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Assessing the Memorability and usability of the Gutenberg Editor Interface in the Drupal CMS

Ocena zapamiętywalności i użyteczności interfejsu edytora Gutenberg w CMS Drupal

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Abstract
The study was conducted with the participation of 8 online editors with no previous experience with the Drupal system. The subjects performed a series of tasks in 3 sessions spread over time. The time of completion of each task was measured – it was noted that it decreased in subsequent sessions, which suggests an increase in interface memorability and greater efficiency of the editor. The results of the System Usability Scale survey showed a positive assessment of the editor, and interviews revealed the intuitiveness of many functions, and the challenges related to the level of complexity of some operations.

Keywords: memorability; usability; Gutenberg editor; Drupal CMS

Streszczenie
W artykule przedstawiono wyniki badania zapamiętywalności interfejsu edytora Gutenberg w CMS Drupal. Badanie przeprowadzono z udziałem 8 redaktorów online niemających wcześniejszego doświadczenia z systemem Drupal. Badani wykonywali serie zadań w 3 sesjach rozłożonych w czasie. Czas wykonania każdego zadania był mierzony – odnotowano, że skracał się w kolejnych sesjach, co sugeruje wzrost zapamiętywalności interfejsu oraz większą efektywność edytora. Wyniki ankiety System Usability Scale wykazały pozytywną ocenę edytora, a wywiady ujawniły intuicyjność wielu funkcji oraz wyzwania związane z poziomem skomplikowania niektórych operacji.

Słowa kluczowe: zapamiętywalność; użyteczność; edytor Gutenberg; CMS Drupal

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1. Introduction

In the era of dynamic development of Internet technologies and the growing importance of online content, WYSIWYG (What You See Is What You Get) editors play a key role in content management systems (CMS). They allow editors to create and edit content without the need for HTML knowledge, which increases the accessibility of working with content for a wide range of users.

One of the main challenges faced by the designers of these tools is to ensure high usability and intuitiveness of the interface. Memorability – defined as the ability of users to recall how to perform basic tasks after a long break – is a key aspect of this usability, although rarely discussed in the literature [1]. Interfaces with a high level of memorability allow users to work efficiently without the need to frequently recall individual functions and commands.

This study focuses on analysing the memorability of the Gutenberg editor interface in the Drupal CMS. To achieve this goal, a memorability experiment was conducted, focusing on user performance in completing tasks within the editor across multiple sessions. The overall user experience with the tool was also assessed through qualitative and quantitative methods, including the System Usability Scale (SUS) survey [2] and post-experiment interviews, to gather subjective feedback on intuitiveness and ease of use.

2. Literature Review

2.1. Memorability of User Interfaces

Memorability is one of the key aspects of usability, defined by Nielsen [1] as the ability of the user to effectively return to using the interface after a break. In the research literature, the issue of memorization has been taken up, e.g., by Miłosz et al. [3], who conducted a study comparing experiments with memorization with expert methods in assessing the usability of websites. For this purpose, they used the "Memorability Level" (ML) metric. The results of this research showed that memorization experiments can be an effective tool for assessing the intuitiveness and ease of navigation in interfaces.

Pytka and Miłosz [4] analyzed the impact of interface quality on the memorability of websites on the example of online stores. The study used Nielsen heuristics and memory experiments to measure ML for different interfaces. The results showed that an intuitive, clear and well-organized interface has a positive effect on memorability, reducing the time needed for users to use the system effectively

A new approach to the analysis of memorability was introduced by Bylinskii et al. [5], defining it as the ability of an image to be remembered by observers. Their research showed that memorability is an inherent feature of visual information, independent of individual differences between users, making it measurable and predictable using computer algorithms. The use of these algorithms in user interface design can support the creation of more intuitive and effective systems that support users in their tasks, while increasing the user experience with the interface.

2.2. Usability and Memorability of CMS Interfaces

In a comparison conducted by Iqbal et al. [6] of three popular CMS systems: WordPress, Drupal, and Joomla, it was shown that the former particularly stands out in terms of ease of use and overall usability assessment. According to the researchers, WordPress's advantage stems from its intuitive interface, which directly correlates with positive user experiences.

