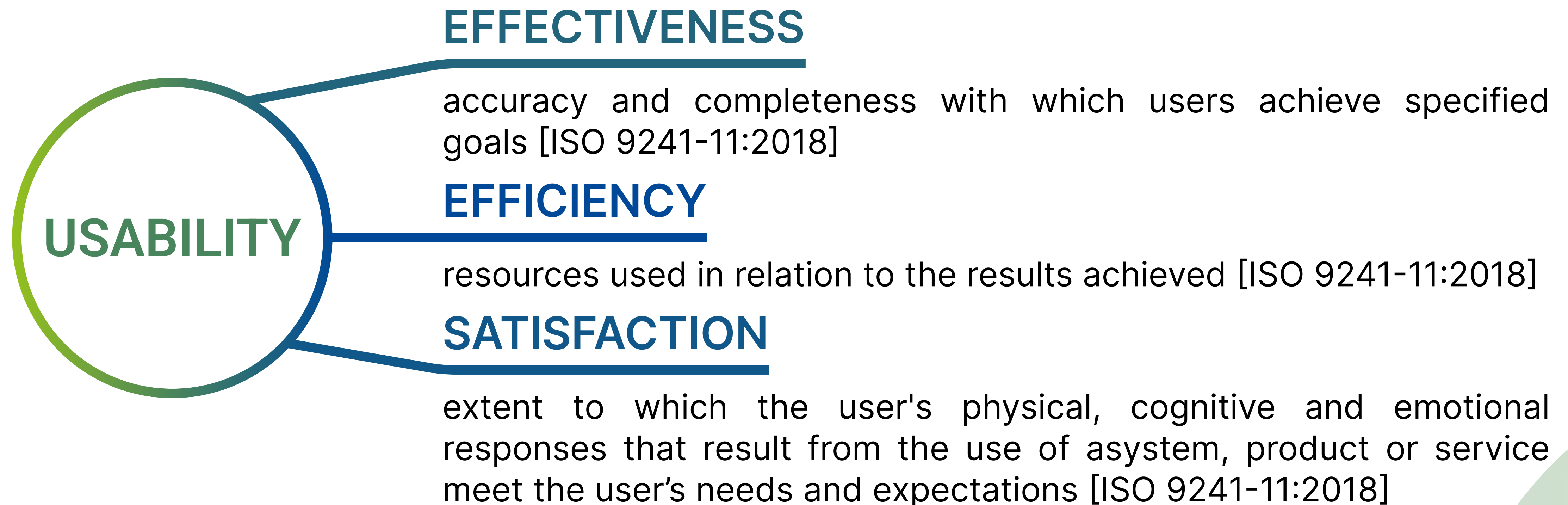
The chatbot has two paths of operation:

- **the main path** - when the question is typed in the text field,
- **the script path** - when user instead of typing in the question, looks for the information by choosing certain blocks



What is usability?

Usability is an extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use [ISO 9241-11:2018].



How are the usability metrics measured?

Efficiency



- task time

Effectiveness



- success rate
- errors per task

Satisfaction



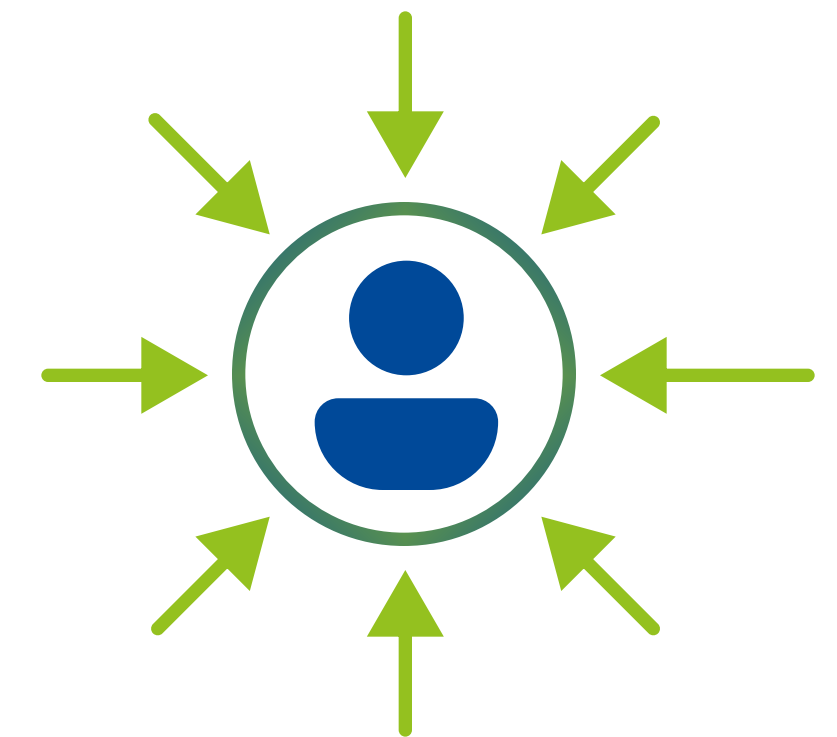
- Standardized questionnaires e.g.
- System Usability Scale (SUS)
 - Questionnaire for User Interaction Satisfaction (QUIS)

