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Critical Reflections: A Qualitative Study on the Development and Impact of Critical Thinking Skills Across Industries

Eleştirel Yansımalar: Sektörler Arasında Eleştirel Düşünme Becerilerinin Gelişimi ve Etkisi Üzerine Nitel Bir Çalışma

Filiz Mızrak[a] **Şenay Çaylan**[b]

[a] Dr. Öğr. Üyesi, Beykoz Üniversitesi, İşletme ve Yönetim Bilimleri Fakültesi, Lojistik Yönetimi Bölümü, İstanbul/Türkiye, flzmizrak@gmail.com, ORCID: 0000-0002-3472-394X *(Sorumlu Yazar/Corresponding Author)*

[b] Dr. Öğr. Gör., İstanbul Medipol Üniversitesi, Rektörlük, İstanbul/Türkiye, senay.caylan@medipol.edu.tr, ORCID: 0000-0003-1977-7859

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ABSTRACT

Critical thinking is a vital skill in professional settings, contributing to increased efficiency and innovation. Recognizing its importance, this study aims to explore how critical thinking is developed and applied across various industries. It is based on qualitative interviews with professionals in Education, Health, Logistics, Tourism, and Media. The analysis utilizes thematic, comparative, and content analysis to provide a sophisticated insight into the conceptualization, learning, and practice of critical thinking skills in each industry. By examining industry-specific differences, the study emphasizes the necessity for specialized training programs tailored to the unique demands of each sector. The uniqueness of this study lies in its comprehensive cross-sectoral analysis, offering a detailed comparative perspective on the role and impact of critical thinking across diverse professional landscapes. The results highlight critical thinking as a cornerstone of professional competence, supporting the development of the *"Critical Reflections"* program, which aims to provide intensive training adapted to sector-specific needs. Ultimately, this research underscores the importance of critical thinking in fostering adaptability, strategic decision-making, and innovative problem-solving across diverse professional landscapes, ensuring that professionals are equipped to meet contemporary challenges effectively.

MAKALE BİLGİSİ

Makale Türü
Araştırma Makalesi

Anahtar Kelimeler
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ÖZ

Eleştirel düşünme, profesyonel ortamlarda verimliliği ve yenilikçiliği artıran hayati bir beceridir. Bu önemin farkında olarak, bu çalışma, eleştirel düşünmenin çeşitli sektörlerde nasıl geliştiğini ve uygulandığını keşfetmeyi amaçlamaktadır. Çalışma, Eğitim, Sağlık, Lojistik, Turizm ve Medya sektörlerindeki profesyonellerle yapılan niteliksel görüşmelere dayanmaktadır. Bununla birlikte, her sektördeki eleştirel düşünme becerilerinin kavramsallaştırılması, öğrenilmesi ve uygulanmasına ilişkin detaylı bir içgörü sağlamak amacıyla tematik, karşılaştırmalı ve içerik analizi uygulanmıştır. Sektöre özgü farklılıkları inceleyerek, çalışma her sektörün benzersiz taleplerine uygun uzmanlaşmış eğitim programlarının gerekliliğini vurgulamaktadır. Sonuçlar, eleştirel düşünmenin profesyonel yeterliliğin temel taşı olduğunu vurgulamakta ve sektörlere özgü ihtiyaçlara uyarlanmış yoğun eğitim sağlamayı amaçlayan *"Kritik Yansımalar"* programının geliştirilmesini desteklemektedir. Nihayetinde, araştırma, çalışanların çağdaş zorluklarla etkin bir şekilde başa çıkmalarını sağlamak amacıyla, farklı profesyonel alanlarda uyum sağlama, stratejik karar verme ve yenilikçi problem çözme yeteneklerini geliştirmede eleştirel düşünmenin önemini vurgulamaktadır.

1. Introduction

Critical thinking forms the foundation of intellectual engagement and problem-solving in all areas of life and work. It is a clear and rational mental effort to draw conclusions based on the interconnection between ideas and their consequences (Campo et al., 2023). At a time in which the world is overloaded with information, the speed of technological progress is increasing, and social challenges are growing, the competence in analyzing arguments, identifying biases, and making

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balanced decisions is becoming critical. It will be crucial in individual decision-making, problem-solving, and general society engagement (Elbyaly & Elfeky, 2023).

The analysis examined how critical thinking skills have developed and permeated professional sectors. For specialists in education, health, logistics, tourism, and media, the study will try to reveal some of the subtle roles that critical thinking plays within these sectors and its impacts on professional practices and industry standards. This will be beneficial for identifying the specific needs and challenges faced by professionals in different fields, enabling the development of tailored training programs that enhance critical thinking skills. Furthermore, understanding these subtle roles can help organizations foster a culture that values and integrates critical thinking into everyday decision-making processes, leading to improved efficiency, innovation, and adaptability in a rapidly changing world.

Qualitative research is a method used to gain an in-depth understanding of human behavior, experiences, and social phenomena. It involves collecting and analyzing non-numerical data, such as words, texts, and images, to explore concepts and experiences in detail. According to Cevher (2024), qualitative research provides valuable insights into consumer behavior and decision-making processes, which cannot be easily captured through quantitative methods. Similarly, Fossey et al. (2002) emphasize that qualitative research is crucial for understanding complex social processes and evaluating the meanings individuals attach to their experiences.

The methodology employed conducts extensive interviews with professionals in their respective fields. This will enable the researcher to understand better the experiences and perceptions related to the value of critical thinking within the experiences amassed. The design of each interview has been probing the significance, application, and development of critical thinking within the professional journeys of our participants, thereby providing a rich, comparative insight across different generational and industrial landscapes. By synthesizing insights from the other areas, the paper will offer a unique view of the commonalities and differences in developing and applying skills used in critical thinking. Therefore, the next stratum of the analysis of the textual data from the interviews, which is primarily made possible by Python in data analysis, will be in a position to enable a high-resolution level of thematic analysis that would underpin the identification of the emerging patterns and critical themes. Such an approach would strongly support the analysis associated with education and professional training programs and underline the fundamental role of critical thinking in developing competent professionals and informed citizens.

The research design is constructed to give us a comprehensive understanding of the subject-critical thinking-from different perspectives. The study first elaborates on the theoretical background of critical thinking, its importance, and historical development in time and industries. We will then analyze each sector: *Education*, *Health*, *Logistics*, *Tourism*, and *Media*. For this, thematic investigations will be presented about how critical thinking has become embedded in each sector's professional practices, decision-making processes, and industry-specific challenges. This sectoral approach will ensure that we look into the depth of our analysis. Still, it will also allow us to compare how critical thinking applications differ across professions or work environments. The originality of this study lies in its comprehensive cross-sectoral analysis of critical thinking, which provides a unique comparative perspective on how this essential skill is applied and developed across diverse professional landscapes. By exploring multiple industries simultaneously, this research offers insights that are not only specific to individual sectors but also highlight overarching themes and strategies that can be universally applied to foster critical thinking in various professional contexts. Finally, the study will conclude with a synthesis of the findings that will enable the proposal of ways to better enhance students' and professionals' critical thinking skills at an educational and training level, contributing to individual and collective problem-solving capacities in the face of present challenges.