Additionally, as shown by research conducted by Abdullah et al. [7] regarding e-commerce CMS systems, interface memorability, alongside accuracy and efficiency, constitutes very important aspects for evaluating the usability of web applications. It was demonstrated that the ease of re-learning the interface strongly influences the overall quality of the UX parameter and the general willingness of the user to continue using the system.

Similar conclusions are presented by Wijaszka and Dzieńkowski [8], who, in their analysis of the usability of e-commerce systems such as Prestashop, Magento, and Joomla, showed that "interface memorability" is a very important factor affecting the overall usability assessment. Their experiments with novice users showed that the Prestashop interface was characterized by higher memorability, which translated into better understanding of the system's operation.

2.3. Usability and Design of WYSIWYG Editors

WYSIWYG editors like TinyMCE or Gutenberg are commonly used in web content editing. Zhan [9] emphasizes that functionality analysis using Selenium WebDriver can improve the intuitiveness of these tools. Boeve et al. [10] introduced the concept of TAXATA (Things Are Exactly As They Appear), which indicates that direct editing of objects increases intuitiveness and makes it easier to remember operations.

Minin et al. [11] proposed a WYSIWYG editor to support the creation of accessible web content by implementing WCAG guidelines. The authors emphasize that providing warnings and guidance for non-technical users can facilitate the understanding and application of accessibility principles, while increasing the intuitiveness and memorability of the interface. Initial usability tests confirmed that this approach allows users to better align content with accessibility standards.

In the context of dynamic web design, Wolber et al. [12] emphasize that intuitive editing tools, such as those offered by WYSIWYG editors, allow you to visualize and edit content instantly. This ensures a positive user experience and reduces errors, which has a positive effect on the memorability of the interface.

Wiberg and Bergqvist [13] analyze the mutual impact of automation and interaction in design, highlighting the necessity of them in order to create engaging user experiences. The authors present a two-dimensional design space that considers both interaction and automation as key elements in interface design. Excessive automation can limit user engagement and negatively affect the memorability of the interface, while too much interactivity without automation support can lead to user overload. Designers should strive to integrate both to create interfaces that are both intuitive and supportive of user efficiency.

2.4. Literature Review Summary

The memorability of user interfaces is still a relatively unexplored area, especially in the context of WYSIWYG editors. The literature focuses mainly on aspects such as functionality, efficiency and accessibility, while research on memorability is less frequently undertaken. Few papers analyze the relationship between the quality of the interface and its memorability, the topic needs further development. This paper fills this gap by experimentally evaluating the Gutenberg editor interface in the Drupal CMS, with particular emphasis on the intuitiveness and memorability of its functions.

3. Research Goal and Scope

The goal of the research is to assess the memorability of the Gutenberg editor interface in the Drupal CMS among editors who have no previous experience with this system. The study aims to identify factors influencing the intuitiveness and ease of re-using the editor after a break.

The scope of the research includes:

- Conducting a memorability experiment,
- Usability assessment using the SUS (System Usability Scale) survey,
- Interviews with the study participants.

Research hypotheses:

- **Hypothesis 1:** There is a statistically significant difference in the time it takes to perform editing tasks in the Gutenberg editor in the Drupal CMS between subsequent sessions, with task completion times being shorter in subsequent sessions.
- **Hypothesis 2:** The Gutenberg editor in the Drupal CMS is characterized by high usability.
- **Hypothesis 3:** The time required to complete tasks by an expert is significantly lower compared to a novice for tasks specific to the Gutenberg editor in the Drupal CMS, while the difference is less pronounced for typical tasks common to most WYSIWYG editors.
- **Hypothesis 4:** There are opportunities to improve the usability of the Gutenberg editor's interface by addressing identified user difficulties, particularly in

areas related to interface clarity, navigation, and block manipulation.

4. Materials and Methods

4.1. Characteristics of the Research Sample

The research group was composed of individuals who regularly engage in online content editing either as part of their professional responsibilities or extracurricular activities. Specifically, participants were selected from content marketers and web administrators, both of whom frequently use applications that facilitate the direct publication of online content. This group was purposefully chosen to mirror typical users of WYSIWYG editors. The selection criterion ensured that participants had practical experience with content editing on a daily basis, providing a realistic basis for evaluating the editor. The exclusion criterion was prior experience with the Drupal system or the Gutenberg editor to assess the editor's intuitiveness from the perspective of new users. The number of participants was limited to 8 people, according to the recommendations of Nielsen and Landauer [14], who indicate that testing with 5 to 8 users allows for the detection of most usability problems.