Why is usability testing important?

Usability testing ensures products are effective, easy to use, and accessible. It increases user satisfaction, minimizes health and safety risks, strengthens brand image, and increases the chances of project success.

In the context of a chatbot:

- makes the chatbot easier to understand and use,
- enhances overall user experience,
- reduces stress and discomfort for users.



Methodology

Goal:

The goal of conducting usability test of our chatbot is to ensure it is easy to use, meets user needs, and provides effective interaction.

Process:

1. Defining objectives and tasks that users will perform.
2. Preparing chatbot's prototype.
3. Conducting tests, during which measures such as task completion time, clicks, success rate, SUS Score are collected.
4. Analyzing the collected data to identify problems and areas for enhancement.

Prepared tasks

The prepared tasks covered all of the chatbot functionalities:

Task 1 (Script path)

Finding the answer to the question about the performance parameters for type 4 chemical clothing using the scenario (block) path.

Task 2 (Script path - navigation between categories)

Finding the answer to the question of what seams are best to use in clothing protecting against liquid chemicals using the scenario path.

Task 3 (Main path)

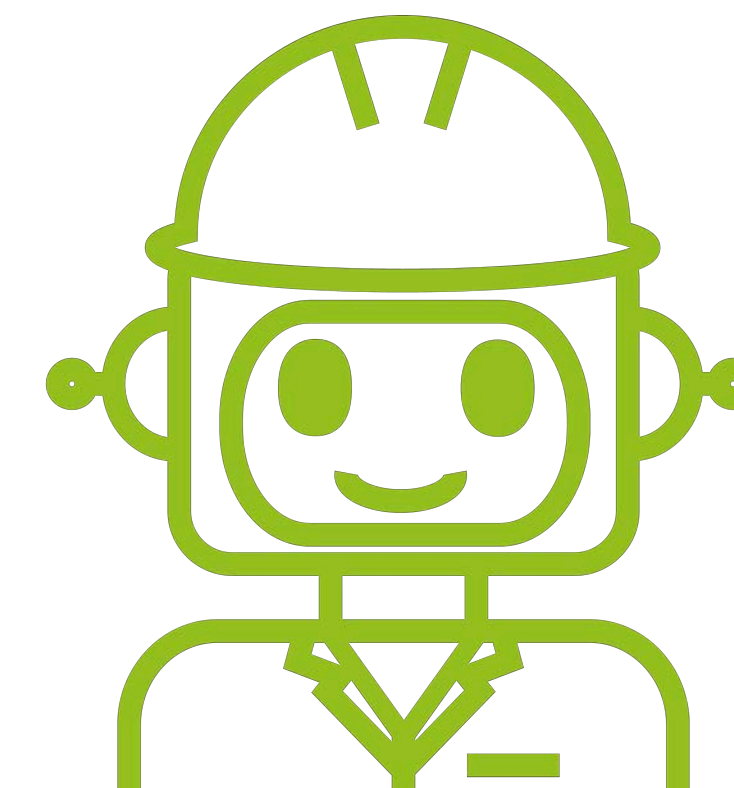
Finding the answer to the question what standards type 3-B clothing must meet using the main path.