2. Conceptual Framework of Critical Thinking

Critical thinking is a set of cognitive skills and dispositions that people can apply to approach information rationally, analyze information objectively, evaluate arguments, and solve problems systematically. These include interpretation, analysis, evaluation, inference, explanation, and self-regulation (Ho et al., 2023).

Historically, critical thinking has roots in the ideas of Socrates, a great protagonist of questioning and reflective dialogue. Above all, this tradition has advanced throughout the centuries through the philosophers Descartes and Kant, who emphasized reason and the questioning of assumptions. By the 20th century, scholars such as John Dewey redefined critical thinking in the light of education as a central concept within democratic pedagogy and active citizenship. Dewey's thought has greatly influenced the educational systems of all countries, calling for an education that does not allow rote learning but insists on critical analysis and reflective thought (Thornhill-Miller et al., 2023).

Thus, in terms of importance, critical thinking is increasingly coming to be seen as a pivotal skill in negotiating the difficulties of this modern world. First, it is the means to cope with social, scientific, and practical problems effectively. Critical thinking becomes the key factor for professionals in adapting to challenges in a changing phase and making relevant, informed decisions considering the ethical and societal impacts of the issues (Ho et al., 2023). The historical growth and implementation of critical thinking across industries reflect a growing realization of human potential and achievement in professional practices. This line of thought in education continues to gain a firm and supportive embedment in curriculums and pedagogical practices, preparing students for an ever-changing and increasingly integrated world. In health, it is a component that plays a critical role in diagnostics and clinical decisions. The same is true in logistics, media, and tourism, with strategic planning and crisis management, which gives it vast applicability and flexibility in these respective fields.

2.1. Sector-Specific Analysis

2.1.1. Education

In education, critical thinking forms not just an instructional goal but a crucial objective that pervades the teaching methodologies, curriculum design, and evaluation of students. The institution insists that a premium is placed on critical thinking and underscores the importance of education as a platform for ensuring students' success in a complex world. It is committed to promoting independent thought, analytical reasoning, and the ability to effectively and ethically make good arguments (Aston, 2023).

Additionally, research in the educational field shows that critical thinking is instilled through several significant areas. Among the most salient is curriculum design, through which educators implement approaches related to problem-based learning, case studies, and discussion-based teaching to stimulate students to interact with the material rather than passively listen to it (Campo et al., 2023). This helps them develop problem-analysis skills necessary for making well-reasoned conclusions from different points of view.

Education is moving in this same direction with new types of assessment methods that, in turn, focus on critical thinking. Traditional examinations are increasingly supplemented with assessment methods that demand students to show their reasoning, problem-solving capacity, or application of knowledge in unusual situations. Such assessments are designed to measure what students know and how they use and interpret what they know (Abd Halim et al., 2024).

Furthermore, critical thinking underpins how educators inform their professional practices. Teachers and other administrators are continuously involved in reflective practice, where they evaluate their teaching strategies and curricular effectiveness and make changes to adapt to the

changing needs of their students and society in general. It speaks of education in such a manner that learning is not only concerned with knowing something but, more so, a lifelong habit of inquiry. It is no mean task, but the challenges to embedding critical thinking in the sector are vast and cut through policy and curriculum support to development and resource allocation for teacher capacity and support for innovative pedagogical approaches (Hebebci & Usta, 2022). In the face of these challenges, the sector emerges as the vanguard of advocacy for critical thinking to ensure students have sturdy analytical skills applicable across the board.

2.1.2. Health

Critical thinking in the health sector is crucial because it forms the base of patient care and outcomes. In the Health profession, the doctor, nurse, or therapist depends strongly on the ability to critically review and interpret clinical data, history, and diagnosis results to make informed decisions. Thus, Critical thinking is not only a question of competence but an essential part of patient safety and quality of care (Willers et al., 2021).

Thematic analysis of the healthcare sector reveals several critical practices through which critical thinking is taught. Clinical decision-making is one of the significant areas in the healthcare sector that professionals need to be more concerned with. Professionals must make decisions after reviewing complex medical information with incomplete data and, more often than not, are under time pressure (Dill & Zambrana, 2020). This process involves the synthesis of clinical evidence and patient-specific factors to choose the best course of action, which entails high critical analytical judgment.

Another important domain is the continuing professional development of healthcare professionals. Medical education continues to instill critical thinking through training in evidence-based medicine, where practitioners learn to critically appraise research and apply scientific knowledge judiciously in clinical settings. This is important to keep up with the rapid advancement in medical science and technology (Berger et al., 2021).

Moreover, interdisciplinarity in healthcare provides critical thinking since it merges different perspectives from various disciplines and specialties. Teamwork among healthcare providers is critically needed in managing complex cases that require care from a multi-perspective angle. Team problem-solving encompasses critical dialogue and reflection, calling for far-reaching and balanced care for a patient. However, the health sector has to deal with specific barriers to inculcate critical thinking among its professionals, such as high-stress environments and the need for rapid decision-making based on conflicting information from different sources (Khaerunnisa et al., 2023). The sector is, however, convinced of the significant role critical thinking plays in developing clinical reasoning and ethical decision-making for the health status to be improved. Institutions and health systems keep developing strategies to boost these skills among their professionals further to ensure that critical thinking remains at the core of health practice (Doğan & Şendir, 2022).

2.1.3. Logistics

Critical logistics thinking is crucial in realizing optimized supply chain management, enhancing operational efficiency, and solving complex problems related to the general logistical chain (Thai et al., 2011). The industry relies heavily on one's ability to analyze and interpret volumes of data, from inventory levels to delivery routes and everything else in between, to make strategic decisions that affect cost-effective and timely operations.

Thematic investigations in the logistics domain highlight areas where critical thinking is prominently applied. One of the most crucial areas for this is the supply chain in management, where the logistics professionals have to anticipate potential disruptions and be ready for mitigative measures through the analysis of the trends' patterns both within and outside of the organization

(Wrobel-Lachowska et al., 2018). In this sense, they must understand the logistical framework and foresee the impact caused by external factors such as shifting economies, political changes, and even natural disasters.