4.2. Research Environment

The study was conducted in a controlled environment using a single, specially prepared computer workstation. The CMS Drupal system (version 10) with the Gutenberg editor (version 2.14) was installed on the hardware. Drupal is one of the most flexible and popular open-source solutions, particularly valued for its modular structure, multilingual support, and use in organizations with high requirements, such as government institutions or large enterprises [15]. Gutenberg, originally designed for the WordPress CMS, is a modern block editor, which differs significantly from traditional WYSIWYG editors, allowing for more intuitive content editing [16].

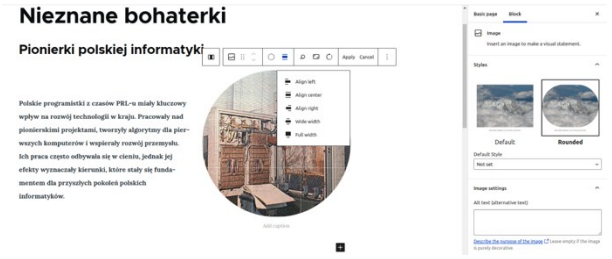

Figure 1: Example screenshot of the Gutenberg editor on Drupal platform.

4.3. Research Procedure

Participants performed tasks on a page with predefined blocks and content, which ensured uniform research conditions. The study took place in 3 sessions separated by a one-week break to enable analysis of the memorability of the editor's functions. After each session, the work environment was reset to its initial state to eliminate differences resulting from previous actions.

During the study, participants performed a series of 10 tasks, which were divided into tasks typical for most WYSIWYG editors and tasks specific to the Gutenberg editor.

Typical tasks for most editors:

1. Centering the page title text – basic text formatting.
2. Changing the selected bulleted list to a numbered list – editing list styles.
3. Linking text to another article in the Drupal system – adding a hyperlink to the content.
4. Adding an image from the gallery and resizing it to full width – inserting and editing images.
5. Saving the changes made.

Gutenberg editor specific tasks:

6. Transforming a Paragraph block into a Quote and changing the text color – manipulating block types and their properties.
7. Swapping the header block with a paragraph – reorganizing the block structure.
8. Removing the block with the page subtitle – block management.
9. Swapping columns in the Columns block – manipulating the column layout.
10. Adding a Spacer block and setting its height to 50 pixels – managing the space between elements.

The above tasks were performed in an order that simulates typical web page content editing, including both simple text formatting and more complex operations. Each task could be performed independently of the others, which allowed for maintaining uniform conditions for each participant. To prevent participants from memorizing the tasks, the subject matter of the website changed between sessions.

4.4. Research Tools

Three main tools were used in the study to collect data: measurement of task completion time, the System Usability Scale (SUS) survey, and interviews with the participants. Each of these tools provided information that allowed for the assessment of user effectiveness, memorability of the Gutenberg editor interface functions, and subjective assessment of its usability.

4.5. Measurement of Task Completion Time

The completion time of each of the 10 tasks was measured using a stopwatch. This measurement served as an objective indicator of user effectiveness and their familiarity with the editor interface. Time results were analyzed in 3 research sessions, which allowed for the identification of changes in user effectiveness between sessions.

4.6. SUS Survey

The subjective assessment of the editor's usability was carried out using the standardized System Usability Scale (SUS) questionnaire [2]. SUS consists of ten statements evaluating various aspects of usability, such as intuitiveness, ease of use, and overall user satisfaction.

Participants rated each statement on a 5-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree."

The following statements were used in the SUS survey:

1. I think that I would like to use this editor frequently.
2. I find the editor unnecessarily complex.
3. I think the editor is easy to use.
4. I think I would need the support of a technical person to be able to fully use this editor.
5. I find the various functions in this editor are well integrated.
6. I think there is too much inconsistency in this editor.
7. I would imagine that most people would learn to use this editor very quickly.
8. I find the editor very cumbersome to use.
9. I felt very confident using the editor.
10. I needed to learn a lot of things before I could get going with this editor.

The SUS survey was conducted after the completion of 3 sessions to assess the final impressions of users after a full cycle of interaction with the editor.

