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QUALITATIVE ANALYSIS AND EYE-TRACKING EXAMINATION OF GUIDELINES RELATING TO EASY LANGUAGE PUBLICATIONS WITH VISUAL MATERIALS

Doctoral Dissertation Thesis

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Content

Justification of topic selection and significance of the research

Modern societies are built entirely on linguistic constructions: legislation, business, religion, education, science, politics, and many more. According to our current human rights perspective, every person has an equal right to information, inclusion, and social participation. Among the difficulties and barriers that arise during communication, linguistic and cultural differences play a prominent role, as well as limited access to information for certain groups. These factors can lead to various misunderstandings, incomplete transmission of information, and cooperation difficulties (Maaß, 2020).

By creating and disseminating information that is equally accessible, we can effectively support the social integration of people with low linguistic competence and those who need support in interpreting information. The tool for info-communication accessibility is Easy Language, which is an indispensable condition for independent, self-reliant living and self-advocacy, and means presenting information that appears in common language or at more complex linguistic levels in a simple, clear form for the sake of information comprehension (Horváth, 2017; Farkasné Gönczi, 2021).

Visual materials used in Easy Language products are visual tools or symbols that are intended to facilitate understanding. They are important in information transmission, as they help remember information as additional experiential stimuli, facilitate the reception of more complex content, and make it easier to process data. We understand content faster when it is also visually supported, making visual materials and graphics essential in effective information transmission, for example in presentations, education, and in marketing and business communication (Maaß, 2020). Text alone explains and justifies, but cannot create a quick impression. Text needs visual materials, and visual materials necessarily need text. Visual assistance can be useful not only for people with intellectual disabilities but also for those who have reading, writing, or attention difficulties, or for whom the given communication language is not their native language (Farkasné Gönczi & Graf-Jaska, 2009).

The research aims to examine an area that focuses on improving the effectiveness of visual communication and information acquisition. Interest in this is relevant not only from an academic perspective but is also an urgent question at the social level. The complexity of modern societies and the continuously increasing amount of information pose new challenges to ensuring equal access. Barriers to information reception particularly affect people with low linguistic competence or those living with some cognitive difficulty, while they can also impact

areas of migration, education, and healthcare, where clear and understandable communication is fundamentally important.

In the digital world, where the amount of information is continuously growing, Easy Language and well-structured publications are vital for users. The application of eye-tracking technology enables researchers to gain deeper insight into how people with intellectual disabilities react to visual content and what factors influence their attention and understanding (Gönczi & Hlédik, 2020; Berki-Süle, 2023).

Theoretical background of Easy Language

Concept and definition of Easy Language

Regarding the concept of Easy Language, or easy-to-understand communication as it was called when the definitions were created in Hungary, we find the following definitions in Hungarian-language literature: "A method of oral or written information that provides information for people living with comprehension problems" (Csató et al., 2009, p. 46).

Rita, Farkasné Gönczi (2021b) defined the concept of easy-to-understand communication based on international and domestic examples, following suggestions from Hungarian experts by experience. "Easy-to-understand communication is communication that applies linguistic and non-linguistic signs, or elements of the linguistic sign system, often according to unique rules. Easy-to-understand communication applies each language's own linguistic and non-linguistic signs during message development and transmission. The unique application of the linguistic sign system means that the level of text comprehension of the people participating in communication determines the level of easy-to-understand communication and adjusts the scope of applicable grammatical rules accordingly. Participants in easy-to-understand communication apply message-creation rules appearing in the communication situation either consciously or spontaneously. Based on this definition, easy-to-understand communication, like other communication methods, does not provide a real solution for everyone" (Farkasné, 2021b, p. 9).

Péter László, Horváth (2017) states: "An indispensable condition for independent, self-reliant living and self-advocacy is that we should not be cut off from information and thus from the possibility of decision-making. This is also vital in the case of people with intellectual disability. Easy-to-understand communication, as a technique for making information accessible and available to everyone, practically offers this kind of assistance."

In international literature, we most frequently encounter the terms Easy Language and Easy-to-Read, which are often interchanged and used as synonyms, but may have different meanings depending on the context. At the international level, the Easy Language expression is increasingly gaining precedence over Easy-to-Read, the main explanation being that Easy Language content now appears across a wide spectrum of media implementations, and only some of them require reading ability, so only a portion of the target groups actually read texts (Maaß, 2020).