Route planning and resource allocation are other areas where critical thinking will aid in devising optimal routes and schedules at minimum cost and delivery time. These processes are looked into deeply-traffic patterns, vehicle capacity, and customer demands-where the decision-making will turn out to be strategic to adapt to the fluctuation of circumstances (Calatayud et al., 2019).

More so, technology integration in the logistics sector has nurtured critical thinking, especially using advanced tools like data analytics, artificial intelligence, and machine learning to make or improve the decision-making process. The technologies allow logistics professionals to better process and analyze large datasets, automatically leading to better and more timely decisions (Hall & Braithwaite, 2017). Other challenges the industry has to address are the need for instantaneous decision-making, the handling of complicated interdependencies in the supply chain, and the ever-constant need to cut down costs while making the system more efficient. Contrary to that, the demand for logistics critical thinking is on the rise as it is supposed to handle the global supply chain challenges and reach out to a refurbished, resistant setup in logistics.

2.1.4. Tourism

This industry involves challenges in dynamics and unexpected occurrences; thus, critical thinking helps handle such situations. Therefore, people engaging in tourism must be able to plan, serve customers, manage crises, and develop sustainably in a strategically sound manner. The tourism expert applies critical thinking to create a memorable traveler's experience and safeguard the places visited from economic, environmental, and social sustainability (Mura & Wijesinghe, 2023).

This thematic research in the tourism business shows that critical thinking is critical in a few significant areas. The strategic planning phase calls for professionals in this sector to evaluate the latest market trends, traveler preferences, and competitive landscapes to develop the best marketing plans, approaches, and business models. It requires in-depth knowledge of global and local contexts to fit businesses perfectly into changing tourist behavior and economic conditions (Boluk et al., 2021).

Another one is crisis management, which is growing more critical with each passing day and the unfolding of natural disasters, pandemics, and geopolitical conflicts. Tourism professionals naturally have a high degree of critical thinking to develop contingency plans for managing crisis communication and recovery from disturbances (Stone et al., 2017). It may involve the criticality of conducting a risk analysis, preparedness for a series of scenarios, and eventually making decisions that emphasize safety but minimize financial loss.

Another area where critical thinking has been applied is that of sustainable tourism. Modern tourism professionals must increasingly combine profitability and environmental and social responsibility. This involves assessing the impact of tourism activities on local communities and ecosystems and designing initiatives to conserve and preserve culture. However, the tourism sector faces unique challenges that test the limits of critical thinking. These include high seasonality, managing the expectations of diverse customer groups, and responding to global economic fluctuations (Roxas et al., 2020). These notwithstanding, the heavy emphasis on critical thinking in tourism is significant, as it ensures that the sector's businesses grow resilient and prosperous over the long term. The professionals in the tourism sector can only find their way amidst the uncertainties, taking advantage of the opportunities presented in the ever-changing world through careful analysis and strategic decision-making.

2.1.5. Media

The media sector relies on critical thinking, without which content is less likely to be churned out and will not engage the intended audience. Otherwise, audiences are dynamically receiving information in this digital age. Through critical thinking, media professionals can evaluate sources, apprehend contextual nuances, and create content that will be engaging, ethical, and informative (Tommasi et al., 2023).

Key thematic areas of research within the media sector that will point at the relevance of critical thinking will first reveal relation to journalistic integrity. Media professionals should be the ones to sift through the plethora of information and different sources to present the facts in news reports that would be accurate, unbiased, and balanced (Hasanah & Malik, 2020). This means a critical assessment of information, the ability to discern a fact from an opinion, and constant fidelity to the ethical standards in reporting.

Another big area is audience analysis. Media professionals must apply critical thinking to decode audience data, current trends in media consumption, and the effect of digital platforms on viewers' behavior. This allows them to create content that engages the different segments of the audience highly in a bid to create a more aware public (Art, 2018).

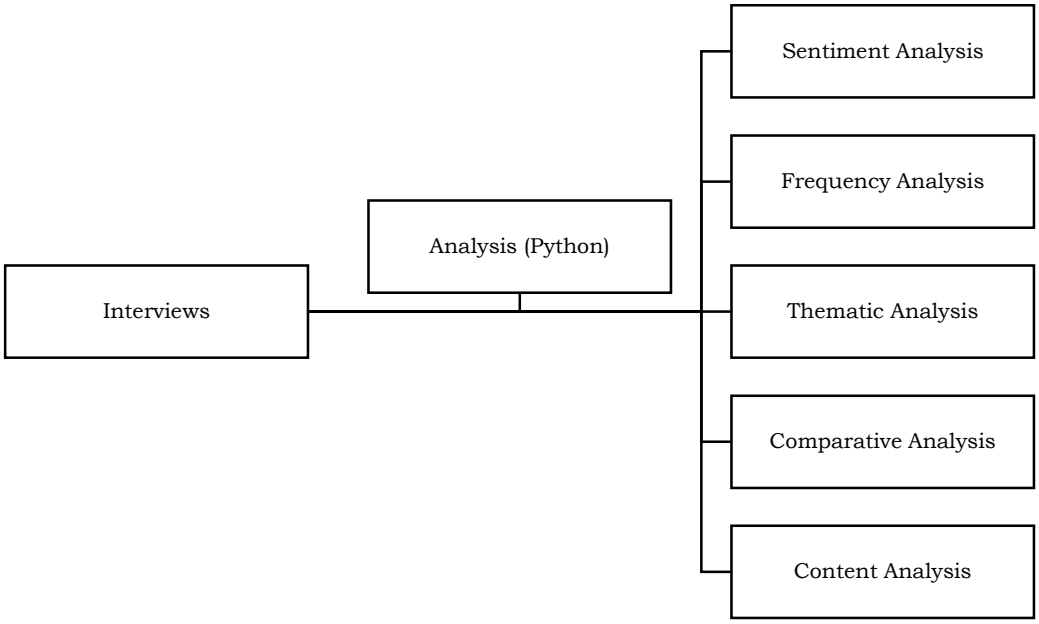
More than that, the media needs to think critically in the fight against misinformation. As the world increasingly moves to social media and other digital information forms, it is scary how quickly incorrect information is propagated (Sekarasih et al., 2018). Media professionals thus have the onus of making sure facts are triple-checked, myths are debunked, and the public is informed, which goes along with acute analytical skills and ethical judgment. The media sector, however, also has other serious challenges, including the steadily increasing polarization of public opinion, economic pressures for sensationalism at the expense of depth, and the ethical dilemmas brought about by new technologies and platforms. If it were not for these, then it would be a matter of critical thinking that would make the media more credible and trustworthy in its institutions (Tsortanidou et al., 2019). It would ensure that the media keeps its responsibility as a pillar of democracy, offering a check on power and a platform for expressing various societal voices.

