



The effect of information design in corporate knowledge management: An experimental research

Kurumsal bilgi yönetiminde bilgilendirme tasarımının etkisi: Deneyisel bir araştırma

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Abstract

Information design is an approach that presents information to the target audience in a clear, structured, and meaningful manner by integrating visual, verbal, and structural components. In corporate knowledge management processes, the effective presentation of information is as important as its production in supporting decision-making and learning. This study aims to experimentally examine the extent to which reports prepared according to information design principles differ from traditional presentation formats in corporate knowledge management processes. In this context, the study seeks to reveal the effect of information design on report comprehensibility, cognitive load, visual literacy, and learning styles.

The study used a full experimental post-test control group design. The sample consisted of 200 public sector employees randomly assigned to experimental and control groups. The experimental group was presented with a report prepared according to information design principles, while the control group examined a text-heavy report prepared using traditional methods with identical content. Data were collected through report-related questions, the Cognitive Load Scale, the Visual Literacy Competencies Scale, and the Verbal/Visual Dominant Learning Style Identification Scale. The collected data were analysed using IBM SPSS Statistics 25.0.

The findings showed that the experimental group achieved higher comprehension and lower cognitive load ($p < 0.001$). Results suggest that information design is a strategic tool that enhances understanding and reduces cognitive effort in organizational reporting.

Keywords: Information design, corporate knowledge management, cognitive load, visual literacy, learning styles.

Öz

Bilgilendirme tasarımı, bilginin hedef kitleye açık, düzenli ve anlamlı biçimde sunulmasını amaçlayan; görsel, sözel ve yapısal bileşenleri ele alan bir yaklaşımdır. Kurumsal bilgi yönetimi süreçlerinde, bilginin üretilmesi kadar karar alma ve öğrenme süreçlerini destekleyecek biçimde sunulması da önem taşımaktadır. Bu çalışma, kurumsal bilgi yönetimi süreçlerinde bilgilendirme tasarımı

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ilkelerine göre hazırlanan raporların, geleneksel sunum biçimlerine kıyasla ne ölçüde fark yarattığını deneysel olarak incelemeyi amaçlamaktadır. Araştırma, bilgilendirme tasarımının raporların anlaşılabilirliği, bilişsel yük, görsel okuryazarlık ve öğrenme stilleri üzerindeki etkisini ortaya koymayı hedeflemektedir.

Araştırma, son-test kontrol gruplu tam deneysel desenle yürütülmüştür. Çalışma grubunu rastgele atama yoluyla oluşturulan 200 kamu personeli oluşturmuştur. Deney grubuna bilgilendirme tasarımı ilkelerine göre hazırlanmış bir rapor, kontrol grubuna ise aynı içeriğe sahip geleneksel yöntemle hazırlanmış metin ağırlıklı bir rapor sunulmuştur. Veri toplama araçları olarak rapora ilişkin sorular, Bilişsel Yük Ölçeği, Görsel Okuryazarlık Yeterlikleri Ölçeği ve Sözel/Görsel Baskın Öğrenme Stili Belirleme Ölçeği kullanılmış; elde edilen veriler IBM SPSS Statistics 25.0 programı ile analiz edilmiştir.

Bulgular, deney grubunun daha yüksek kavrama düzeyine ve daha düşük bilişsel yüke ulaştığını göstermiştir ($p < 0.001$). Sonuçlar, bilgilendirme tasarımının, kurumsal raporlamada anlayışı artıran ve bilişsel çabayı azaltan stratejik bir araç olduğunu düşündürmektedir.

Anahtar Kelimeler: Bilgilendirme tasarımı, kurumsal bilgi yönetimi, bilişsel yük, görsel okuryazarlık, öğrenme stilleri.

Introduction

The organizational value of data lies not only in its collection but also in its ability to be transformed into comprehensible information that can guide decision-making processes. Nevertheless, presentations, reports, and dashboards filled with data tend to lose their meaning and fail to create a lasting impact when they are not designed within a coherent narrative framework (Wojtkowski & Wojtkowski, 2002, p. 3). In this sense, the effective management of information directly supports decision-making mechanisms, organizational efficiency, and the development of a learning organization structure. However, traditional methods have proven inadequate in structuring and presenting large datasets in a comprehensible manner, thereby revealing the necessity of information design approaches.

Within this framework, reports stand out as one of the primary tools of corporate knowledge management. Reports that guide internal decision-making mechanisms, strategic planning, and operational functioning fulfil not only the function of collecting and recording information but also of making sense of and transferring it. Yet, traditional report methods fall short of addressing the increasing data density and the growing expectations of target audiences, necessitating the development of new methods for effective information presentation. In this context, information design emerges as a strategic element in corporate knowledge management processes by facilitating access to and the inference of meaning from information through accurate, clear, and engaging presentations (Pettersson, 2002, p. 19). Particularly through the use of visualisation and storytelling tools, information design reduces users' cognitive load and supports faster and more effective perception of information.

Humans experience the world through five senses; however, vision plays a dominant role in information acquisition, with approximately one-third of the human brain devoted to visual processing (Eagleman, 2016, p. 48). It has been widely reported that nearly 90% of the information processed by the brain is visual in nature, and that visual information is processed significantly faster than textual information (Walter & Gioglio, 2015, p. 20-21). From this perspective, the effective visual presentation of information extends beyond the organization of increasing volumes of data and emerges as a strategic factor influencing sociocultural, economic, and technological developments in contemporary societies.

At the same time, the proliferation of communication channels has intensified competition for attention, making it increasingly difficult to capture and sustain audience engagement. Under these conditions, the ability to create visually compelling content has become essential across a wide range of professional domains, from education to finance. Consequently, visual literacy has been recognised as a critical competency in the digital age. Supporting this view, the Visual Economy Report (2023) indicates that 95% of business leaders expect employees to possess design-related skills and visual literacy, even in roles not traditionally associated with visual communication.

Information design plays a significant role in information transfer by enabling the presentation of information in an engaging, concise, and comprehensible manner. In an era where scientific research and knowledge production processes are undergoing rapid transformation, interdisciplinary and transdisciplinary approaches have become increasingly important (Canan & Acungil, 2018, p. 164). In this context, information design, gaining new dimensions through technological developments, can be regarded as a contemporary knowledge management practice and represents a research area that warrants greater attention within the field of knowledge management.

This study experimentally examined the effect of information design in corporate knowledge management. The study aims to determine whether reports with information design provide greater comprehensibility and lower cognitive load than traditional report methods. In addition, the role of individual variables such as visual literacy level and learning style in this process was also analysed.

This research aims to make an empirical contribution to the literature on knowledge management and information design and to guide organizations in developing new approaches to knowledge management strategies.

Research Purpose and Problem/Questions/Hypotheses

This study aims to evaluate the effect of content prepared in accordance with information design principles on corporate knowledge management processes. In the context of individual variables such as comprehensibility of reports, cognitive load, visual literacy level and learning style, the extent to which information design makes a difference compared to traditional presentations was empirically examined.