Easy Language is an extremely complex concept that is located at the intersection of numerous scientific disciplines and has different meanings for different stakeholders. Therefore, it is vital to approach its definition from multiple perspectives. The dissertation analyzes the concept of Easy Language in detail from special education and social approaches, as well as from legal, linguistic, and social perspectives, based on which a new definition was created. In my own interpretation, Easy Language is a consciously developed linguistic register whose primary purpose is the effective and barrier-free transmission of information to people with the most diverse backgrounds and abilities, but primarily to those with low linguistic competence and those who need support in interpreting information. In the application of Easy Language, linguistic tools (lexicon, syntax, discursive structures) are selected and combined in ways that minimize barriers arising during information processing and maximize message comprehension. It is realized through conscious linguistic simplification strategies based on thorough knowledge of the language's internal functioning and the psychological processes of text processing. It is a key tool in effective communication with the target group, in developing independence and improving quality of life, and additionally promotes social inclusion and cohesion, and plays a fundamental role in enforcing the rights of people with disabilities by ensuring equal access to information.

Role of visual materials in communication and Easy Language publications

Visual communication plays a key role not only in the arts but also in education and scientific communication. It is one of the prominently important tools of information transmission, which can make message transmission more effective and understandable through the application of visual materials, graphics, and diagrams, as it is capable of simplifying complex information and making it more understandable for the audience, thus helping more effective information transmission (Perra & Boukhechba, 2021). The effectiveness of visual communication is also supported by cognitive psychology. The human brain processes visual information much faster

and more effectively than textual information. Information linked to visual materials remains better in memory, as during the processing of visual information, our brain involves multiple senses and brain areas (Antik, 2022; Bubik & Simon, 2016; Simon & Kárpáti, 2018). According to Paivio's (2007) dual coding theory, people use two types of codes for storing information: verbal and visual. Visual codes have an important role in learning, as visual information integrates better with existing knowledge.

Based on the literature, it can be said that the use of visual materials in Easy Language materials can bring numerous advantages, as the reader often sees the visual material first. Regarding facilitating understanding, thanks to good visual materials, the reader already understands the message of the text in advance, and there are things that are simply easier to explain with visual materials than with words, such as how something looks or how something works. Often visual materials convey feelings and moods that are difficult to express in words (Begriplig Text, 2019). However, numerous doubts also arise regarding the use of Easy Language visual materials. Different interpretation is common, as some visual materials can be misunderstood or carry different meanings in different cultures, and certain complex concepts are difficult to depict simply, which can lead to inaccuracy. Visual overload can also appear, so the use of too many visual materials can distract from the essential (Maaß, 2020). The main contradictions can be grouped around the relationship between visual materials and text, the effectiveness of visual support, structural and theoretical questions of visual material use, and the role of cognitive abilities.

Problem statement

Easy Language is a key tool in info-communication accessibility. Its goal is to transmit information in a simple and clear form, thereby facilitating independent living and self-advocacy. Along with the use of simplified language, visual assistance also plays a significant role: visual materials, visual tools, and symbols not only support textual information but also contribute as experiential stimuli to easier processing and understanding of content (Boerman et al., 2014; Horváth, 2017; Farkasné Gönczi, 2021).

Despite this, numerous problems and questions arise around the application of Easy Language visual materials. European guidelines are not uniform; guidelines regarding the use of visual materials and their formal and content requirements differ. It is not clear how effective Easy Language and its visual components are in supporting understanding, or what consensuses or contradictions can be observed among the rules. The information overload of the digital age

and the growing importance of visual communication further strengthen the problem. While Easy Language and well-structured information is vital for users, little empirical data is available about how people with intellectual disabilities or other linguistic-cognitive difficulties react to this content.

The research aims to address these gaps, with particular attention to analyzing the effectiveness of visual content. The application of eye-tracking technology enables a more precise understanding of the dynamics of attention and cognitive processing. With this method, it can be examined how visual and textual elements affect users' attention and understanding, and what aspects need to be considered when designing Easy Language publications.

Objectives, research questions and hypotheses

The research can be divided into two major parts. The goal of the first research part is to explore and analyze the rules of visual material use contained in European guidelines of Easy Language. During this, we pay special attention to categorizing rules related to visual materials, understanding general principles, and mapping consensuses and contradictions between individual guideline systems.