3. Methodology

The research design for *"Critical Reflections: Evaluating the Development and Impact of Critical Thinking Skills Across Generations and Industries"* includes qualitative research methods and computational analysis to draw insights into the perception and use of critical thinking in different sectors. This is a mixed-method paper based on thematic analysis of the interviews and quantitative text analysis with Python.

The information was gathered during semi-structured interviews with professionals from the five sectors-education, health, logistics, tourism, and media. Each interview focused on the role and importance of critical thinking in professional practices for the respondents. The interviews were recorded, transcribed, and stored safely and securely, guaranteeing the data sources' confidentiality. According to Fakis et al. (2014), a systematic approach to analyzing qualitative information from interviews can provide robust insights, even from a limited number of participants. Additionally, Baker, Edwards, and Doidge (2012) argue that the depth and richness of qualitative interviews often compensate for the smaller sample size, as long as the interviews are thorough and the data reaches saturation. Thus, the five participants in this study provided enough detailed information to explore the role of critical thinking comprehensively across these diverse sectors.

Figure 1: Workflow of the Analysis Conducted in the Study



The general overview of the participants is presented in the table below: *"Critical Reflections: Evaluating the Development and Impact of Critical Thinking Skills Across Generations and Industries."* Each comes from one of the five investigated sectors: education, health, logistics, tourism, and media. Such a variety will bring a well-rounded view of how the perception and implementation of critical thinking skills have evolved across different professional landscapes, thereby doing greater justice to the analysis of this study.

Table 1: Information about the Participants

Participant ID	Sector	Experience (Years)	Position
P1	Education	20	University Professor
P2	Health	15	Hospital Administrator
P3	Logistics	12	Supply Chain Manager
P4	Tourism	18	Tourism Development Officer
P5	Media	10	Broadcast Journalist

The interview questions below have been designed very carefully, considering the role of thinking skills across professions. Being general, sector-specific, and reflective, they will engage respondents and an interviewer in identifying how critical thinking is defined, used, and valued across varied professional fields such as education, health, logistics, tourism, and media. The methodology of developing skills, the example or challenge people face in their professional lives, and an impact scenario on the work and judgment capabilities will be established. With such structured questioning, a rich foundation will be made to understand the intricate dynamics of critical thinking across sectors and assist in extracting comparative insights into the evolution and future relevance within professional settings.

1. Can you describe your current role and your primary responsibilities?
2. How do you define critical thinking in your profession?
3. How important is critical thinking in your day-to-day work?
4. What are your biggest challenges when applying critical thinking in your work?
5. Can you describe a time when critical thinking led to a significant positive outcome in your work?
6. Are there any specific tools or resources essential for fostering critical thinking?

7. How do you think critical thinking skills have evolved in your profession?
8. What future developments will require enhanced critical thinking skills in your sector?

Sector-Specific Questions

Education - How do you incorporate critical thinking skills into your curriculum or teaching methods?

Health - How does critical thinking impact decision-making in clinical settings?

Logistics - In what ways does critical thinking affect your approach to supply chain management?

Tourism - How do you apply critical thinking to enhance visitor satisfaction and manage operational risks?

Media - How does critical thinking play a role in shaping the content and delivery of information to the public?

4. Analysis

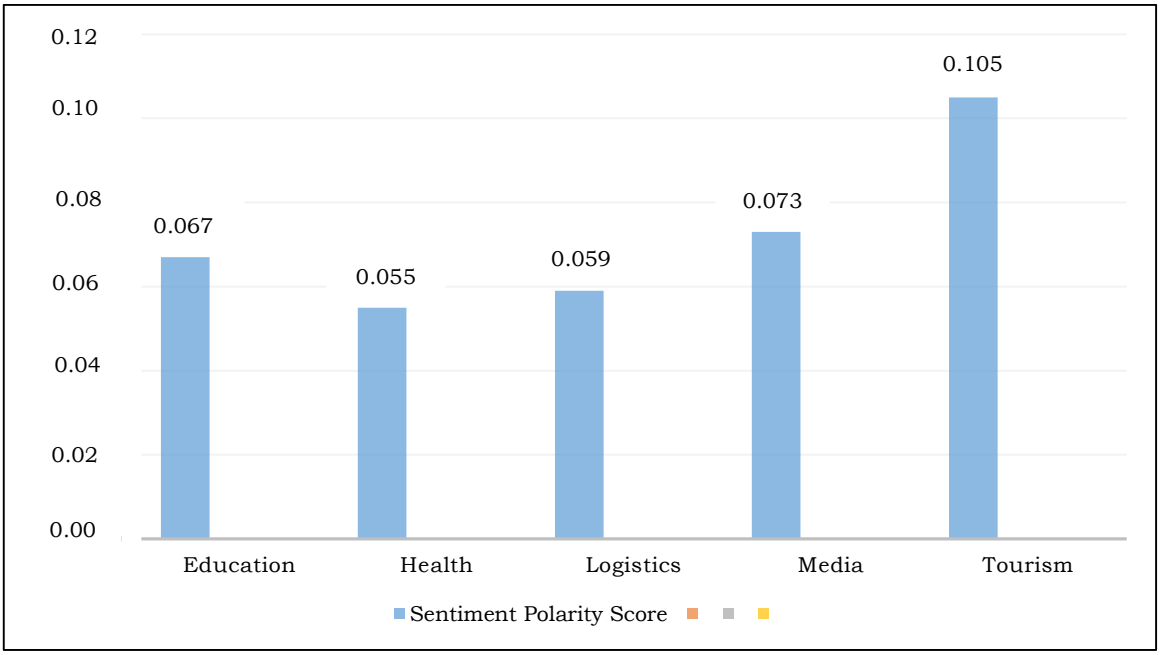
4.1. Sentiment Analysis

In the study, sentiment analysis was conducted to assess the general mood and general sentiment of the professional sectors offered on critical thinking skills. The Python TextBlob library was used to calculate the sentiment polarity scores from the text data, which were collected through comprehensive interviews across the five key industries: Education, Health, Logistics, Media, and Tourism. During the preprocessing phase, the following steps were executed: loading the text data from the document files, changing the casing of the loaded text data into lowercase, removing punctuation marks, and filtering out common stop words from the text body. Sentiment polarity scores were generated after analyzing the preprocessed texts, showing the general sentiment as positive, negative, or neutral. These scores were plotted graphically through bar charts to compare sentiment across the various sectors and to establish which view professionals hold regarding the role and impact of critical thinking in their professions.