Organizations face significant challenges in transforming large volumes of data into strategic and context-specific knowledge and in generating maximum value from their intellectual capital during this process. These challenges largely stem from the inability to process and present data obtained from Knowledge Management Systems (KMS) effectively and meaningfully. As a result, organizational knowledge potential cannot be fully utilized, and decision-making and learning processes are not adequately supported.

The main hypothesis of this study is that information design is a strategic component of corporate knowledge management. Accordingly, the primary hypothesis of the research is formulated as follows:

H1: Reports designed in accordance with information design principles result in higher levels of comprehensibility compared to reports prepared using traditional methods.

In order to test this main hypothesis through the experimental framework designed in the study, the following sub-hypotheses have been developed:

H2: Reports designed in accordance with information design principles result in lower perceived cognitive load compared to reports prepared using traditional methods.

H3: Individuals with higher levels of visual literacy achieve higher comprehension scores when interacting with information design-based reports.

H4: Individuals with a dominant visual learning style achieve higher comprehension and perceived effectiveness scores when interacting with information design-based reports compared to verbally dominant individuals.

The main research questions addressed in this study are as follows:

Q1: What is the role and importance of information design in improving corporate knowledge management activities?

Q2: What are the contributions of preparing reports derived from corporate Knowledge Management System data according to information design principles to knowledge management processes?

Q3: Is there a statistically significant difference among participants' visual literacy levels, learning styles, perceived cognitive load, and responses to comprehension questions when information is presented through different reporting techniques?

Q4: How does the visual literacy level affect the comprehensibility and effectiveness of information design in corporate knowledge management?

Q5: How do verbal and visual learning styles influence the perceived effectiveness of information design in corporate knowledge management?

Q6: What role does cognitive load level play in the comprehensibility and usability of information presented through information design?

Q7: According to which principles can information design be optimized to reduce cognitive load in corporate knowledge management contexts?

Literature Review

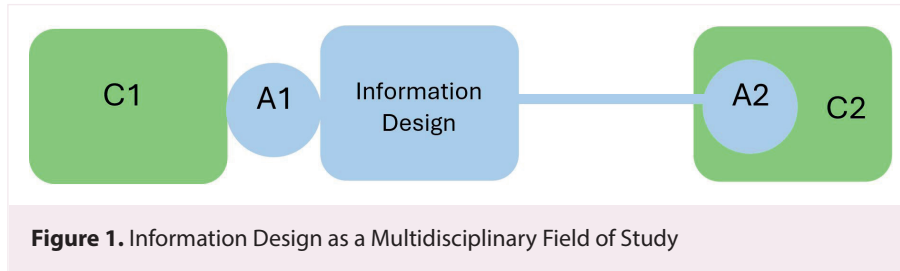
Özdemirci (2001, p. 2) defines corporate knowledge as all types of information, ideas, and facts that play a decisive role in an organization's management and development processes. Odabaş and Polat (2008, p. 236) conceptualize corporate knowledge as encompassing all recorded and unrecorded information that is either produced within the organization or obtained from external sources. Similarly, Anameriç (2004, p. 170) describes corporate knowledge as the information acquired through the internal activities of public institutions.

Corporate knowledge management is concerned not only with producing and storing knowledge, but also with presenting it to decision makers in a comprehensible, timely and actionable manner. Traditional knowledge management models, such as Wiig (1993), Nonaka and Takeuchi (1995) and Choo (1996), have generally focused on the production, categorisation and sharing of , while the question of how knowledge is presented to users has remained secondary. However, as digitalisation and data density have increased, the value of comprehensible information as well as data has come to the fore.

Today, data can be automatically collected, classified, labeled, and analysed through computer-mediated systems, and these capabilities continue to expand rapidly. As a result, individuals are exposed to unprecedented volumes of information, analysis, and interpretation. In such an environment, the ability to distinguish between useful and useless, accurate and inaccurate, urgent and non-urgent, as well as relevant and irrelevant information has become increasingly critical (Aksu, 2015, p. 179). In this context, information design stands out as a critical concept that needs to be integrated with knowledge management. Information design involves the analysis, planning, presentation, and comprehension of a message-including its content, language, and form-in order to meet the information needs of the target audience (Pettersson, 2002, p. 19). In particular, information presentation with graphics, colour, space, hierarchy, typography and visual symbols enables users to perceive and remember information faster (Tufte & Graves-Morris, 1983; Ware, 2019). Pettersson (2002) defines the basis of this approach as "the presentation of meaning through form". Durmaz and Ergüven (2009, p. 78) define information design as the process of planning the content of information, the medium through which it will be presented, and the mode of communication in accordance with user requirements, in order to create a meaningful and functional whole.

Pettersson (2014, p. 5), the first professor of information design in Sweden, describes information design in his article "Information Design Theories" as a multidisciplinary field that draws on contributions from more than fifty disciplines and professional domains. According to Pettersson (2014), these contributions encompass a wide range of elements, including phenomena, effects, methods, practices, principles, processes, strategies, theoretical approaches, and tools.

Pettersson (2014, p. 5) argues from a process-oriented perspective that the rise of new academic disciplines and professional fields concurrently promotes the development and institutionalization of practices unique to these areas (Figure 1).



In Figure 1, Pettersson illustrates that the interaction between information design and existing disciplines and professions (represented as C1) has led to the emergence of a range of new practices (represented as A1), and that these practices have subsequently developed within other disciplines and professional fields (represented as C2). He further notes that additional practices continue to be developed within the scope of information design itself. Pettersson's explicit reference to administrative documents/reports and document and information management systems among these practices (Pettersson, 2014, p. 5) is particularly significant, as it aligns directly with the focus of the present study.

Cognitive load theory is one of the frameworks that can be used to measure the effects of information design. The theory developed by Sweller (1988) centres on the limited processing capacity of the human mind. Complex and irregular information presentations can create "excessive cognitive load," making it difficult for individuals to learn or make decisions (Sweller et al., 2011). For this reason, structures that reduce cognitive load, that is, structures that present information in a processable and hierarchical way, support learning. Mayer and Moreno (2003) showed that presenting visual and verbal content in harmony in multimedia-supported learning increases both the quality of learning and the level of information retention.

Visual literacy is an individual's ability to recognise, analyse and reproduce visual messages (Burns, 2006; Messaris (1991). This concept becomes critical especially in environments where information is presented through visual channels such as graphics, icons and infographics. The Visual Literacy Competencies Scale developed by Kiper et al. (2012) is an important measurement tool for assessing individuals' levels in this field. Various studies have shown that individuals with high visual literacy levels comprehend presentations based on information design faster and show higher performance (Moreno, 2006; Ware, 2019).

The effect of information presentation is not only related to visual perception, but also to learning styles. The Verbal or Visual Dominant Learning Style Identification Scale developed by Childers, Houston, and Heckler (1985) and adapted into Turkish by Akgün et al. (2014) is used to measure individuals' information processing preferences. Experimental research has shown that individuals who are visual-dominant learners benefit more from visual content and achieve higher knowledge acquisition than those who are verbal-dominant (Moreno, 2006).