Research questions of the first research part

This part of the research is organized around four main questions:

1. Identification of categories of rules related to visual materials

We examine what main themes or aspects guide different European countries' guidelines in grouping rules related to visual material use. This enables comparison of the role and functions of visual materials in Easy Language. Related research question: *What main themes or aspects can be used to group different countries' guidelines?*

2. Exploration of general rules and practical guidelines

Within each category, we analyze in detail what general rules the guidelines formulate. This includes analyzing practical guidelines regarding visual material selection, format, style, and application methods. It is particularly important to understand how these rules contribute to visual material comprehensibility and acceptability. Related research questions: *What general rules do the guidelines formulate within each main category? What practical guidelines do they give regarding visual material selection, format, style, etc.?*

3. Consensuses and contradictions among guidelines

We explore which rules enjoy broad agreement among guidelines, as well as areas where we experience contradictions or different approaches. This examination helps identify possibilities for standardizing visual material use and highlights the need for rule development. Related research questions: *In which rules can broad agreement be observed among guidelines? In which areas do contradictory guidelines occur?*

4. Examination of regional and temporal dimensions

This research question explores connections between the geographical and chronological characteristics of guidelines. We analyze what connection exists between the place and time of guideline publication and their level of detail and development. Related research questions: *Is there a connection between the geographical location of guideline publication and their level of detail? Can a connection be observed between publication dates and the development level of guidelines?*

Research questions and hypotheses of the second research part

Building on the results of the first research part, in the second research phase we examine the practical application of rules related to visual materials with the involvement of people with intellectual disabilities using eye-tracking examination (Tobii Pro Fusion 60Hz). This approach enables us to support the effectiveness of theoretical guidelines with empirical methods and test different visual solutions in real usage situations.

Research questions:

1. **How do different properties of visual materials** (type, placement, function) in Easy Language publications **influence information processing effectiveness**? The purpose of this question is to explore which visual solutions increase attention and understanding among the target group.
2. **What cognitive load do different types of visual materials represent** for people with intellectual disabilities in Easy Language publications? The purpose of this question is to explore processing differences between abstract and concrete visual materials.
3. **Which design guidelines prove to be decisive in shaping visual materials** of Easy Language materials? The research aims to explore where it is worthwhile to place important visual information and what types of visual materials are appropriate to use.
4. **How does the perceptual strategy of visual materials** detectable with eye-tracking equipment relate **to users' subjective understanding and preference experiences**? This research question reveals whether objective data measured with eye-tracking

examination and subjective opinions obtained from interviews are consistent with each other.

Research hypotheses related to the second phase of the research:

H1: The properties of visual materials (type, placement, function) in Easy Language publications significantly influence information processing effectiveness.

- H1a: Concrete visual materials result in faster first fixation time than abstract representations.
- H1b: Visual materials that are placed beside the text (left or right) maintain attention longer than those found above or below the text.
- H1c: Attention-grabbing functional visual materials show higher noticeability rates (count).

H2: Different types of visual materials represent different cognitive loads for people with intellectual disabilities.

- H2a: Abstract visual materials require more return fixations and longer processing time than concrete visual materials.
- H2b: Explanatory functional visual materials show higher numbers of fixations and longer fixation duration.
- H2c: Right-side placement results in more return fixations and longer fixation time.

H3: The effectiveness of visual materials in Easy Language publications is influenced by specific design guidelines.

- H3a: Left-side visual materials result in shorter first fixation time.
- H3b: Longer fixation duration can be measured for symbols.
- H3c: The number of fixations measured in empty areas is significantly greater than zero.

H4: A significant correlation can be demonstrated between objective processing indicators of visual materials and users' subjective experiences.

- H4a: There is a positive correlation between fixation duration and subjective usefulness assessment.
- H4b: Multiple returns correlate negatively with subjective evaluation of understanding.
- H4c: The presence of visual material captions influences the relationship between fixation time and subjective liking.

Research methodology and data collection tools

The research applies two main empirical methodological approaches. In the first phase, qualitative content analysis and meta-narrative literature review took place, aimed at systematizing guidelines and structured evaluation. Within this guideline, we developed a matrix-based analysis system that enabled the categorization and comparative examination of guideline systems. In the second phase of the research, empirical data collection took place, which combined two methods: eye-tracking examination and semi-structured interviews. The eye-tracking examination procedure revealed the characteristics of visual information processing through quantitative measurements, while interviews qualitatively complemented the results by exploring participants' subjective experiences. The joint application of these two approaches enabled comprehensive evaluation of the effectiveness of visual material use guidelines.

First phase of the research: literature analysis and matrix-based evaluation

The first level of the phase consists of guidelines analysis: we included a total of 22 international guidelines in it. We explored the guideline systems currently used in Europe, for which we used the Handbook of Easy Languages in Europe (Lindholm & Vanhatalo, 2021) manual, which contains reports from 21 European countries on the situation of Easy Language. This was followed by an intuitive search phase, where we conducted "snowball searching" to identify guideline systems not included in the mentioned European report. From the 53 guideline systems collected this way, we excluded those that already had newer editions published, different language versions of individual guideline systems (we analyzed only the original language versions), guideline systems created for producing content types other than written text, and those that were not accessible. The final bibliography contained publications from 11 countries and 3 multinational entities, totaling 22 publications.