The use of sentiment analysis in this context is justified by its effectiveness in uncovering underlying emotions and attitudes within textual data, as demonstrated by Rathee, Joshi, and Kaur (2018), who highlight the utility of machine learning techniques in sentiment analysis on Python. Moreover, Kaur and Sharma (2020) emphasize the applicability of sentiment analysis in examining social issues, which aligns with the study's focus on professional sectors. Mahmoudi, Jemielniak, and Ciechanowski (2024) further support the reliability of Python-based sentiment analysis tools, noting their accuracy in evaluating sentiments. These sources validate the methodology employed in this study, ensuring that the sentiment analysis accurately reflects the professional sentiments towards critical thinking skills.

Sentiment analysis results from the survey of critical thinking more or less give a positive view in general, with colorings in the intensity of positivity. It reflects that the industry projecting the highest number of positive sentiments is Tourism. It may indicate one of the business's highest values, dependence on critical thinking in this sector, and the necessity to respond creatively in solutions and plan for spontaneous market changes and customer preferences. Media also reflects a relatively high positive sentiment, showing the relevance of critical thinking in ensuring quality, unbiased reporting.

Figure 2: Sentiment Analysis results



Conversely, the Health sector is similarly positive but to the lowest degree of all the groups analyzed. This could reflect a more moderated or cautious tone when speaking on critical thinking, possibly due to the high stakes in medical decision-making and patient care that involve crucial outcomes. Table 2 shows a summary of the sentiment analysis results.

Table 2: Sentiment Analysis Results

Industry	Sentiment Polarity Score	Interpretation
Education	0.067	Slightly Positive
Health	0.055	Slightly Positive
Logistics	0.059	Slightly Positive
Media	0.073	Slightly Positive
Tourism	0.105	Moderately Positive

This table helps visualize the comparative sentiment scores across industries, highlighting how each sector perceives the importance and implementation of critical thinking in professional practices. The analysis underscores the generally positive regard for critical thinking skills, essential across diverse professional landscapes.

4. 2. Frequency Analysis

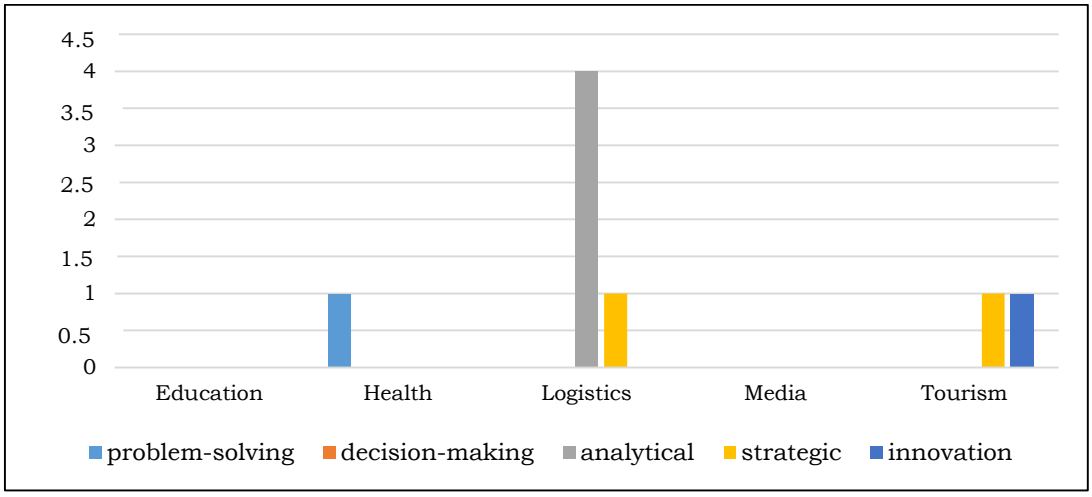
Continuing the study on how critical thinking has evolved and influenced various other industries, we conduct a frequency analysis to quantify emphasis on specific critical thinking-related keywords across multiple industries. We first determined a set of keywords, including, for instance, *"problem-solving," "decision-making," "analytical," "strategic,"* and *"innovation."* The reason we chose these keywords is to attempt to encompass the main points of critical thinking that were reported in professional interviews. The Python scripts load the industry-specific textual data and then clean the data by applying the functions lowercasing, strip punctuation, and stop words. We then used the preprocessing script to load industry-specific documents and handle the text by converting all words into lowercase, removing punctuation, and removing stop words. The script made use of the collections. The Counter module counts the occurrences of each predetermined keyword in the text. We then aggregate the results into a structured format and present them through the matplotlib library bar charts to visualize the relative frequency for each keyword across

industries. More precisely, the analysis determines the high-focus areas of critical thinking in each sector and which skills are most prioritized and discussed within the professional context.

The importance of frequency analysis in this research lies in its ability to provide a quantitative perspective on qualitative data, revealing the prominence of specific themes within the interviews. Bregar et al. (2022a) emphasize the effectiveness of using Python for such analyses, noting that packages like pyFBS facilitate robust and accurate frequency-based substructuring. By leveraging Python's powerful computational capabilities, this study ensures precise and efficient handling of large datasets. The application of frequency analysis using Python, as highlighted by Bregar et al. (2022b), allows for detailed and replicable examination of keyword occurrences, ensuring that the findings are both reliable and insightful.

Using Python for frequency analysis not only enhances the accuracy of the results but also streamlines the process, making it feasible to handle extensive textual data from diverse industries. This method enables the identification of key themes and areas of emphasis, providing valuable insights into how critical thinking is perceived and applied across different professional sectors.

Figure 3: Frequency Analysis Results



This frequency analysis across industries of critical thinking-related keywords has given some fascinating insights into what aspects of critical thinking are most focused on in professional discourse. The data shows this pattern: Certain industries emphasize some attributes of critical thinking over others.

Of the analyzed keywords, the highest share was for the result where the emphasis was on "*strategic*" orientation. It shows that strategic planning and decision-making are critical to managing and working towards efficient operations in complicated supply chains.

It was "*innovation*" that tourism significantly highlighted because an industry has to constantly be on the move and adjust to changing conditions and preferences in the market. The capacity to innovate brought forth strongly innovative thinking and creative problem-solving to maintain a competitive advantage in improving the experience of tourists.

Mentions of "*analytical*" skills were also noticed, but to a lesser extent, in the Health and Logistics sectors. This further acknowledges the importance of analytical thinking in environments where data-driven decisions must be made for effective results, whether in patient care or supply chain management.