Task 4 (Main path-unprecised question)

Finding the answer to the question of what should be on the label of clothing protecting against infectious agents using the main path.

Task 5 (Path of user's choice)

Finding the answer to the question of what should be included in the product's user manual using any path you choose



Tools used

To conduct the usability tests, we used the following tools:

Python

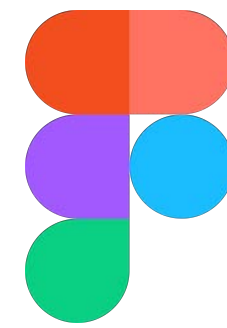
programming language used to create graphs and data analysis



Figma

app used to create a chatbot prototype

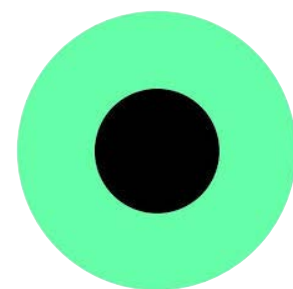
figma.com



Interankiety

platform used to collect responses from the SUS questionnaire

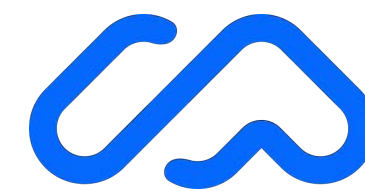
interankiety.pl



Maze

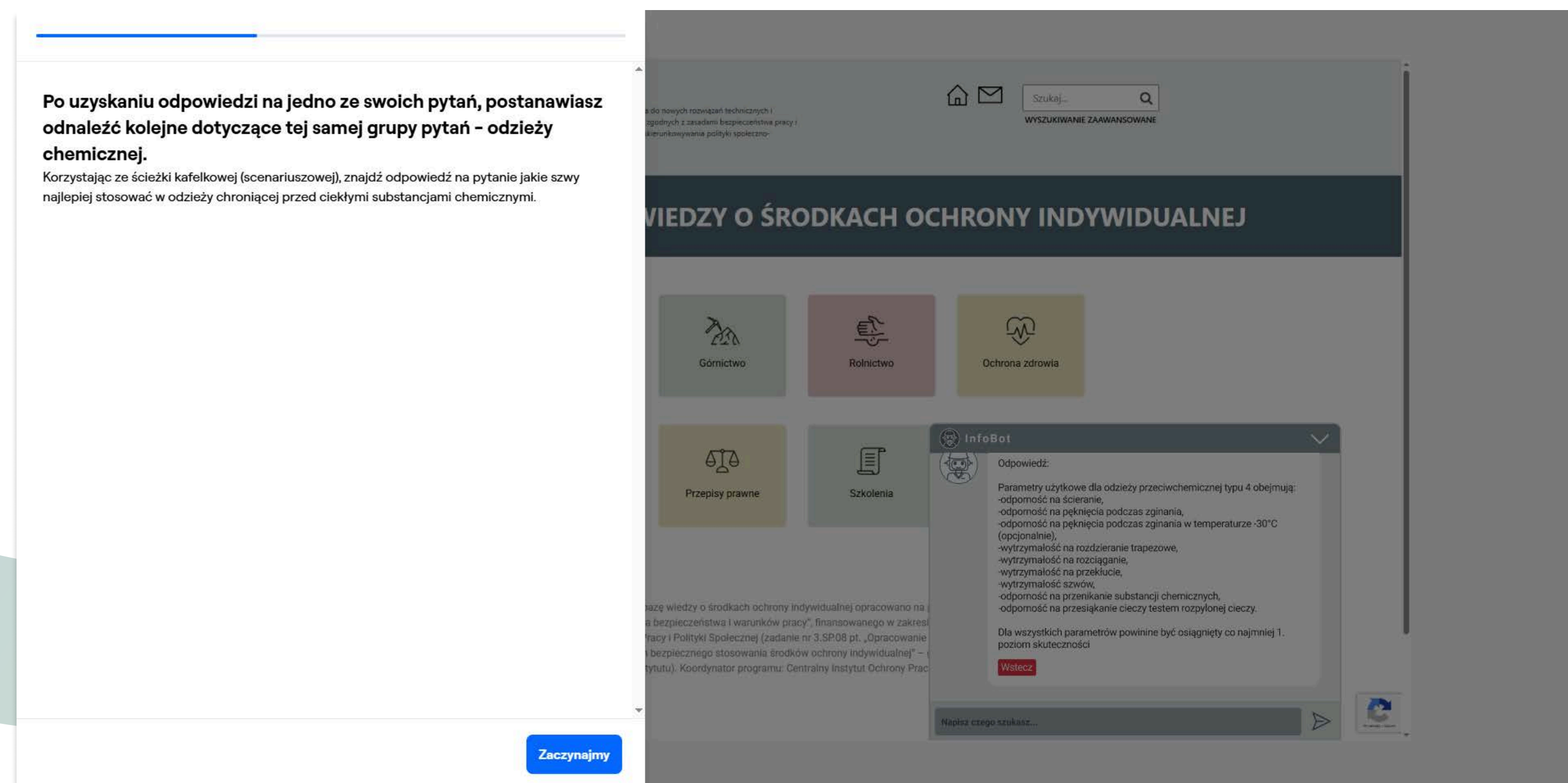
platform used to conduct tests and collect data