At the second level, we conducted a meta-narrative literature review. Our goal was not to explore theoretical and methodological differences between individual guidelines, but to collect very similar international guideline systems in their topics and categorize their content using specific epistemology and methodology. We compiled the main bibliographic data of the guideline systems in a matrix table, based on which we grouped and color-coded them by countries and languages. After translation of the guidelines (using multiple translation programs together), their qualitative analysis began: creating categories in a deductive (theory-driven) way, then developing additional main and subcategories inductively. The second level thus divides visual material use rules into five main categories: 1. Rules related to visual material

meaning matrix 2. Visual material quality requirements matrix 3. Placement rules matrix 4. Rules for visual material types matrix 5. Rules related to visual material content matrix

At the third level, we defined three subcategories within each main category, which cover specific aspects of regulation. This structure enabled detailed and systematic evaluation of the rules of visual material use. The evaluation system uses a four-level ordinal scale (0-3), where: 0: no documented information exists for the given subcategory; 1: documented mention or basic rule exists; 2: detailed, documented regulation is found; 3: detailed regulation is supplemented by examples and explanations. This hierarchical matrix structure (22 guidelines × 5 main categories × 3 subcategories) results in a total of 330 potential evaluation points. The analysis method enables both comprehensive evaluation of individual guidelines and comparative analysis at the level of main categories and subcategories. Every evaluation can be supported with concrete text passages from the examined documents. For reliability purposes, we only considered explicitly formulated rules and guidelines. We conducted coding and categorization of qualitative data using Microsoft Excel in structured tables, where we marked identified themes and their connections with color coding. During the examination, when calculating the reliability indicator, we applied intra-coding, whose value was km=0.82 (Sántha, 2013).

Second phase of the research: empirical data collection

The methodology of the second part of the research is based on the combination of eye-tracking technology and interviews, which enables thorough examination of the effectiveness of Easy Language and visual materials among subjects with intellectual disabilities. We conduct eye-tracking examinations with Tobii Fusion equipment (Tobii Pro, Tobii AB, Stockholm, Sweden), at 60 Hz sampling frequency, following manufacturer recommendations, using a 27" 1920 × 1080 pixel resolution LCD display (Asus ExpertBook B1500C laptop). We use the Tobii Pro Lab application for recording eye movements and extracting eye movement parameters.

We categorized visual stimuli along multiple dimensions. According to the level of abstraction, we distinguished abstract (representing general concepts) and concrete (depicting real, specific elements) visual materials. According to visual material type, we differentiated photos, drawings, and symbols. Regarding the function of visual materials, we applied four categories: explanatory (presenting new information, concepts), illustrative (demonstrative, decorative), attention-grabbing (highlighting warnings, important information), and navigational (guiding, helping orientation on the surface) elements. During the eye-tracking examination, we applied three main metrics: total duration of fixations, number of fixations, and time to first fixation. These measures enabled detailed analysis of participants' visual attention patterns, including

the perceptual order of different types and positioned visual materials, attention switches between text and visual materials, and attention patterns triggered by visual materials with different functions.

An important method of the second phase was conducting interviews, during which we collected participants' subjective experiences and feelings about the use of Easy Language and visual materials. After the instrumental examination, we asked questions about participants' understanding processes, their preferences regarding linguistic and visual materials, and about which elements best help understanding. The interviews also provided an opportunity for participants to express what difficulties they face in processing different linguistic and visual information, thus gaining deeper understanding of communication challenges.

Sampling and participants

During the second phase of the research, expert sampling was applied, in which a total of 31 people participated. The average age of examination participants was 32.7; 10 women, 21 men. The sample size (n=31) was determined considering the statistical conditions for applying the chi-square test. The advantage of expert sampling is that it specifically ensures the involvement of the relevant population in the examination, which is particularly justified in examining adults with intellectual disabilities. However, the disadvantages of the method include that the sample cannot be considered representative for the entire population, so the results cannot be generalized to a broader sample. However, the present research did not aim for population-level generalization, but for deeper understanding of the target group's information processing characteristics.

In determining sampling criteria, a fundamental consideration was that the examined group should meet the research objective, namely examining the use of visual materials in Easy Language materials. Accordingly, the conditions for inclusion in the sample were: (1) adult age, (2) diagnosis of intellectual disability, and (3) possession of reading ability.

The sampling criteria of the research fully align with the practical application of Easy Language in Hungary. The criteria ensure that the examined group adequately represents people who can read but need linguistic support.