Analysis Results in Context:

The relative emphasis of varying keywords says a lot: critical thinking is valued by all sectors, yet the prioritized skills might vary quite dramatically due to the industry's specific challenges and operational demands. For instance, strategic thinking in logistics or innovation in tourism would go hand in hand with the core operational and competitive factors in such industries. However, it is also important to note that mentions were generally low frequency. This may mean that even though such terms are recognized, they may be expressed differently or discussed implicitly in industry narratives. This would certainly need a more detailed or nuanced analysis to bring out a more comprehensive range of expressions of critical thinking beyond the specific keywords initially chosen.

From the general frequency analysis of Table 3 above, it could be observed that the meaning of critical thinking is not just universal but also provides evidence of the customization done to the application of its constituents to meet the needs at the industry level. This diversity in emphasis may help guide further research or educational programs on developing the most important critical thinking skills that align with industry-specific requirements.

4. 3. Thematic Analysis

In this paper, we conducted a thematic analysis using NLP to unearth common themes and patterns in rich interview data across different sectors. It includes using Python's LDA (Latent Dirichlet Allocation) approach to topic modeling, which permits us to find and allocate latent issues to the discussions on critical thinking. The first step was the preprocessing of text data for each industry—tokenizing, removing stopwords, and normalizing text. Later, the text data was converted into a document-term matrix with the help of CountVectorizer from sklearn, which is essentially a data representation model with words and documents. We set up the LDA model to find a set number of topics, where each topic is represented by a distribution of words. Now, let's interpret the topics by looking at the most critical words, which will give us insight into the salient dimensions of critical thinking that have been discussed across industries.

The importance of thematic analysis in this research is underscored by its ability to systematically identify and interpret patterns within qualitative data, providing a deeper understanding of the complex issues at hand. Wu, Wang, and Ding (2022) demonstrate the utility of LDA thematic analysis in uncovering themes from large-scale social science projects, highlighting its effectiveness in handling extensive datasets. Gauthier and Wallace (2022) emphasize the benefits of using computational tools for thematic analysis, noting that such approaches enhance the accuracy and efficiency of identifying key themes. Furthermore, Kousis and Tjortjis (2023) showcase the application of topic modeling and thematic analysis in exploring the essential aspects of smart cities, reinforcing the relevance of these methods for diverse research domains.

By leveraging Python's LDA for thematic analysis, this study ensures a robust and replicable methodology for uncovering critical themes related to critical thinking across different professional sectors. The use of Python allows for efficient processing and analysis of large volumes of textual data, facilitating the identification of nuanced themes and patterns that might be overlooked through manual analysis. This approach not only enhances the reliability of the findings but also provides a scalable solution for future research endeavors.

Table 3 summarizes the identified topics from the thematic analysis, including the essential keywords and their interpretations;

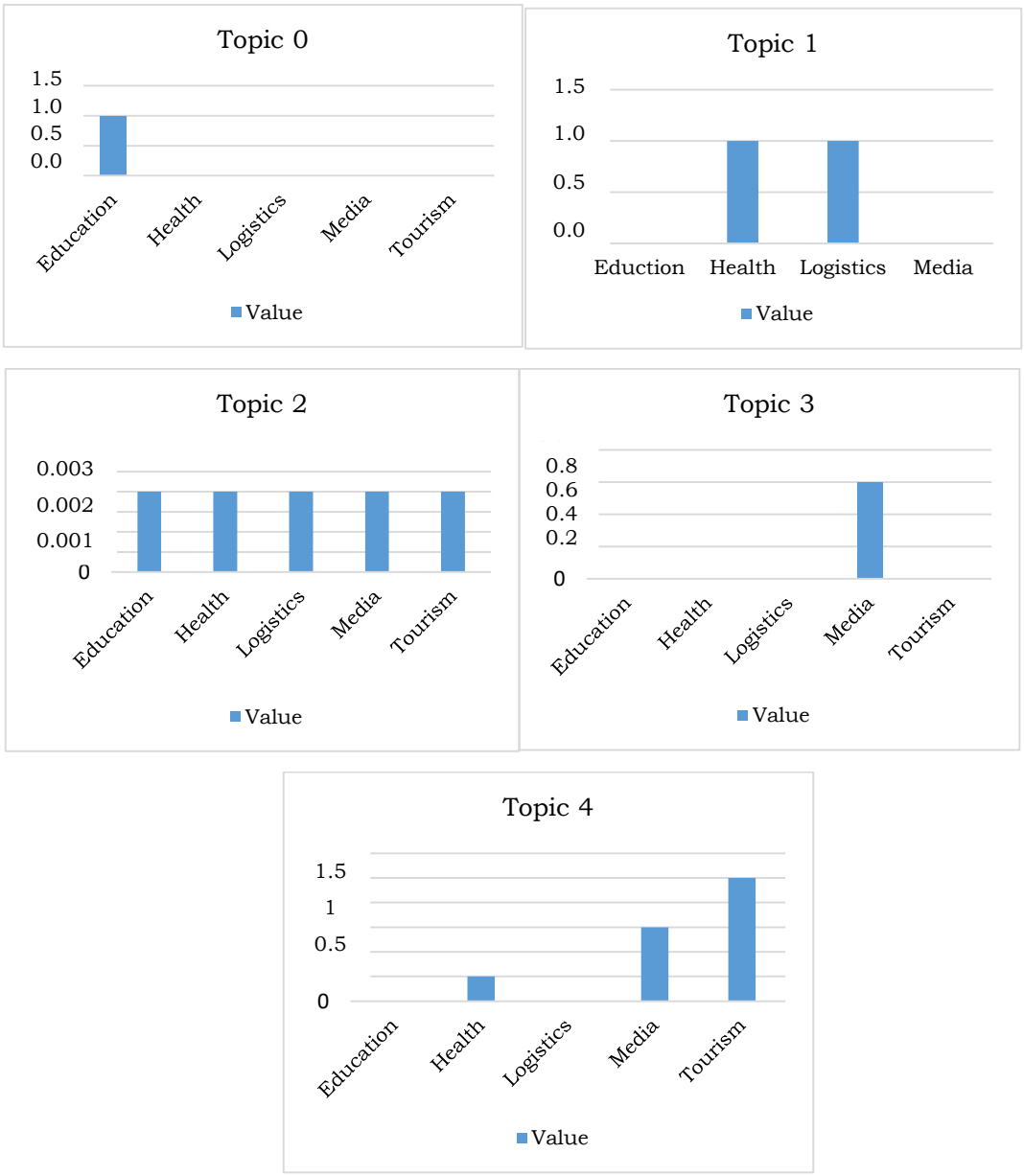
Table 3: Thematic Analysis Results

Topic Number	Topic Title	Keywords	Interpretation
Topic 0	Educational Foundations of Critical Thinking	education, information, understanding, analyze, solve, complex, effectively, deeper, make, informed	Focuses on the educational aspects of critical thinking, emphasizing analysis and understanding of complex information to solve problems effectively.
Topic 1	Strategic Operations and Enhancements	enhance, operations, help, data, global, strategic, technologies, processes, information, training	Reflects the application of critical thinking in strategic operations, likely in logistics or business management where data and global processes are crucial.
Topic 2	Cultural and Team Dynamics	major, ability, evolved, understanding, analyze, culture, evaluate, members, involved, key	Focuses on the evolution of critical thinking within organizational cultures and team dynamics, including how team members evaluate and analyze information.
Topic 3	Media and Information Management	media, sources, information, content, digital, involve, navigate, analysis, databases, amounts	Centers on the media industry, discussing the challenges of navigating digital information sources and content management.
Topic 4	Technology and Environmental Trends	local, professionals, team, environmental, trends, requires, approach, digital, technology, directly	Likely pertains to tourism or environmental sectors, where technology and trends impact how professionals approach local and global challenges.