In this context, studies on integrating information design into corporate knowledge management processes are limited. In corporate reporting, the transfer of large volumes of data content to decision makers is usually carried out through dense text and table structures, which can lead to information overload, conceptual disorganization and meaning gaps for users (Choo, 1996). For this reason, corporate knowledge management should see the presentation of knowledge as a strategic process as well as its production. Tufte and Graves-Morris (1983) emphasize that information design practices are not only an aesthetic contribution but also a tool that supports analytical thinking.

The originality of this study stems from its experimental testing of the effect of information design on corporate knowledge management processes, alongside individual variables such as cognitive load, visual literacy, and learning style. Examples in the literature where these variables are considered together are extremely limited. Therefore, the study proposes a new

approach based on user-centred information design, arguing that information management should be rethought not only in terms of content production but also in terms of presentation quality.

Although the existing literature provides substantial insights into corporate knowledge management, information design, and cognitive theories, these domains have largely developed in parallel rather than through an integrative perspective. The knowledge management literature has traditionally focused on the processes of knowledge creation, storage, and sharing (Alavi & Leidner, 2001; Davenport & Prusak, 1998; Nonaka & Takeuchi, 1995), while paying relatively limited attention to how knowledge is presented, perceived, and cognitively processed by users.

Similarly, studies in information design and multimedia learning have extensively examined how visual and verbal elements influence comprehension, cognitive load, and learning outcomes (Mayer & Moreno, 2003; Sweller, 1988; Ware, 2019). However, these studies are generally situated within educational or communication contexts and are rarely integrated into the domain of corporate knowledge management.

This separation has resulted in a significant gap in the literature. Specifically, the role of information presentation as a strategic component of knowledge management processes remains underexplored. In particular, the literature lacks empirical studies that examine how information design principles influence the usability and effectiveness of knowledge generated through corporate Knowledge Management Systems.

Moreover, within the fields of information and records management, the emphasis has predominantly been placed on classification, storage, access, and preservation of information, whereas the presentation and user-centered structuring of information have received comparatively limited and fragmented attention. This indicates a need for a more systematic integration of cognitive and design-oriented perspectives into knowledge and records management research.

In response to these gaps, this study makes three main contributions. First, it introduces an integrative perspective that connects corporate knowledge management with information design through cognitive theories. Second, it provides empirical evidence on how information design affects comprehensibility and cognitive load in a corporate context. Third, it reconceptualizes information design not merely as a supportive tool, but as a strategic and transformative component of knowledge management processes.

By doing so, the study moves beyond a descriptive review of the literature and contributes to an emerging discussion on the role of user-centered and cognitively informed approaches in enhancing the effectiveness of organizational knowledge.

In this context, the relationship between corporate knowledge management and information design must be considered not merely at the level of functional complementarity, but also within an analytical and transformative framework. While traditional knowledge management approaches focus on the processes of producing, storing and sharing information, the dimension of how this information is perceived, processed and interpreted by the user is often relegated to a secondary role. However, the capacity of information to generate organizational value depends not only on its accessibility but also on its being cognitively processable and presented in a meaningful manner.

At this point, information design is positioned not merely as an aesthetic element added to information management processes, but as a strategic component that directly influences the way information is structured and interpreted. In particular, guided by the principles established by cognitive load and dominant learning style approaches, the holistic design of information's visual and verbal elements optimizes users' mental processing and ensures the more effective use of information.

In this context, the relationship between information design and corporate knowledge management should be viewed not as the parallel development of two separate fields, but as an interaction that transforms and redefines one another. Accordingly, corporate knowledge management is not merely a process limited to the production and distribution of information; it must be reconceptualised as a multi-layered structure that also encompasses the presentation of this information to the

target audience in a manner characterized by low cognitive load, high comprehensibility, and support for decision-making processes.

In line with this approach, information design is becoming an integral part of corporate knowledge management; it plays a critical role in the transformation of information from raw data into meaningful and actionable knowledge. Thus, the effectiveness of knowledge management processes is directly linked not only to “what information is produced” but also to “how this information is designed and presented”.

Methodology

This study utilized a full experimental design (Karasar, 2016, p. 97) with a post-test control group to assess the impact of information design on corporate knowledge management processes. In the experiment, reports featuring different designs were presented to both the experimental and control groups. Subsequently, measurements were taken to determine if there were significant differences between the two groups. A total of 200 public employees were randomly assigned to either the experimental or the control group.

Table 1. Research Design

Group	Operation	Post-Test
Experimental Group (100 Public Personnel)	Report Created with Information Design	Questions Regarding the Report Cognitive Load Visual Literacy Identifying Verbal or Visual Dominant Learning Style
Control Group (100 Public Personnel)	Report Generated by Traditional Method (No action.)	Questions Regarding the Report Cognitive Load Visual Literacy Identifying Verbal or Visual Dominant Learning Style

In the study, the report design (a report created using information design or a traditional report) was used as the independent variable. The dependent variables included responses to questions about the report, cognitive load, visual literacy level, and learning style.

In a post-test control group experimental research design, at least two groups must be formed and these groups must be determined by random allocation. These groups are the control and experimental groups. In the experiment conducted, a post-test is administered to both the experimental and control groups (Karasar, 2006, p. 97).

The reasons for not administering a pre-test in this study can be summarised as follows:

- **Homogeneity of the Experimental and Control Groups:** The similarity of the characteristics of participants in the experimental and control groups ensures experimental equivalence. A random allocation method was used to ensure equivalence between the experimental and control groups. In this case, the scientific value of administering a pre-test is limited. This is because the absence of significant differences between the groups rendered the pre-test unnecessary for the purpose of confirming equivalence. The random selection of the defined groups and the fact that the groups are at the same level prior to the experimental process render the pre-test unnecessary (Karasar, 2006, p. 86).
- **Avoiding the Retest Effect:** Administering a pre-test prior to the experimental procedure may lead participants to become aware of the results and use this information to influence the post-test. For this reason, a pre-test was not administered in this study in order to eliminate the retest effect.

- **Saving Time:** Selecting a homogeneous group minimised differences within the group from the outset; consequently, rather than conducting a detailed assessment for a pre-test or baseline measurements, the experimental procedure was commenced directly. This saved time for the research and allowed for a focus on evaluating the effects of the experiment.

Although random assignment was used to ensure group equivalence, it is acknowledged that certain uncontrolled variables may have influenced the results. In particular, participants' prior knowledge levels, familiarity with report formats, and previous exposure to visually designed materials may have affected their comprehension and cognitive load.

To minimize these potential effects, participants were selected from a relatively homogeneous population (public sector employees involved in similar knowledge processes), and both experimental and control groups were formed through random assignment. In addition, both groups were exposed to reports containing identical content, ensuring that only the presentation format varied.

However, despite these precautions, the potential influence of individual differences such as prior experience with data interpretation, visual literacy habits developed outside the experimental setting, and familiarity with institutional reporting formats cannot be entirely ruled out. Therefore, these variables should be considered as limitations of the study and taken into account in the interpretation of the findings.