Research protocol and ethical considerations

The research met all ethical expectations: participants received prior information, participated voluntarily, and all data handling occurred in accordance with GDPR regulations. The research received approval from the EKCU Research Ethics Committee.

The eye-tracking examination took place individually, without breaks, taking approximately 15 minutes per person. The experimenter was always the research leader. The examination was based on 16 selected pages from an Easy Language publication previously published by Hungarian Association for Persons with Intellectual Disability (ÉFOÉSZ) (ÉFOÉSZ, 2022), which we modified to create different visual arrangements. The modifications occurred along three parameters: position of visual materials (left-side, right-side, below or above text placement), type of visual representation (drawings, photographs, symbols), and coloring of visual materials (color or black-and-white display).

During the examination, the subject sat at a medium viewing distance, approximately 70 cm from the laptop, with the head not fixed. The eye-tracking device was a 37.4 cm × 1.8 cm × 1.37 cm apparatus, which was placed at the junction of the monitor and keyboard, thus blending into the laptop in a barely noticeable way.

The examination procedure was as follows: first, participants read a short title page aloud and answered related questions, thereby checking their reading comprehension abilities. This was followed by 9-point automatic calibration, during which examination subjects received verbal instruction: "Follow the white dot appearing on the screen with your eyes! Don't move your head, just follow the white dot with your eyes!"

After calibration, they could participate in two practice tests, which consisted of a 2-step task: first independent, silent reading, then oral verification questions. The related instruction: "Interpret what you see on the monitor! Afterwards, I will ask questions related to these." The actual examination consisted of 14 different pages. We did not set time limits for individuals, but asked them to speak up when they finished with the given page. After each page, we asked one or two questions to check understanding.

After completing the examination, reviewing printed versions of test visual materials through guided questions, we asked participants what the individual visual materials meant to them, whether they helped them understand the content, how much they liked the visual materials, what types of visual materials they preferred, and what arrangement they found appropriate. We recorded their answers in structured tables.

The presented stimulus material was identical for every person. External auditory and visual stimuli (lighting, filtering sounds) could not be kept completely under control due to varying locations, but we did not experience significant disturbing stimuli. The examination occurred once per person; repetition was not necessary.

Results

Regulations for visual material usage contained in European guidelines on Easy Language

The analysis of visual material usage regulations contained in European Easy Language guidelines addressed our first research question regarding **what main themes or aspects can be used to categorize the guidelines from different countries**. Using the 22 examined guidelines, we identified categories of visual material-related regulations. Based on the European guidelines, the visual material-related regulations were grouped around the following main categories:

1. Rules related to visual material meaning
2. Rules related to visual material quality
3. Rules related to visual material placement and arrangement
4. Rules related to visual material types
5. Rules related to visual material content

Within each main category, 3 additional subcategories (15 total) were established, containing a total of 50 related rules. This high number primarily stems from linguistic and phrasing differences between guidelines, as well as additional clauses and exceptions attached to individual rules.

Our second research question focused on **general rules and practical regulations within each category**. Although the number of subcategories is identical for each main category (3), the number of rules they contain differs significantly, which may indicate different regulatory needs for different areas. The guidelines contain 50 separate rules regarding visual materials, representing comprehensive yet manageable guidance for practical application. This high number primarily results from linguistic and phrasing differences between guidelines, as well as additional clauses and exceptions attached to individual subcategories.

During subcategory analysis, a total of 330 evaluations were made on the 0-3 scale. Their distribution shows significant inequality: nearly half of the evaluations (158, 47.9%) received a 0 rating, indicating complete absence of documentation. Basic documentation level (rating 1) occurred in 20% of cases (66), while detailed regulation (rating 2) was found in 18.8% of

evaluations (62). The highest level regulation with examples (rating 3) occurred in only 13.3% of evaluations (44).

Overall, it can be established that the guideline system faces significant limitations. The regulation is fragmented, contains internal contradictions, and is incomplete or provides no clear guidance for many subcategories. Where concrete positions are found, the formulation is often too general, making practical application difficult. Nevertheless, several generally acceptable regulations can be highlighted as consensus:

Regarding visual material meaning, most guidelines mention that when providing visual support for Easy Language materials, we should choose visual materials that truly aid understanding, where the connection between visual material and text is clear, and not merely illustrate the text in some way. Regarding visual material quality, there is a definite recommendation for using high-quality, clean visual materials characterized by simple backgrounds and freedom from distracting elements.

The third research question examined **agreements and contradictions among rules**. Broad consensus exists regarding the comprehension-supporting function of visual materials, the necessity of clean quality, and the clarity of text-visual material connections. We identified significant contradictions in three areas: presenting abstract information, using visual material types, and spatial arrangement, where positioning recommendations differ significantly.