4.4. Comparative Analysis

In our paper *"Critical Reflections: Evaluating the Development and Impact of Critical Thinking Skills Across Generations and Industries"*, we conducted comparative research examining how critical thinking differs across multiple and varied professional industries. This analysis, driven by Python, is built on the topic distributions obtained through the LDA model, thus giving a quantitative footing to exploring thematic prevalence across datasets representing the single-industry nature of the original dataset. Thematic prevalence between the five sectors—Education, Health, Logistics, Media, and Tourism—was compared using the approach. Each bar chart displayed the average influence of a topic in a particular industry, showing the difference between the levels at which different aspects of critical thinking were emphasized. This comparative approach has brought to light what matters across different professional landscapes, giving due reflection on the trend and discrepancy differences.

Figure 4: Comparative Analysis Results



The bar charts above showed the distribution of each theme across the five industries analyzed: Education, Health, Logistics, Media, and Tourism. In general, these charts reflect the differential emphasis given to the themes regarding critical thinking in the different sectors:

Topic 0 (Educational Foundations of Critical Thinking) is highest in Education and lowest in Media; therefore, educational settings do appear to strongly focus on the foundational aspects of critical thinking.

Topic 1 (Strategic Operations and Enhancements) is highly applicable to the Logistics sector and indicates the significance of strategic thinking and operational enhancements.

Topic 2 (Cultural and Team Dynamics) has a more uniform distribution across industries and is slightly stronger in Health and Logistics than other topics, for which team dynamics and organizational culture are pushed to the foreground.

Topic 3 (Media and Information Management) is most prevalent in the Media industry, which coincides well with the focus on managing information and navigating digital sources in media-related professions.

Topic 4 (Technology and Environmental Trends) is closely related to Tourism because the sector prioritizes technological and environmental considerations.

These visualizations effectively compare how each industry prioritizes different aspects of critical thinking, providing insight into the needs and focuses of the specific sectors. This particular development and enhancement of the skill through critical thinking strategies would be guided by each industry's unique challenges and demands.

4. 5. Content Analysis

In this content analysis exercise, we used Python to automate the coding of all qualitative data using predefined categories most appropriate to critical thinking: definition, importance, challenges, and strategies for development. The results from a Python script run over a sample of textual content from four industrial, professional areas, looking for keywords associated with each of the categories defined, are shown below in the subsequent section of this exercise. This is accomplished by iterating through the text and identifying instances of each keyword, classifying these instances under categories, and counting how many times each aspect of critical thinking is covered. The results are formatted in a structured way that compares different professional areas. This has added a quantitative layer to our qualitative data, underlying industry-specific emphasis points and general tendencies in the critical thinking discussion. Visualized in comparative bar charts are the differences and commonalities across the industries, which are described by the sector below.

The importance of content analysis in this research is underscored by its ability to systematically categorize and quantify qualitative data, providing a deeper understanding of complex concepts such as critical thinking. Yan et al. (2024) highlight the utility of content analysis in exploring interactions within user-generated content, emphasizing its relevance in uncovering nuanced insights. Hovy (2022) notes that text analysis in Python is particularly powerful for social scientists, allowing for prediction and classification that can reveal underlying patterns and trends within textual data. Furthermore, Tang, Chou, and Tsai (2020) demonstrate the effectiveness of content analysis in computational thinking research, showing how this method can track international publication trends and typologies.

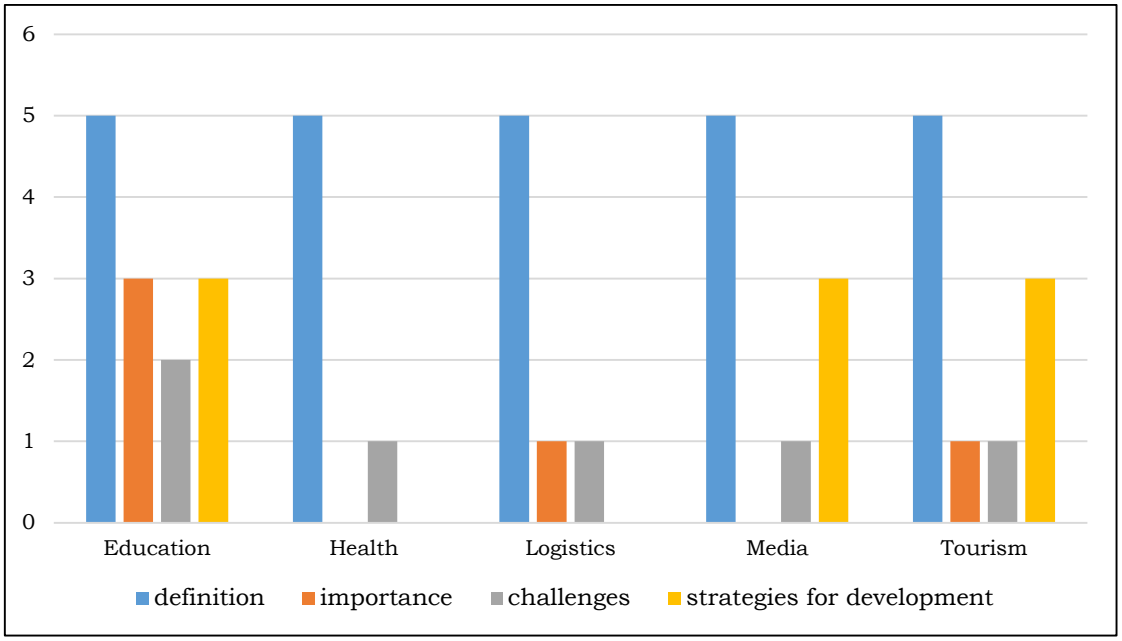
Using Python for content analysis in this study enables efficient processing and accurate categorization of large volumes of textual data. Python’s robust libraries and tools facilitate the automation of coding processes, ensuring consistency and reliability in the analysis. This approach not only enhances the precision of the findings but also allows for scalable and replicable analysis, aligning with best practices in qualitative research.