4.7. Interview

After the completion of 3 sessions, an interview was conducted with each participant. The purpose of the interviews was to collect qualitative data on user experiences with the Gutenberg editor. Participants were asked about the intuitiveness of the interface, difficulties encountered while performing tasks, and the overall assessment of the tool.

5. Results Evaluation Criteria

The study employed three categories of criteria for evaluating the results: objective indicators of effectiveness, subjective usability assessment, and qualitative data from interviews.

5.1. User Effectiveness

User effectiveness in working with the Gutenberg editor was assessed based on three indicators:

- **Average task completion time** – analysis of changes in average times in subsequent sessions allows determining the impact of experience on user efficiency. Shortening the task completion time indicates the process of learning the interface.
- **Comparison with expert time** – the task completion times of the participants were compared with the expert time to identify intuitive and problematic tasks. Tasks with times close to the expert were considered easy, and tasks significantly exceeding the expert time were considered difficult to remember and perform.
- **Memorability Level (ML)** – measures the ability of users to learn and remember interface functions, according to the formula proposed by Miłosz et al. [2]

$$ML = \frac{Tf - T\infty}{Tf} \quad (1)$$

where:

Tf – the average (arithmetic mean) execution time of performing tasks for the first time by inexperienced users;

$T\infty$ – the average execution time of performing tasks for n-time by experienced users ($n \rightarrow \infty$).

Higher ML means a better ability of users to remember interface functions, but it does not necessarily indicate its intuitiveness. As the authors note, intuitive interfaces may be characterized by lower ML because users do not need to remember complex sequences of actions. Therefore, the interpretation of ML should be complemented by a comparison with the expert time – low ML with a short task completion time may suggest the intuitiveness of the interface, while low ML combined with a long time indicates usability problems and the need for optimization

5.2. Subjective Usability Assessment (SUS)

The SUS survey results were converted to a normalized scale from 0 to 100. The criteria for interpreting SUS scores are based on the literature [17]:

- **Score ≥ 68:** Above-average usability – the system is intuitive and easy to use.
- **Score < 68:** Below-average usability – the system requires optimization in terms of intuitiveness and ease of use.

5.3. Participant Feedback (Interviews)

Participant statements were analyzed in terms of key areas related to the editor's usability:

- **Intuitiveness of functions:** Which functions were easy to use and why?
- **Problems with memorization:** Which functions were difficult to remember and what caused the most difficulties during their use?
- **Overall satisfaction:** How did users rate their experience with the editor?

6. Results

The results of the analysis of task completion times, memorability level, and subjective opinions of participants are presented in three subsequent subsections. The data presented allow for the identification of trends in user work efficiency, the indication of difficulties associated with using the editor, and the assessment of the overall impression of its use.

The first part presents the analysis of task completion times, which are the basic indicator of user effectiveness and constitute the basis for calculating the level of memorability of functions. Subsequent subsections discuss the results of the SUS survey and the opinions of participants, which provide a qualitative context for the quantitative results.

6.1. Analysis of Task Completion Times

The figures below present the analysis of the average task completion times by participants. The first (Fig. 2) shows

the average time to complete all tasks in three sessions compared to the expert time, which illustrates the process of users' adaptation to the Gutenberg editor interface. The second (Fig. 3) focuses on dividing tasks into those typical for most WYSIWYG editors and those specific to the Gutenberg editor, which allows assessing whether the unique functions of the editor had an impact on the time it took to complete tasks.

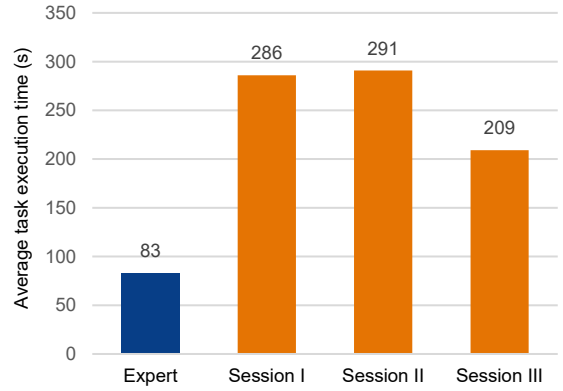

Figure 2: Average task completion time of users in 3 sessions compared to expert time (in seconds).