1. Presenting abstract information: 8 guidelines recommend avoiding the use of abstract visual materials, meaning visual materials should preferably only present concrete information, but six of these stated that if they are still used, they would only be acceptable as supplementary information. This means that instead of complete rejection of abstract visual materials, they argue for their limited and purposeful use. Our analysis, beyond showing that there is no complete agreement among guidelines regarding abstract visual material use, also highlights that 14 guidelines make no mention of this and take no position on the topic.

2. Visual material type usage: According to most guidelines (12), different visual presentation modes - photographs, drawings, and symbols - can all be used. In contrast, 9 guidelines take no position on the question and do not detail what they mean by "visual materials." One guideline suggests avoiding symbol use, recommending only photos or drawings.

3. Spatial arrangement of visual materials: The most contradictory guidance relates to spatial arrangement of visual materials. Based on the data, it can be established that a significant portion of the examined guidelines lack clear guidance on positioning visual materials relative to text. The most common case (6 occurrences) is when guidelines make no mention of spatial placement of visual materials at all.

Our fourth research question addressed **geographical and temporal correlations**. Statistical analysis showed no significant regional differences (Fisher's exact test $p>0.05$), except for a borderline trend regarding visual material types (Linear-by-Linear $p=0.05$). Northern and Western Europe consistently show higher averages in all categories. Temporal analysis identified three distinct phases: 2000-2010 (7 guidelines) with a 0.981 average dominated by multinational cooperation, 2011-2020 (9 guidelines) with a 0.71 average characterized by geographical diversification, and 2021-2024 (5 guidelines) with a 1.66 average showing extreme differences (e.g., Finnish 2.8 vs. Latvian 0.33 values). The temporal correlation was not statistically significant (Fisher's exact test $p=0.215$).

Examination of Easy Language visual material regulations using eye-tracking methodology

The eye-tracking examinations and interview results led to several key insights:

Processing abstract vs. concrete visual materials (H1a examination): The study aimed to determine whether participants' gaze was directed sooner to abstract or concrete visual materials. While a tendency was observable for faster processing of concrete visual materials ($M = 4.85$) compared to abstract representations ($M = 6.62$), this difference did not reach the statistical significance threshold ($p = 0.105$).

Effect of visual material placement (H1b examination): When examining the impact of visual element spatial arrangement, we hypothesized that visual materials placed beside text (left or right side) would hold attention longer than visual elements above or below text. Results showed that average fixation time for laterally positioned visual materials (3.9203) did not differ significantly from vertically positioned visual materials (3.7813). The independent samples t-test result ($t(30) = 0.278$, $p = 0.783$) showed no statistically significant difference between the two arrangement modes.

Examination of attention-drawing functional visual materials (H1c examination): One-way variance analysis results showed no significant difference in noticeability between different functional visual materials ($F = .283$, $p = .837$). Attention-drawing visual materials had the longest average first fixation time ($M = 6.36$ sec, $SD = 7.86$), contradicting our original hypothesis.

Cognitive load of abstract visual materials (H2a examination): Participants returned to abstract visual materials on average more times ($M = 6.79$, $SD = 2.88$) than to concrete visual materials ($M = 4.66$, $SD = 2.83$). Paired t-test results showed a significant difference ($t(30) = 3.690$, $p < .001$). This result suggests that processing abstract visual materials requires more

return viewing for people with intellectual disabilities, which may be an indicator of processing difficulty. To test the second part of the hypothesis, we examined fixation durations. Results showed that while abstract visual materials received somewhat longer average fixation duration (M = 3.97 s, SD = .73) than concrete visual materials (M = 3.35 s, SD = 2.55), this difference was not statistically significant ($t(30) = 1.479$, $p = .150$).

Load of explanatory functional visual materials (H2b examination): Explanatory visual materials (M = 7.24, SD = 3.90) had significantly higher fixation counts than attention-drawing (M = 5.40, SD = 2.52; $t(30) = 2.740$, $p = .010$), illustrative (M = 5.37, SD = 2.24; $t(30) = 3.024$, $p = .005$), and navigational visual materials (M = 3.77, SD = 2.20; $t(30) = 5.868$, $p < .001$). When examining fixation duration, explanatory visual materials (M = 4.51, SD = 2.36) had significantly longer fixation duration than other visual material types (all comparisons $p < .01$).

Effect of right-side placement (H2c examination): Regarding return fixation count, comparison of right-side position (M = 6.21, SD = 3.26) with left-side position (M = 5.22, SD = 3.20) showed no significant difference ($t(30) = 1.503$, $p = 0.143$). However, when compared with top position (M = 8.12, SD = 4.05), a significant difference was found ($t(30) = -2.709$, $p = 0.011$), where surprisingly we measured more return fixations in the top position.