maze.co



Testing process

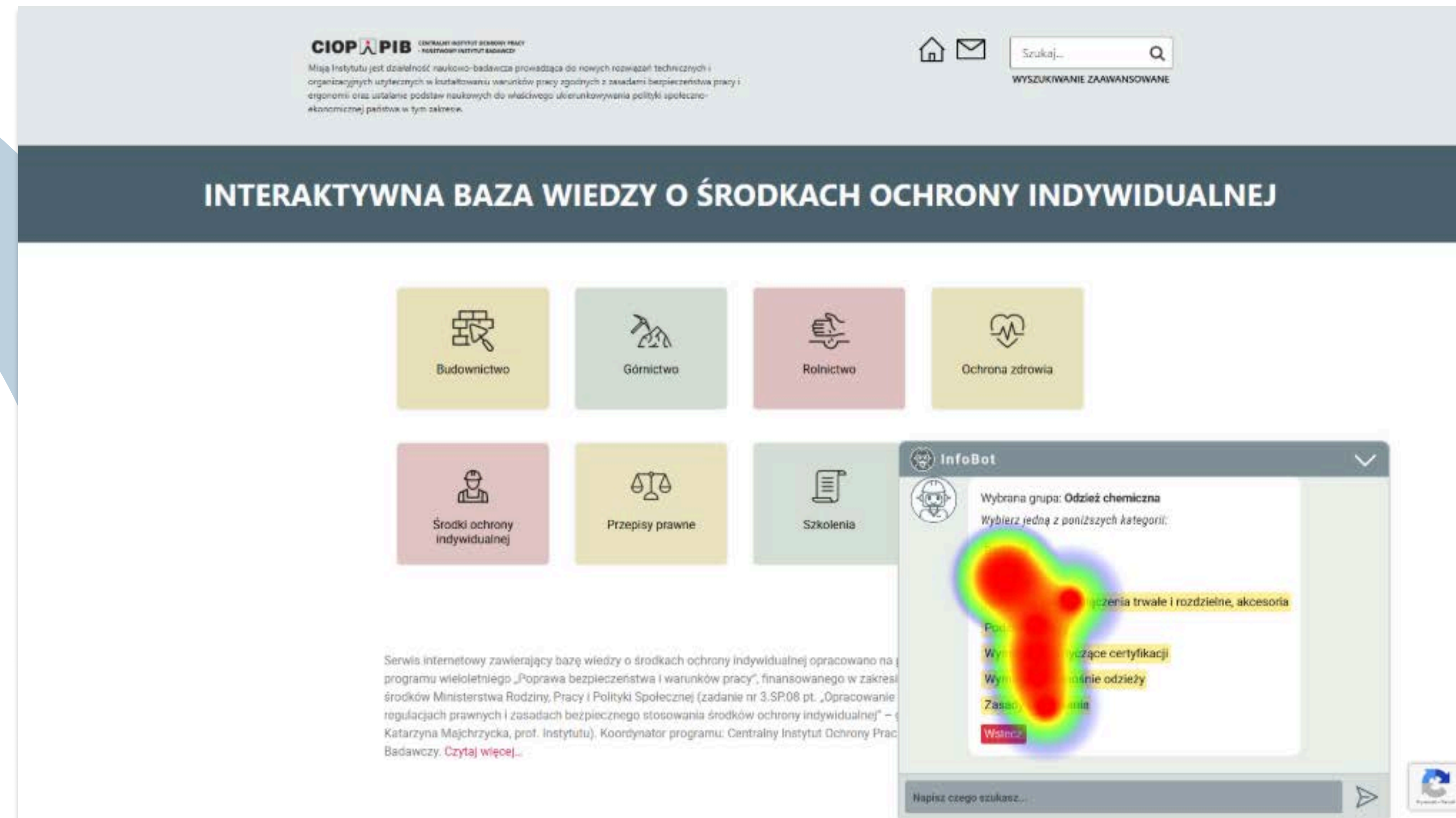
The tests were carried out remotely, using the *Maze* platform. A link to test was sent to selected manufacturers and users of PPE. After completing the tasks, each user completed the SUS questionnaire consisting of 10 statements.