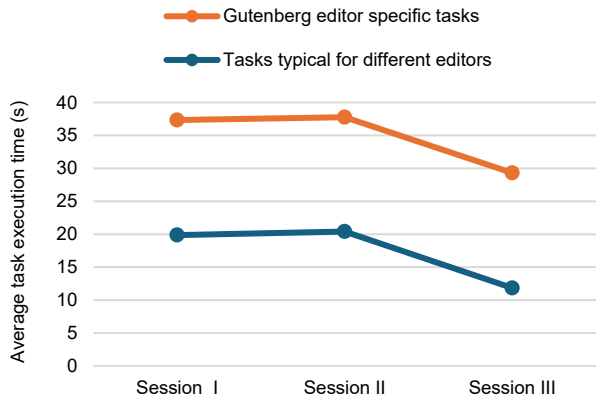

Figure 3: Average time to complete typical and Gutenberg editor specific tasks across sessions (in seconds).

Table 1 presents the memorability level (ML) for each of the tasks. The ML results indicate which tasks were best remembered by the participants and which required more effort.

Table 1: Memorability Level (ML) for individual tasks

No.	Task	Memorability Level
1	Center the page title text	34%
2	Changing the selected bulleted list to a numbered list	40%
3	Linking the text to another Drupal article	46%
4	Adding an image from the gallery and resizing it to full width	38%
5	Saving the changes	51%
6	Converting the Paragraph block to a Quote and changing the text color	-7%
7	Swapping the Header block with the Paragraph	10%
8	Removing the page subtitle block	38%
9	Swapping the columns in the Columns block	-29%
10	Adding a Spacer block and setting its height to 50 pixels	63%

To gain a deeper understanding of the effectiveness aspect, a comparison of the average task completion times across the three sessions with the expert time is presented. The first chart illustrates the results for tasks typical of most WYSIWYG editors, while the second focuses on tasks specific to the Gutenberg editor. Both sets allow us to assess which types of tasks posed a greater challenge for participants and how their effectiveness changed in subsequent sessions compared to the expert.

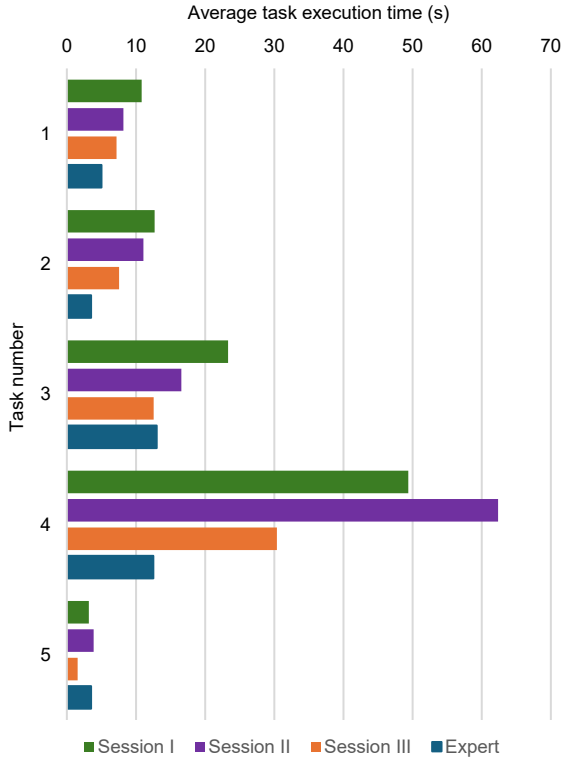

Figure 4: Comparison of average times for tasks typical of most editors to those of an expert (in seconds).