Advantage of left-side elements (H3a examination): Average fixation times for examined positions were: left side: M = 3.89 seconds (SD = 4.30), right side: M = 6.78 seconds (SD = 5.57). Paired t-test showed significant difference between left and right-side placement ($t(30) = -2.407$, $p = 0.022$). Left-side elements indeed resulted in significantly shorter fixation time compared to right-side elements.

Symbol processing (H3b examination): Results showed symbols produced shorter average fixation time (M = 2.26 sec) than photos (M = 2.62 sec) or drawings (M = 2.85 sec). This contradicts our original hypothesis. Statistical analysis shows that while differences did not always reach the traditional significance level, the tendency is clear and consistent: symbol processing required less time.

Searching empty areas (H3c examination): Processing data from 31 participants, the average number of fixations on empty areas was 2.065 (SD = 2.136), which proved statistically significant regarding deviation from zero ($t(30) = 5.382$, $p < 0.001$). This result indicates that participants actively search for visual cues to aid understanding.

Relationship between fixation duration and subjective usefulness (H4a examination): Results do not support our original hypothesis. Interestingly, we observed the opposite: participants' gaze lingered significantly longer on visual materials deemed not useful (M =

2.253 sec, SD = 1.093) than on those deemed useful (M = 1.351 sec, SD = 0.696). Effect size calculations indicated a large difference (Cohen's d = -0.988).

Relationship between returns and understanding (H4b examination): Visual materials not understood had significantly higher average return counts (M = 4.14, SD = 2.10) than understood visual materials (M = 2.50, SD = 1.38). The Wilcoxon signed-rank test showed significant difference (Z = -4.605, $p < 0.001$).

Effect of visual material captions (H4c examination): All captioned visual materials were liked by participants, so no cases fell into the "captioned, not liked" category. Two-way repeated measures variance analysis revealed significant interaction between visual material type and preference (F = 15.192, $p < 0.001$), which statistically clearly supports that caption presence modifies the relationship between fixation time and subjective liking.

New Scientific Results

The research brought several new scientific results that make significant contributions to the literature on Easy Language and visual communication:

1. First comprehensive European comparative analysis: Through systematic analysis of 22 European frameworks, we revealed fragmentation and contradictions among visual material usage guidelines in Easy Language. This is the first research to examine visual material usage rules at the European level.

2. Development of new taxonomy: We developed a new system for categorizing visual material usage rules (5 main categories, 15 subcategories, 50 specific rules), which provides a structured framework for future regulation and enables international comparison.

3. First Hungarian eye-tracking examination in this field: For the first time in Hungary, we conducted eye-tracking examination of visual information processing by people with intellectual disabilities in an Easy Language context, providing gap-filling empirical data.

4. Identification of "multi-stage" processing strategy: We discovered that people with intellectual disabilities apply a distinctive "multi-stage" processing strategy for abstract visual materials: they return significantly more often to the same visual element (M = 6.79 vs. M = 4.66, $p < .001$), presumably to reinforce or reinterpret its meaning.

5. Discovery of paradoxical relationship: We demonstrated a paradoxical relationship between processing time and subjective usefulness: participants looked significantly longer at visual materials deemed not useful (M = 2.253 vs. M = 1.351 sec, $p < 0.001$), which questions previous assumptions about the nature of visual learning processes.

6. Empirical proof of positive effect of visual material captions: We first proved empirically that the presence of visual material captions positively influences the evaluation of visual elements: captioned visual materials received exclusively positive evaluations.

7. Documentation of active visual searching behavior: We statistically proved that participants actively search for visual cues in empty areas ($M = 2.065$ fixations, $p < 0.001$), which supports the necessity of visual assistance.

8. Discovery of special role of explanatory functional visual materials: We demonstrated that explanatory functional visual materials consistently and significantly attract more attention ($M = 7.24$ fixations) and require longer processing time ($M = 4.51$ s) compared to all other visual material types.

Practical Significance of the Research

Based on the research results, several concrete recommendations can be formulated for designing Easy Language publications:

1. Placement of visual elements: Favoring left-side or bottom position, as these result in shorter fixation time and enable easier processing.

2. Choice of visual material types: Using familiar, conventional symbols can be effective, as these require shorter processing time. Additionally, it is worthwhile to favor the use of concrete visual materials over abstract ones, especially for important information.

3. Application of visual material captions: The use of captions significantly improves the evaluation and comprehensibility of publications, so it is advisable to attach short, explanatory text to every visual material.