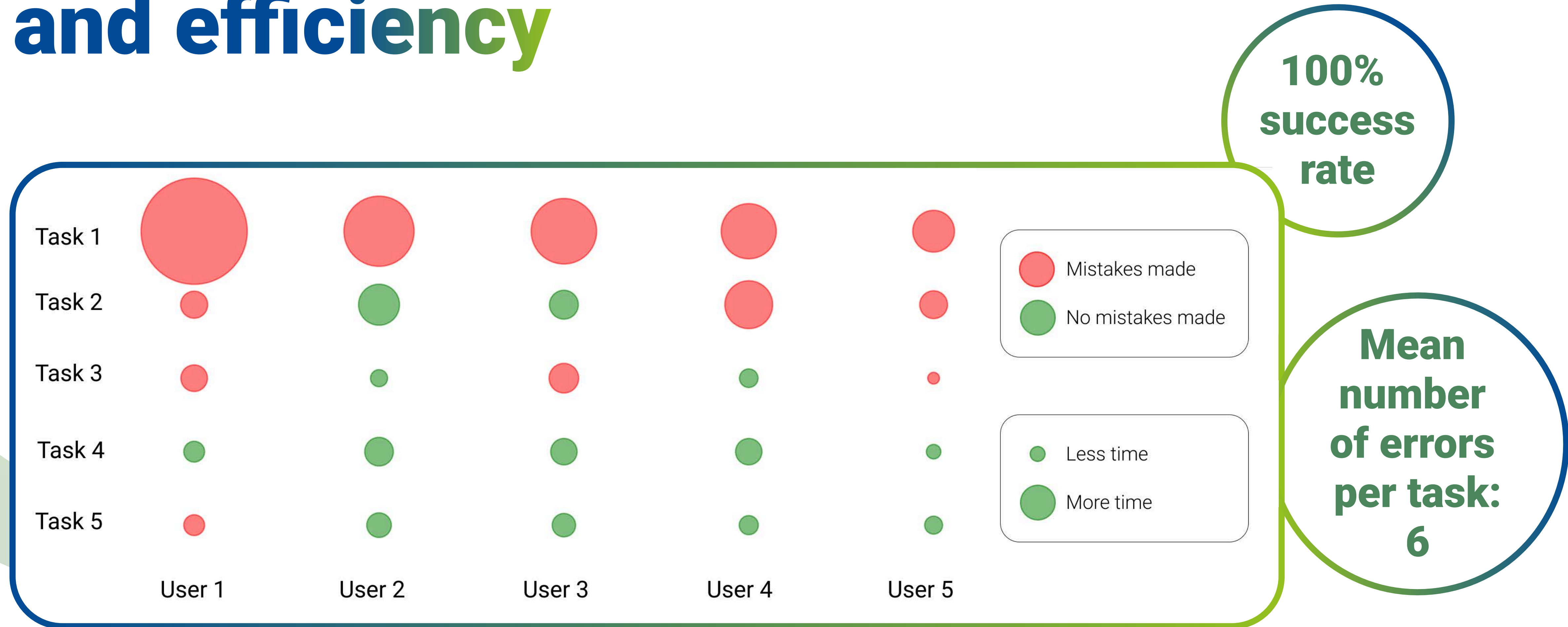
When users performed tasks, the time taken to complete the tasks was measured, and individual clicks were recorded, based on which heat maps were created.