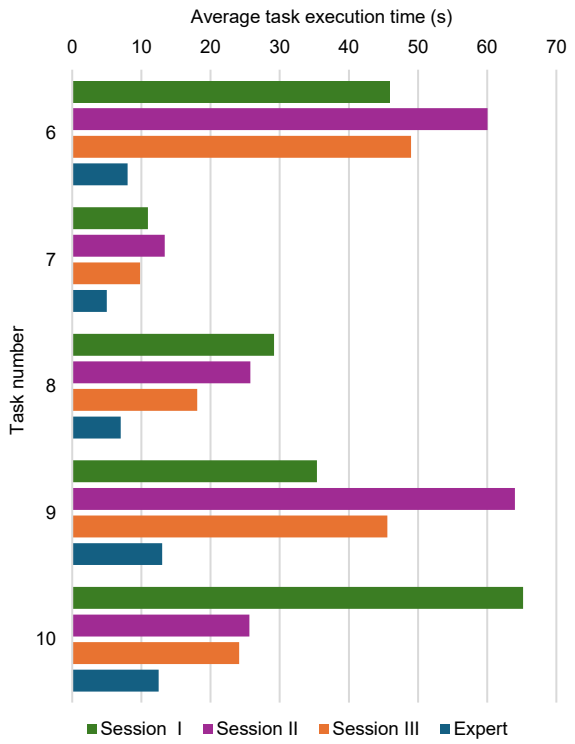

Figure 5: Comparison of average times for Gutenberg editor specific tasks to expert times (in seconds).

6.2. SUS Survey Results

This subsection presents the results of the SUS survey, which was conducted after the third research session. The ratings of individual participants and the average of all responses allow for the assessment of the overall usability of the Gutenberg editor based on the subjective feelings of users.

Table 2: SUS survey results for individual participants and average Gutenberg editor usability rating

Participant	SUS score
1	75
2	87.5
3	70
4	62.5
5	67.5
6	70
7	87.5
8	87.5
Average	**75.94**

6.3. Results of the Interview Analysis

To identify areas of the Gutenberg editor that may affect the memorability of its interface, participant statements gathered during the interviews were analyzed. Table 3 presents a list of reported problems along with the number of users who indicated them.

Table 3: Interface issues reported by the participants

Issue	Number of reports
Icons are unclear or missing	5
Unintuitive menu and option layout	5
Unclear labels or feature descriptions	4
No hints, e.g. in the form of a tooltip	3
Difficulty navigating nested blocks	3
Confusion and uncertainty in using the editor	2
No editor customization options	2
Problems with distinguishing blocks with similar functionality	1
Problems with moving blocks	1
Accessibility issues	1

7. Discussion

The goal of this study was to assess the memorability of the Gutenberg editor interface in the Drupal CMS. Understanding how users learn and remember the editor's functions is crucial for designing intuitive and user-friendly content creation tools. This chapter presents a discussion of the research findings, focusing on task completion times, Memorability Level (ML), and participant feedback gathered during interviews. The results will be interpreted in the context of general knowledge about interface usability and memorability, and conclusions and recommendations for content editor design will be formulated based on them.

7.1. Analysis of Task Completion Times

Analysis of task completion times (Fig. 2 and Fig. 3) indicates a general decrease in time in the third session, which suggests a process of user adaptation to the interface. The average task completion time in the 1st session was 286 seconds, and in the 3rd session it dropped to 209 seconds. Similar dynamics were observed for typical and specific tasks in both cases, there was a decrease in task completion times in the third session, which may indicate an improvement in memorizing the editor's functions (Fig. 3). Nevertheless, tasks specific to the Gutenberg editor required more time than typical ones, which may indicate difficulties in mastering the unique functions of the editor.

Table 1 presents the Memorability Level (ML) for individual tasks. Most tasks achieved positive ML values, which indicates the process of learning the interface. However, some tasks, such as "Transforming a Paragraph block into a Quote" and "Swapping columns", showed negative ML (-7% and -29%, respectively). This may suggest problems with the intuitiveness or comprehensibility of these functions. Negative ML may be due to the fact that tasks require greater complexity of action sequences or due to an incorrectly prepared interface. It is worth considering redesigning these functions to facilitate their use. Only one task ("Adding a Spacer block") achieved an ML value above 60%, which suggests that users remembered its implementation well.

A comparison of average task completion times in the third session with expert times (Fig. 4 and Fig. 5) suggests that typical WYSIWYG tasks were performed at times close to those of the expert, indicating their intuitiveness. The total completion time for typical tasks in the third session was 59.5 seconds, while the expert required 37.5 seconds. Notably, the task of linking text to another article was completed in 12.5 seconds, compared to 13.0 seconds for the expert. This suggests that users quickly familiarized themselves with standard functions in WYSIWYG editors.