Population and Sample

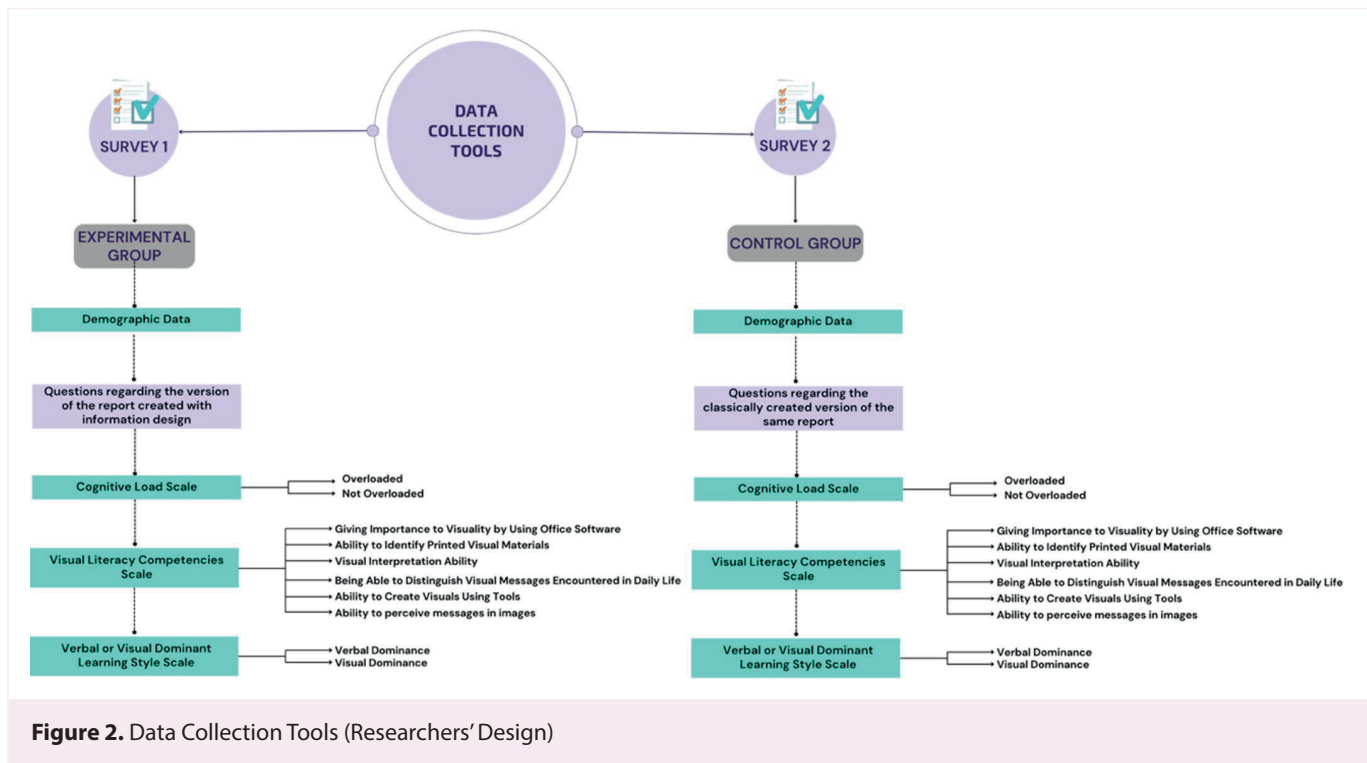
The study population consisted of employees working in Turkish public sector institutions, and the research was conducted within public organizations operating under the Turkish public administration system. The sample frame included public employees who actively participate in institutional knowledge management processes, such as the creation, use, sharing, or management of organizational information, and participation was voluntary. The sample comprised 200 public sector employees, who were randomly assigned to either the experimental or the control group. While the experimental group analysed a report prepared using information design principles, the control group analysed a report prepared using traditional methods.

Demographic characteristics of the participants such as age, gender, education level and position within the organization were also collected and it was ensured that the groups were homogeneously distributed.

Data Collection Tools

Data were collected using the following tools:

- **Questions Regarding the Report Prepared with Information Design and the Report Prepared with Traditional Method:** Two report groups prepared with the same content and different presentation formats were used. Although the contents were exactly the same, information design was applied in the report presented to the experimental group. A total of 15 questions (5 questions for each report section) were used to measure the comprehensibility of the information obtained from the reports.
- **Cognitive Load Scale:** "Cognitive Load Scale" developed by Paas and van Merriënboer (1993) and adapted into Turkish by Kılıç and Karadeniz (2004) was used to measure the cognitive load experienced by the participants while perceiving the report.
- **Visual Literacy Competences Scale:** "Visual Literacy Competencies Scale" developed by Kiper et al. (2012) was used to examine the relationship between information design and visual literacy levels of individuals.
- **Verbal or Visual Dominant Learning Style Identification Scale:** In order to determine the learning styles of the participants, the Style of Processing Scale, which was adapted into Turkish by Akgün et al. (2014) as the "Verbal or Visual Dominant Learning Style Determination Scale" and developed by Childers et al. (1985) to determine the verbal or visual dominant learning style, was applied.



Design of Experimental Materials (Reports)

To isolate the experimental intervention, two different reports were prepared, each with identical content (raw data and text) but differing in presentation format. The Information Design report presented to the experimental group was structured specifically according to Tufte and Graves-Morris's (1983) data visualisation principles. This report avoided dense text and tables, presenting data through infographics and customized data visualisations that reduced complexity. Reading flow was optimized through the use of semantic color theory, typographic hierarchy, and white space to support comprehension. In contrast, the Traditional Report presented to the control group, although presenting the same information, used the default graphic output of standard office software and featured a standard page layout based on dense text blocks with limited visual hierarchy. This intentional design difference enabled clear measurement of the impact of the information presentation format, the study's independent variable, on participants' perceptions, cognitive load, and achievement levels.

The information design-based report used in the experimental group was developed in accordance with established principles from the information design literature in order to ensure a systematic and theory-driven intervention.

First, the design process was guided by the principles proposed by Sless (1997, p. 1-5), known as the "5P" framework: Politics, Position, Parsimony, Politeness, and Performance. Within this framework, the report was designed to align with the informational needs and expectations of the target audience (Position), to present only necessary and relevant information by avoiding redundancy (Parsimony), to ensure clarity and accessibility in communication (Politeness), and to maximize usability and effectiveness in real-world contexts (Performance). These principles were adopted to bridge the gap between theory and practice in information design and to enhance the overall communicative effectiveness of the report.

In addition to the 5P framework, the document design process followed a structured, multi-stage approach based on the model proposed by Delin et al. (2002, p. 57). Accordingly, the development of the experimental report involved the following stages:

1. Content Structure: All relevant textual and visual materials were identified and systematically organized prior to the design process. This included the selection of key data, supporting visuals, and potential thematic groupings to ensure content completeness and relevance.
2. Rhetorical Structure: The overall communicative structure of the report was defined by organizing the content hierarchically. Main themes, headings, and subheadings were determined to guide the logical flow of information and to support coherent message delivery.
3. Layout Structure: Based on the established rhetorical structure, visual hierarchy and spatial organization were designed. The positioning, size, and prominence of textual and visual elements were carefully arranged to guide user attention and facilitate information processing.
4. Navigation Structure: The relationships between different content elements were clarified to support ease of navigation. Visual and textual cues were used to establish connections between sections, enabling users to follow the information flow intuitively.
5. Linguistic Structure: The language used in the report was simplified and optimized to enhance clarity and comprehension. Textual elements were designed to complement visual components, ensuring coherence between verbal and visual communication.