Results

An example of a heat map showing clicks when searching for the right category while looking for answer to a given question.

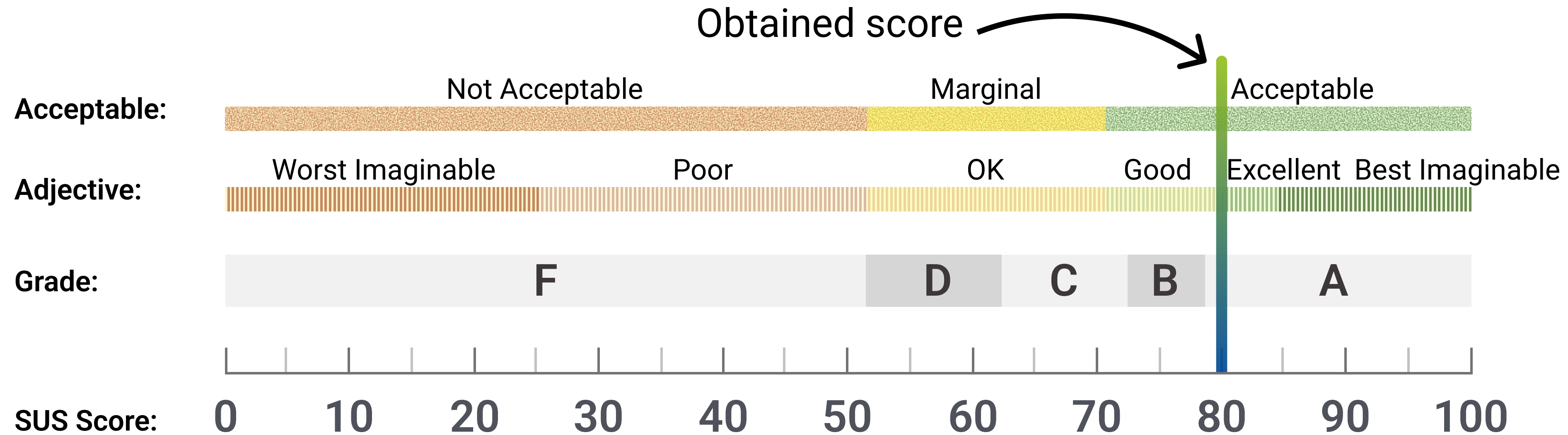


Results: effectiveness and efficiency



Results: satisfaction

The SUS Score obtained from SUS Questionnaire is a measure presenting user's perception of the usability of our chatbot.



SUS Score 80

Bibliography:

1. Bangor, A., Kortum, P. T., & Miller, J. T. (2008). An Empirical Evaluation of the System Usability Scale. *International Journal of Human-Computer Interaction*, 24(6), 574-594. <https://doi.org/10.1080/10447310802205776>
2. Bangor, A., Kortum, P. T., & Miller, J. T. (2009). Determining What Individual SUS Scores Mean: Adding an Adjective Rating Scale. *Journal of Usability Studies*, 4(3), 114-123.

Conclusion

Identified problems:

- incorrect sorting of questions into individual categories,
- a large number of questions increases the time it takes to search for a question,
- the main path turned out to be easier and faster.



Areas for improvement based on the tests results:

- regrouping the questions,
- adding additional subcategories.

Areas for improvement unrelated to tests:

- adding different language option,
- adding info on other PPE to database.

The chatbot is still in an iterative development stage. After introducing these improvements, the data from larger group of users will be gathered.

Thank you for your attention!

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This task was completed on the basis of results of research carried out within the scope of the 6th stage of the National Programme “Governmental Programme for Improvement of Safety and Working Conditions”, funded by state services of the Ministry of Family, Labour and Social Policy.

Task no.: 5.ZS.05

Entitled: Development of an interactive knowledge database on personal protective equipment (PPE) through the use of a text-based conversational interface as a tool to support business entities in quick problems solving concerning production technology and the principles of safe use of PPE

The Central Institute for Labour Protection – National Research Institute is the Programme’s main co-ordinator.