In contrast, tasks specific to the Gutenberg editor required significantly more time than the expert's, even in the final session. The total completion time for Gutenberg-specific tasks in the third session was 146.5 seconds, while the expert needed only 45.5 seconds. For instance, transforming a Paragraph block into a Quote and changing its color took users an average of 49.0 seconds, whereas the expert completed it in 8.0 seconds. This large discrepancy suggests that these functions may be unintuitive or difficult to remember. Similarly, swapping columns in a Columns block took 45.5 seconds compared to 13.0 seconds for the expert.

This confirms the need to simplify the interface and provide additional training for users in the use of the unique functions of the Gutenberg editor.

7.2. Measuring subjective usability with the SUS

The results of the SUS survey (Tab. 2) indicate a generally positive assessment of the editor's usability, with an average of 75.94 – this value is above the average for most applications [17]. Most participants rated the editor as intuitive and easy to use, which is reflected in the high SUS scores for most questions. However, statements regarding interface consistency (e.g., "I find the various functions in this editor are well integrated") and the need for support ("I think I would need the support of a technical person to be able to full use this editor") received lower scores (between 60 and 70 points). Lower ratings in these questions may suggest that some editor functions are poorly integrated with the rest of the interface and require additional effort to memorize. It is worth considering redesigning these functions or adding more detailed instructions for users.

7.3. Results of the Interview Analysis

Qualitative analysis based on interviews indicates several key areas for improvement in the Gutenberg editor interface. The most frequently reported problems were unclear labels and icons, unintuitive menu layout, and difficulty navigating nested blocks (Tab. 3). For example, one participant stated: "There is no ‘trash can’ icon next to the delete button, and the Heading block icon looks like a typical ‘bookmark’ icon." These problems may have contributed to longer task completion times, especially those specific to the Gutenberg editor, which is confirmed by the results of the task completion time analysis (Fig. 5). Additionally, the lack of prompts, such as tooltips, and the general "overwhelm" with the number and level of complexity of available options were problematic for users.

8. Conclusions

The study results confirm that the Gutenberg editor interface facilitates users in remembering its functions. This is reflected in the overall reduction of task completion times across sessions and positive ML values. Thus, Hypothesis 1, which stated that task completion times would decrease with each session, has been confirmed.

Hypothesis 2, assuming that the Gutenberg editor is highly usable, is also supported by the results. The average SUS score obtained was 75.94, which exceeds the threshold of 68 defined in the literature [17] as indicating above-average usability. This leads to the conclusion that despite some encountered difficulties, participants generally rated the editor as intuitive and functional.

Hypothesis 3 has also been confirmed. It proposed that the expert would complete tasks significantly faster than novices for Gutenberg-specific tasks, while the difference would be less pronounced for typical WYSIWYG tasks. The analysis of task completion times showed that for typical tasks, the differences between experts and novices decreased over successive sessions. However, for Gutenberg-specific tasks, the difference remained significant, suggesting that these operations were more difficult to master.

Hypothesis 4, which assumed that there are opportunities to improve the usability of the Gutenberg interface by addressing user-reported issues, has also been validated. The qualitative analysis of participant feedback revealed usability challenges, such as difficulties in recognizing icons and labels, problems with nested blocks, and disorientation in interface navigation.

The moderate ML level and reported difficulties indicate areas requiring optimization, particularly in terms of intuitiveness. Similar dependencies were observed by Miłosz et al. [2], who found that more intuitive interfaces are easier to remember and reuse.

A significant limitation of the study was the small number of participants (N=8) and the relatively short breaks between sessions, which may have affected

the memorization process. Therefore, future research could include a larger group of participants and extend the period between sessions to more realistically reflect the process of memorizing interface functions in sporadically used systems. It is also worth considering conducting comparative studies with other content editors to assess how the Gutenberg editor compares to the competition.

Based on the results of the study, the following recommendations for the design of content editors can be formulated:

1. **Improving interface intuitiveness:** It is necessary to ensure that all functions are easy to find and understand. For this purpose, icons, labels, descriptions, and prompts consistent with conventions can be used. It is also worth considering changing the layout of the menu and options to make it more logical and transparent.
2. **Enabling interface personalization:** Users should be able to customize the interface to their individual needs and preferences. For example, it is possible to allow changing the font size of labels, colors, or the arrangement of elements.
3. **Usability testing:** Before implementing new functions or changes to the interface, usability tests should be carried out with the participation of a representative group of users. This will allow for early detection of potential problems and their possible correction.

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