Through the integration of these principles, the experimental report was designed to optimize information presentation in terms of clarity, structure, and cognitive accessibility.

In contrast, the traditional report presented to the control group did not follow a systematic design framework. Although it contained identical content, it was presented in a conventional format characterized by dense text, limited visual hierarchy, minimal use of design principles, and standard table-based representations.

Data Analysis

IBM SPSS Statistics 25.0 (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.) was used. Shapiro-Wilk and Kolmogorov-Smirnov tests were used to determine whether continuous variables were normally distributed. For comparisons between two groups, the independent sample t-test was used for continuous variables and the chi-square test was used for categorical variables. The statistical significance level was set at $p < 0.05$.

Findings

Demographic Data

Of the 200 public employees included in the study, 51% were female and 49% were male, with a mean age of 36.4 years. The majority of participants held a bachelor's degree (70%) and were employed as staff rather than managers (80.5%). Participants had varying lengths of service, ranging from less than one year to over 30 years. No statistically significant differences were found between the experimental and control groups in demographic characteristics, indicating homogeneity ($p > 0.05$).

Table 2. Demographic Data

Variable	Category	n	%
Gender	Female	102	51.0
	Male	98	49.0
Age (years)	Min-Max	25-55	-
	Mean (SD)	36.4	-
Educational Level	Bachelor's degree	140	70.0
	Postgraduate degree	60	30.0

Position	Staff/Employee	161	80.5
	Manager	39	19.5
Years of Service	≤ 1 year	2	1.0
	1-2 years	9	4.5
	3-5 years	21	10.5
	6-10 years	42	21.0
	11-15 years	40	20.0
	16-20 years	19	9.5
	21-29 years	48	24.0
	≥ 30 years	18	9.0

Note: No statistically significant differences were found between the experimental and control groups in terms of demographic characteristics, indicating group homogeneity ($p > 0.05$).

The Effect of the Report Prepared with Information Design on Understandability

In this study, it was tested whether the reports prepared by using information design provide higher comprehensibility compared to traditional reports. The results of the test applied to the experimental and control groups are as follows:

Table 3. Normal Distribution of Data Based on Experimental and Control Groups (Authors' Calculation)

Report Page 1*	Group	n	M	SD	K-S	S-W	Skew	Kurt
	Experiment	100	75.20	22.22	0.23	0.86	-0.77	0.02
	Control	100	51.0	26.27	0.19	0.91	0.28	-0.85
Report Page 2**	Group	n	M	SD	K-S	S-W	Skew	Kurt
	Experiment	100	79.80	22.11	0.23	0.81	-1.07	0.66
	Control	100	54.40	23.28	0.18	0.90	-0.09	-0.98
Report Page 3***	Group	n	M	SD	K-S	S-W	Skew	Kurt
	Experiment	100	75.00	24.02	0.22	0.84	-1.07	1.05
	Control	100	54.40	22.93	0.18	0.92	0.12	-0.18
Total	Group	n	M	SD	K-S	S-W	Skew	Kurt
	Experiment	100	76.67	17.5	0.21	0.90	-0.94	0.46
	Control	100	53.27	18.9	0.10	0.96	0.28	-0.68

Note: n: Sample size, M: Mean, SD: Standard deviation, K-S (Statistic): Kolmogorov-Smirnov test statistic, S-W (Statistic): Shapiro-Wilk test statistic, Skew: Skewness value, Kurt: Kurtosis value.

In the social sciences, skewness and kurtosis values of ± 1 or ± 1.5 indicate that the data are close to a normal distribution (West et al., 1995). The skewness and kurtosis values of the experimental and control groups show that the data are suitable for normal distribution. In the experimental group, skewness was -0.94 and kurtosis was 0.46; in the control group, skewness was 0.28 and kurtosis was -0.68. Histogram tests also support these findings. Therefore, it was concluded that the data were normally distributed and that the independent-samples t-test was appropriate.

When the mean scores of the experimental and control groups are compared, the experimental group scored higher in all cases, and the difference between the groups is significant. For the 5 questions on Report Page 1, the experimental group's average score was 75.20, and the control group's average score was 51.00. For Report Page 2, the experimental group's average score was 79.80, and the control group's average score was 54.40. For Report Page 3, the experimental group scored 75.00 and the control group scored 54.40. Considering the overall average across all pages, the experimental group scored 76.67, and the control group scored 53.27.

In general, the average score of the experimental group was 76.67, while the average score of the control group was 53.27 for the total of the questions covering all pages. These results clearly indicate that the experimental group, which received the information design, understood and interpreted the report information more effectively, demonstrating that the design significantly impacted learning.

The skewness, kurtosis and histogram results of the experimental and control groups show that the data are normally distributed. Accordingly, the assumption of normality was met, and the independent-samples t-test was found appropriate.

Table 4. T-Test of The Data on The Basis of Experimental and Control Groups (Authors' Calculation)

Variable	Group	n	M	SD	t - Test		
					t	Sd	p
Report Page 1*	Experiment	100	75.20	22.22	7.03	198	0.00
	Control	100	51.00	26.26			
Report Page 2**	Experiment	100	79.80	22.10	7.91	198	0,00
	Control	100	54.40	23.28			
Report Page 3***	Experiment	100	75.00	24.01	6.20	198	0,00
	Control	100	54.40	22.93			
Total	Experiment	100	76.67	17.51	9.07	198	0,00
	Control	100	53.27	18.91			

Note: n: Sample size, M: Mean, SD: Standard deviation, t: t-test value, Sd: degrees of freedom, p: significance level.

According to the results of independent sample t-test, the mean of correct answers of the experimental group was significantly higher than the control group ($t(198)=9,07$, $p < 0.001$). The reports prepared with information design significantly increased the understanding of the information.

The Effect of Information Design on Cognitive Load

In order for the participants to perceive the reports, they had to make a certain effort at the cognitive level. In this context, the "Cognitive Load Scale" developed by Paas and van Merriënboer (1993) and adapted into Turkish by Kılıç and Karadeniz (2004) was used. The scale is scored from 1 to 9, and 5 points is considered the midpoint. Scores below 5 indicate low cognitive load and scores above 5 indicate high cognitive load.