4. Use of abstract visual materials: If we use abstract visual materials, we must be prepared that these require more return viewing from users, so more time must be allocated for their processing.

5. Conscious application of explanatory functional visual materials: These visual materials require more cognitive resources but effectively support understanding, so it is worthwhile to associate them with important information.

6. Ensuring visual assistance: In addition to textual information, visual materials must always be provided, as users actively search for these.

7. Considering processing time: Longer processing time does not mean better understanding - visual elements that can be processed simply and quickly are more effective.

These results contribute to the development of info-communication accessibility for people with intellectual disabilities, and since Easy Language materials play an important role in education and teaching from school age, and are often prepared for educational purposes in adulthood, they also contribute to the development of educational science. Due to the language independence of visual materials, the results can be useful at the international level as well.

Limitations of the Research and Future Research Directions

The main limitation of the research is the relatively small sample size (n=31), which may influence the generalizability of the results. The heterogeneity of intellectual disability and different degrees of reading difficulties would require further differentiated analysis. The composition of examination stimuli and the distribution of different types of visual materials was also not completely balanced, which may also limit the interpretation of results. In the analysis of guidelines, due to the low sample size and relatively high number of regions, cell sizes were particularly low, which limited the generalizability of results and the reliability of statistical tests.

Several promising directions emerge for future research. First, it would be necessary to involve larger and more differentiated samples in examinations, as the current sample size of 31 sets limits to the generalizability of results. With a larger, more representative sample, we could get a more accurate picture of the visual information processing characteristics of people with different severities of intellectual disability, and finer differentiations could be explored between different ability levels. Longitudinal studies would be particularly valuable, following the same individuals' visual processing strategies over longer periods. This would provide an opportunity to explore the development and changes in visual processing patterns, as well as to understand what factors influence these processes over time. The longitudinal approach would be particularly important in evaluating the effectiveness of educational and development programs. Future research should strive for more precise, standardized examination of different visual material types and arrangements under controlled conditions. This would include systematic variation of visual material complexity, size, coloring, and positioning, as well as precise measurement of resulting effects. Standardization would enable comparison of results from different studies and meta-analytic processing. Keeping pace with technological development, it would be of paramount importance to map the characteristics of information processing on digital platforms. In today's world, more and more Easy Language content appears in digital form, on mobile devices and interactive surfaces, whose processing may differ

significantly from traditional printed materials. Examining the effects of touchscreens, interactive elements, and multimedia content could open new dimensions in the research field. Conducting international comparative studies would enable exploration of cultural differences in visual information processing. Comparison with results from similar studies conducted in different countries could shed light on how universal or culture-specific the patterns we discovered are, and help harmonize international frameworks. Finally, developing targeted development programs based on research results and empirical effectiveness testing would represent the practical utilization of the research. These programs could provide concrete methodologies and tools for creators of Easy Language publications, while providing continuous feedback on the effectiveness of practical application.

Summary

The dissertation presented a comprehensive analysis and empirical examination of framework systems related to visual materials in Easy Language publications. The research consisted of two markedly distinct yet interconnected phases: the first part involved systematic meta-narrative analysis of 22 European guidelines, while the second phase examined the visual information processing characteristics of 31 adults with intellectual disabilities using eye-tracking technology and conducting semi-structured interviews.

During the analysis of guidelines, we identified five main categories: rules related to visual material meaning, quality, placement, type, and content. The meta-narrative analysis revealed that numerous contradictions and gaps characterize European guidelines. The regulation is fragmented, contains internal contradictions, and in many subcategories is incomplete or provides no clear guidance.

The results of eye-tracking examinations and interviews led to several key insights. The processing of abstract visual materials shows a distinctive pattern: they require significantly more return fixations than concrete visual materials, suggesting that people with intellectual disabilities apply a "multi-stage" processing strategy in their case. Among the different functions of visual materials, explanatory functional visual materials play a prominent role in attention processes, consistently resulting in higher fixation counts and longer fixation duration. The most important result of the research is the discovery of a paradoxical relationship between visual processing and subjective evaluations. Participants' gaze lingered significantly longer on visual materials deemed not useful, while multiple returns clearly correlated with understanding difficulties. This result suggests a paradigm shift in evaluating the effectiveness of visual

elements: not the duration of attention retention, but the ease and speed of processing indicates true effectiveness.

The research makes a significant contribution to the literature on Easy Language and visual communication, provides gap-filling empirical data on the visual information processing characteristics of people with intellectual disabilities, and gives practical guidance for developing Easy Language publications. The results are relevant not only for special education and communication science, but also contribute to educational science, social inclusion, and promoting equal access to information.

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