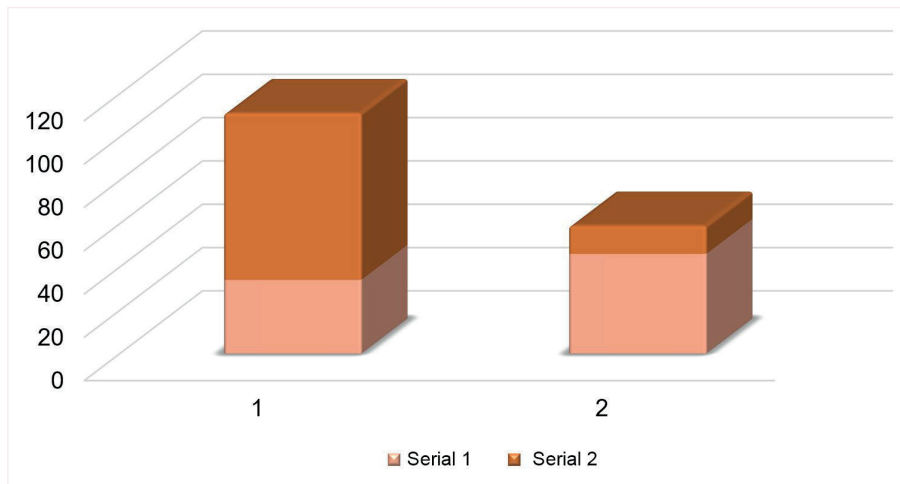


Figure 3. Comparison of The Scores Obtained From the Cognitive Load Scale According to the Groups (Authors' Calculation)

The findings revealed that 42.5% of the experimental group experienced cognitive overload, while 57.5% maintained a low load level. In contrast, the control group showed a much higher rate of cognitive overload, with 85.6% affected, and only 14.4% at a low load level (see Figure 3 and Table 5). A statistically significant difference in cognitive load levels was observed between the two groups ($p < 0.001$).

Table 5. Comparison of The Scores Obtained From the Cognitive Load Scale According to the Groups (Authors' Calculation)

	Overloaded n (%)	Not Overloaded n (%)	x²	p
Experiment	34 (42.5)	46 (57.5)	34.647	<0.001
Control	77 (85.6)	(14.4)		

Note: n: Sample size, x²: Chi-square test statistic, p: significance level.

The results indicate that the cognitive load experienced by the experimental group, which utilized information design, was significantly lower than that of the control group, which employed traditional methods. The information design effectively reduced the mental effort required by users when accessing information.

Visual Literacy Level and Report Perception

In the study, the "Visual Literacy Competencies Scale" consisting of 5-point Likert type, 29 items and 6 sub-dimensions was used.

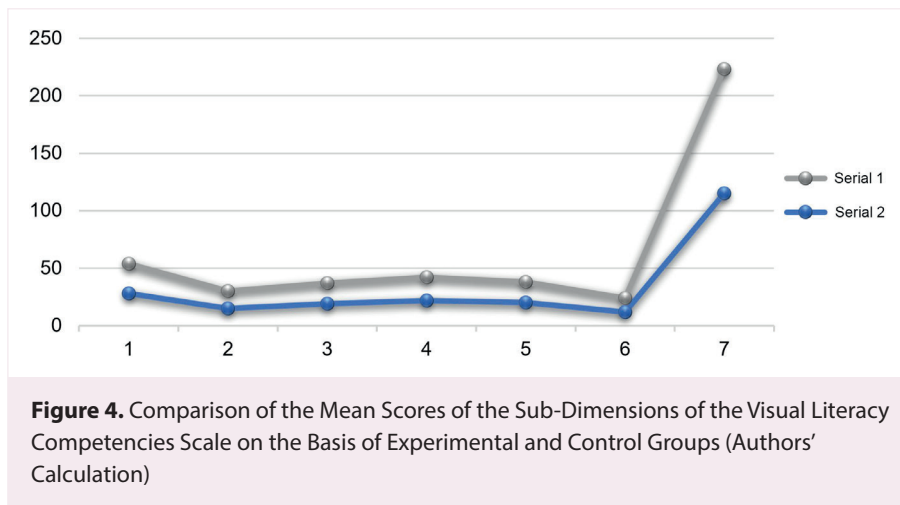


Figure 4. Comparison of the Mean Scores of the Sub-Dimensions of the Visual Literacy Competencies Scale on the Basis of Experimental and Control Groups (Authors' Calculation)

The 6 sub-dimensions and total scores of the Visual Literacy Competencies Scale were compared on the basis of the experimental and control groups and the results are shown in Figure 4 and Table 6.

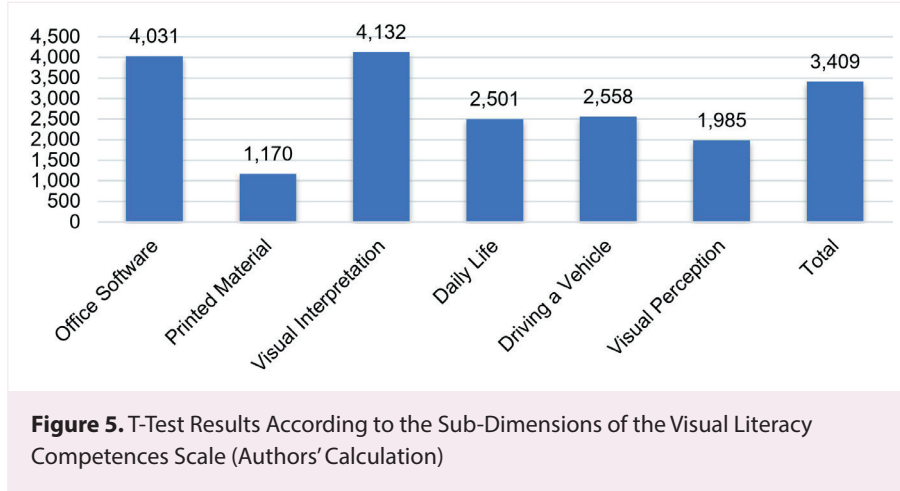
Table 6. Normality Analysis of Visual Literacy Competencies Scale Scores on The Basis of Experimental and Control Groups (Authors' Calculation)

Group	n	M	SD	K-S	S-W	Skew	Kurt
Experiment	100	4.01	0.54	0.07	0.97	-0.39	-0.08
Control	100	3.76	0.51	0.08	0.98	0.01	-0.60

Note: n: Sample size, M: Mean, SD: Standard deviation, K-S (Statistic): Kolmogorov-Smirnov test statistic, S-W (Statistic): Shapiro-Wilk test statistic, Skew: Skewness value, Kurt: Kurtosis value

In the normality analysis, the mean of the experimental group was found to be 4.01, with a standard deviation of 0.54; the mean of the control group was found to be 3.76, with a standard deviation of 0.51; Kolmogorov-Smirnov and Shapiro-Wilk tests yielded results suitable for normal distribution for both groups (Experimental: $p = 0.14$, $p = 0.06$; Control: $p = 0.32$, $p > 0.05$). Skewness and kurtosis values were also within acceptable limits.

Both groups demonstrated a normally distributed variable, allowing for the application of an independent-samples t-test.



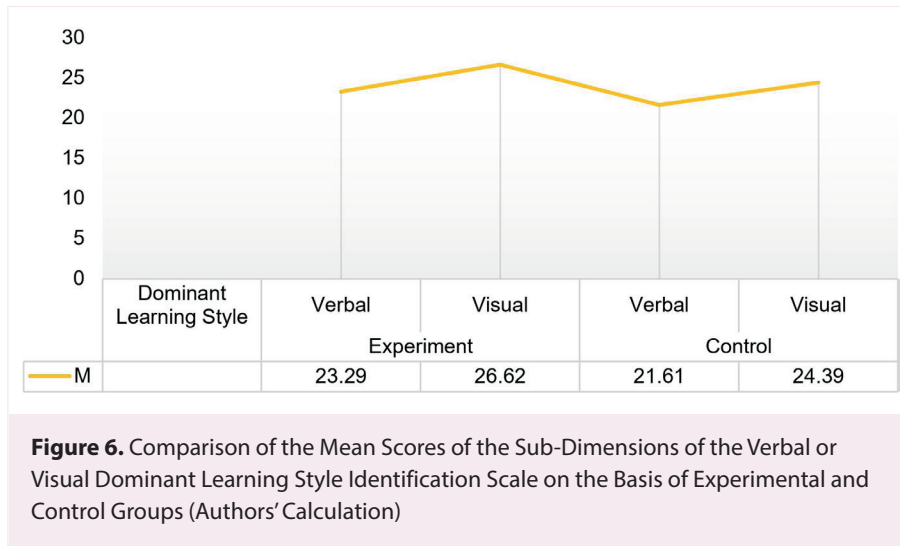
According to the independent samples t-test results, the experimental group outperformed the control group in producing visuals using office software ($t = 4.031$, $p < 0.001$), interpreting visuals ($t = 4.132$, $p < 0.001$), distinguishing visual messages in daily life ($t = 2.501$, $p = 0.012$), producing visuals using tools ($t = 2.558$, $p = 0.011$), and perceiving visual messages ($t = 1.985$, $p = 0.047$). There was no significant difference between the groups in the sub-dimension of recognising printed visual materials ($t = 1.170$, $p = 0.242$).

When the Visual Literacy Competencies Scale scores of the experimental and control groups were compared, the experimental group showed higher averages. A significant difference was found especially in the sub-dimensions of "interpreting visuals" and "perceiving messages in visuals" ($p < 0.05$). Individuals with higher visual literacy comprehended the reports containing information design more successfully.

These results support the importance of using information design as a strategic element in corporate information management. It is also considered that the development and dissemination of visual literacy skills is an important step that will support organizational efficiency, innovation and sustainable success.

The Effect of Learning Style

In the study, "Verbal or Visual Dominant Learning Style Identification Scale" (Akgün et al., 2014) consisting of 4-point Likert type, 16 items and 2 sub-dimensions was used.



Verbal or Visual Dominant Learning Style Identification Scale analyses of the experimental and control groups are given in Table 7. Verbal and visual sub-dimension scores and total score were significantly higher in the experimental group than in the control group ($p < 0.001$).

Table 7. Normality Analysis of Verbal or Visual Dominant Learning Style Identification Scale Scores for Experimental and Control Groups (Authors' Calculation)

Group	n	M	SD	K-S	S-W	Skew	Kurt
Experiment	100	3.12	0.32	0.13	0.96	0.20	-0.73
Control	100	2.88	0.32	0.16	0.94	0.86	0.71

Note: n: Sample size, M: Mean, SD: Standard deviation, K-S (Statistic): Kolmogorov-Smirnov test statistic, S-W (Statistic): Shapiro-Wilk test statistic, Skew: Skewness value, Kurt: Kurtosis value

The scores obtained by the experimental group in the scale were significantly higher than the control group ($p < 0.001$). In normality analyses, the mean of the experimental group was found to be 3.12 with a standard deviation of 0.32; the mean of the control group was found to be 2.88 with a standard deviation of 0.32. Kolmogorov-Smirnov and Shapiro-Wilk tests supported normal distribution for both groups. In addition, skewness 0.20, kurtosis -0.73 in the experimental group; skewness 0.86, kurtosis 0.71 in the control group and all values were within acceptable limits.

It was evaluated that the values analysed in both groups were suitable for normal distribution and independent sample t-test could be performed.

Table 8. T-Test on the Basis of the Experimental and Control Groups According to the Sub-Dimensions of the Verbal or Visual Dominant Learning Style Identification Scale (Authors' Calculation)

Group	Dominant Learning Style	n	M	SD	t - Test		
					t	Sd	p
Experiment	Verbal	100	23.29	2.77	5.35	198	0.01
	Visual		26.62	3.34			
Control	Verbal	100	21.61	2.88			
	Visual		24.39	3.36			

Note: n: Sample size, M: Mean, SD: Standard deviation, t: t-test value, Sd: degrees of freedom, p: significance level.

In line with these findings, an independent-samples t-test was conducted, and the experimental group's total scores were significantly higher than those of the control group ($t = 5.35$, $p < 0.01$). It was observed that the experimental group was more prone to visual learning, and the visual elements in the information design contributed more to this group's learning processes (especially in terms of retention).

In addition, the relationship between the participants' learning styles and their performances based on the information design was analysed. Visually dominant learners performed significantly better on the reports with information design ($p < 0.01$), whereas the difference between the two reports was less significant for verbally dominant learners. These results support the conclusion that information design increases comprehensibility and this effect is stronger in individuals with visual learning style.

Discussion

The findings of this study clearly demonstrate that information design plays a critical role in corporate knowledge management processes. The fact that the experimental group participants achieved higher correct answer rates and reported lower cognitive load in the reports prepared with information design confirms the potential of information design to increase the comprehensibility of information and reduce the mental effort of users.

This outcome is consistent with existing literature, which highlights that the presentation of information is not merely a matter of aesthetic preference; it also plays a crucial role in cognitive processes. Mayer and Moreno (2003), in the context of Cognitive Load Theory, showed that well-structured and visually supported content enables individuals to use their cognitive resources more efficiently. Similarly, Sweller (1988) stated that minimizing cognitive load enhances the effectiveness of learning. In this light, employing effective information design in organizational presentations can significantly improve knowledge management practices.

Another important finding of the study is the significant relationship between visual literacy level and information design perception. It was observed that individuals with high visual literacy interpret information faster and more accurately, which is consistent with the views of Burns (2006) and Messaris (1991) emphasising that visual literacy has become a fundamental competence in the information age. However, no significant difference was found between the groups in the sub-dimension of recognising printed visual materials. This situation may be associated with the nature of the material and the characteristics of the sample. Since both groups examined reports that included familiar visual forms—such as printed charts, tables, and icons—the recognition of such materials likely represented a basic and already internalised skill among all participants. Moreover, public personnel, who frequently engage with printed reports and official documents in their daily routines, may already possess a similar proficiency in this specific skill. Therefore, while information design enhanced higher-order competencies such as interpreting and producing visuals, it did not substantially affect the recognition of familiar printed visuals. This suggests that information design primarily influences the interpretative rather than the recognitive dimensions of visual literacy, highlighting the importance of deep visual engagement beyond surface-level recognition. Consequently, integrating visual literacy development programmes into organizational knowledge strategies can further strengthen employees' interpretative and analytical visual skills, supporting the more effective use of knowledge.

The data obtained in terms of learning styles also showed a significant difference. Individuals with a visually dominant learning style benefited more from the reports prepared using information design. This demonstrates that aligning individuals' learning styles with information presentation techniques optimizes information processing.

In response to the research questions:

- Q1: The findings of this study indicate that information design plays a significant role in enhancing corporate knowledge management activities by improving the comprehensibility of information and reducing users' cognitive load. The higher accuracy rates and lower cognitive load levels observed in the experimental group suggest that information design

supports more efficient information processing, thereby strengthening decision-making, learning, and knowledge-sharing processes within organizations.

- Q2: Reports prepared in accordance with information design principles were found to be more effective than traditionally formatted reports in conveying information. The results demonstrate that such reports facilitate better understanding while requiring less mental effort, indicating that information design contributes to transforming raw data into usable and meaningful organizational knowledge. This finding highlights the added value of information design beyond aesthetic considerations.
- Q3: The study revealed statistically significant differences in participants' comprehension performance and perceived cognitive load depending on the reporting technique used. Additionally, visual literacy level and learning style were found to influence how participants benefited from information design-based reports, confirming that presentation style interacts meaningfully with user characteristics in knowledge processing processes.
- Q4: The results show that participants with higher visual literacy levels interpreted information more quickly and accurately when exposed to reports prepared using information design principles. This suggests that visual literacy enhances the effectiveness of information design by enabling users to engage more deeply with visual structures. However, no significant difference was noted in the recognition of printed visual materials, indicating that information design primarily facilitates interpretation rather than basic recognition of these materials.
- Q5: The findings demonstrate that individuals with a visual dominant learning style benefited more from information design-based reports. This supports the view that aligning information presentation methods with dominant learning styles optimizes information processing and reinforces the effectiveness of knowledge transfer within organizational settings.
- Q6: Lower cognitive load levels among participants exposed to information design-based reports indicate that cognitive load plays a critical role in determining both comprehensibility and usability. Structuring information in a visually supported and organized manner allows users to allocate their cognitive resources more efficiently, enhancing overall information effectiveness.
- Q7: Based on the findings, information design can be optimized by employing principles such as visual hierarchy, clarity, consistency, and alignment with users' cognitive capacities. Designing content that minimizes unnecessary complexity and supports meaningful visual interpretation contributes to reducing cognitive load and improving knowledge utilization.

The results suggest that organizations should focus not only on knowledge generation and storage, but also on how knowledge is presented. Incorporating information design principles into corporate knowledge management can enhance the efficiency of internal decision-making, learning, and knowledge sharing. Moreover, new paradigms that emphasize user experience and cognitive processes should supplant traditional data-oriented approaches in knowledge management models.

This study makes an important contribution by integrating the information design dimension into existing knowledge management models in the literature. However, to generalize the findings, further studies are needed in different sectors and with different sample groups.

While the findings of this study are consistent with existing literature suggesting that well-structured and visually supported information enhances comprehension and reduces cognitive load, the results should be interpreted beyond mere confirmation of prior expectations.

One possible explanation for the observed differences between the experimental and control groups lies in the alignment between information design principles and human cognitive architecture. Reports designed according to information design principles reduce unnecessary cognitive effort by structuring information in a way that supports attention, perception, and memory processes. In this sense, the effectiveness of information design can be understood not only as a matter of visual improvement but as a cognitive optimization mechanism.

However, alternative explanations should also be considered. For instance, participants may have responded more positively to the information design-based reports due to novelty effects, increased visual engagement, or familiarity with contemporary digital interfaces. Similarly, individual differences such as prior experience with visual materials, digital literacy, or professional background may have influenced the results independently of the experimental manipulation.

These considerations suggest that the observed effects cannot be attributed solely to design quality, but may also be shaped by contextual and individual factors. Therefore, future studies should further investigate these variables through more controlled designs, such as incorporating pre-test measures or longitudinal approaches.

From a theoretical perspective, the findings contribute to the knowledge management literature by emphasizing that the value of knowledge does not depend solely on its production, storage, or accessibility, but also on how it is presented and cognitively processed by users. In this regard, the study supports the reconceptualization of information presentation as a central dimension of knowledge management processes rather than a peripheral or purely technical concern.

By demonstrating that information design significantly affects comprehension and cognitive load in a corporate context, this study extends traditional knowledge management models and introduces a user-centered and cognitively grounded perspective. Accordingly, knowledge management can be reinterpreted as a process that not only manages information but also actively shapes how that information is understood and used in decision-making contexts.

Conclusion and Recommendations

The findings of this study clearly revealed that information design is an important strategic tool in corporate knowledge management processes. In the light of the experimental data;

- The report with information design provided higher comprehensibility compared to the traditional (text-heavy) report.
- A notable reduction in cognitive load was seen in the experimental group that implemented the information design.
- It was determined that individuals with high visual literacy level processed information more effectively.
- It was observed that individuals with visual learning style benefited more from the information design.

These results demonstrate that both having information and presenting it effectively are crucial for gaining a competitive advantage in organizations' knowledge management strategies. Information design helps extract valuable insights from large datasets and supports their integration into organizational processes.

Based on the research findings, the following recommendations have been developed:

- Information design principles should align with corporate knowledge management strategies, and audience-focused visual techniques should be systematically integrated into reporting and content presentation processes.
- Information design and visual literacy training should be integrated into in-house learning programmes to improve employees' ability to access, interpret and use information effectively.
- Flexible and diversified information presentation formats should be developed by considering individuals with different learning styles. Observations indicate that visual and narrated content, such as infographics, are particularly effective for visually dominant learners.
- Cognitive load management should be adopted as a quality standard in organizational content production and the impact of information presentations such as reports on user mental capacity should be systematically evaluated.
- In future studies, the long-term effects of information design (e.g. decision-making quality, information recall, organizational innovation) should be examined and research should be conducted with large samples, taking into account sectoral differences.

To enhance efficiency and foster learning, organizations should develop knowledge management strategies that prioritize not only the collection and storage of data but also the effective and meaningful presentation of knowledge.

Author contributions

Conception: N.K., F.Ö.; Design: N.K. ; Data acquisition: N.K.; Data analysis: N.K. and F.Ö.; Data interpretation: N.K., F.Ö.; Drafting of the manuscript: N.K.; Critical revision of the manuscript: N.K., F.Ö. All authors reviewed the results, approved the final version of the manuscript, and agreed to be accountable for all aspects of this study.

Ethical approval

This study received ethical approval from the Ankara University Ethic Committee (85434274-050.04.04/1100151) on 02.10.2023. Permission for the use of the Cognitive Load Scale (Kılıç & Karadeniz), the Visual Literacy Competences Scale (Kiper et al., 2012), and the Verbal or Visual Dominant Learning Style Identification Scale (Akgün et al., 2014) was obtained from the authors via email.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of interest

The authors declare that this study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Generative AI statement

The authors declare that no generative AI or AI-assisted technologies were used in the writing or preparation of this study.

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