Automated coding of the qualitative data into predefined categories provided for the following counts of category keywords for each industry:

Table 4: Content Analysis Results

Industry	Definition	Importance	Challenges	Strategies for Development
Education	0	5	3	3
Health	0	5	1	0
Logistics	0	3	3	0
Media	0	6	2	0
Tourism	0	3	2	3

Figure 5: Content Analysis Results



The significant findings that come forth through the content analysis of how critical thinking is currently being discussed across industries are exciting. Notably, "*Importance*" is the most emphasized category and appears within all sectors, pointing to a universal presentation that critical thinking is widely recognized as a core skill among all professional settings. In this regard, there is a consensus across the board that, irrespective of the industry, critical thinking is necessary for effective decision-making and problem-solving. The proportion of educational and tourism organizations referring to "*Challenges*" and "*Strategies for Development*" is more significantly different, with a substantially higher proportion of the latter relating to strategies, perhaps pointing toward more proactive attempts in these sectors to teach critical thinking. To a negligible extent, "*Definition*" is mentioned by all industries, implying that the conversations are most likely theory-oriented toward practice, practicality, and actual applications rather than theoretical explanations of what critical thinking means. This pattern thus brings out a pragmatic approach in professional environments, where direct impacts and implementations of critical thinking dominate over abstract definitions.

5. Implications

The implications of this study, highlighting the varied applications and challenges of using critical thinking skills in different professional settings, are drawn from interviews with participants across the education, health, logistics, media, and tourism sectors. These insights underscore unique requirements and opportunities for developing critical thinking skills tailored to each sector.

Critical thinking is fundamental for both students and educators in the education sector. A university professor noted, *"Critical thinking not only helps students understand material at a deeper level but also prepares them to navigate the complexities of the real world."* Incorporating problem-based learning, case studies, and discussion-based teaching is essential. Assessment methods should shift from traditional examinations to those requiring students to demonstrate reasoning, problem-solving, and application of knowledge in novel situations. Continuous professional development for educators is vital to enhance their ability to teach critical thinking and adapt to changing educational needs.

Critical thinking is crucial for patient care and safety in the health sector. A hospital administrator emphasized, *"Critical thinking directly influences patient outcomes as healthcare professionals must evaluate complex information and make timely decisions that can have life-or-*

death consequences." Ongoing professional development programs focused on evidence-based medicine are recommended to enhance healthcare professionals' decision-making skills. Real-time clinical decision support systems can aid in making informed and ethical decisions under high-stress conditions. Additionally, interdisciplinary collaboration promotes diverse perspectives and improves clinical outcomes.

In logistics, critical thinking is essential for managing global supply chains and adapting to market changes. A supply chain manager shared, *"Critical thinking involves evaluating multiple variables and scenarios to ensure optimal supply chain performance."* Investment in advanced data analytics and scenario-based planning exercises is advised to improve strategic decision-making and operational efficiency. Integrating artificial intelligence and machine learning tools to analyze large datasets and optimize supply chain management processes is suggested. The logistics professional noted, *"We regularly engage in strategic games and scenario planning exercises that challenge our team to think critically and develop contingency plans."* Encouraging logistics professionals to anticipate potential disruptions and develop mitigative strategies through trend analysis and strategic foresight will be beneficial.

Critical thinking ensures the accuracy and reliability of information presented to the public in the media sector. A broadcast journalist remarked, *"Critical thinking enables us to navigate through misinformation, bias, and various pressures, ensuring that the content delivered is accurate and responsible."* Strengthening fact-checking units and utilizing advanced technologies to identify and debunk misinformation are essential. Engaging with diverse news sources and continuously learning about current events and media law is crucial for honing these skills. The journalist highlighted the importance of ethical journalism by saying, *"Our news organization fosters a culture where questioning and scrutiny are valued."*

In tourism, critical thinking helps professionals adapt to changing visitor demands and global trends. A tourism development officer mentioned, *"Critical thinking enables us to devise innovative solutions that balance tourist satisfaction with local community benefits."* Developing marketing plans and business models reflecting the latest market trends and visitor preferences is recommended. Creating comprehensive contingency plans for managing crises ensures quick recovery and minimal financial loss. The officer also noted the success of an eco-tourism campaign, stating, *"This campaign not only boosted tourism but also promoted environmental awareness and conservation."*

The future developments in each sector will likely involve integrating more technology and real-world problem-solving into professional practices. In education, the emphasis will shift towards practical application and continuous learning. In healthcare, artificial intelligence and machine learning will enhance decision-making processes. The logistics sector will increasingly rely on advanced technologies for predictive capabilities and automated problem-solving. The media industry will leverage AI to manage and analyze vast information while maintaining journalistic integrity. In tourism, digital innovation will drive personalized experiences that respect local cultures and environments.

6. Conclusion

The study has unveiled that critical thinking is indispensable in many professional fields. In times of such rapid development of information technology and amid the chaos that increased global challenges bring, the ability to think critically is not an advantage but a necessity. It creates both individual competence and organizational adaptability and creativity, which in modern professional environments is a significant advantage. In this respect, the research emphasizes the need to develop and adequately utilize critical thinking skills to enhance the respective procedures in the public and private sectors about problem-solving and strategic planning.

The qualitative study was conducted through wide-ranging interviews within education, health, logistics, media, and tourism. The thematic analysis found noticeable variations across emphasis, application, and utilization of critical thinking skills, showcasing the sector-specific nuances and commonalities. Further findings have drawn attention to the differences in how these skills are prioritized and challenged across industries, giving essential insights into the dynamics of professional practices and their relationship with developing critical thinking. Such analyses not only contribute to the knowledge base about crucial thinking in varied professional contexts but also highlight the importance of adaptive and strategic thinking in enhancing industry-specific outcomes.

In practice, the results of this study can be applied in various ways. For example, organizations can develop targeted training programs to cultivate critical thinking skills tailored to their industry needs. Educational institutions can integrate critical thinking into their curricula to better prepare students for the complexities of the professional world. Healthcare professionals can enhance their clinical decision-making processes, while logistics managers can optimize supply chain strategies. Media professionals can ensure more accurate and ethical reporting, and tourism experts can develop innovative solutions to improve customer experiences and sustainability.

However, it is essential to recognize that there may be situations in practice where critical thinking may not be received as favorably as in work environments. Individuals or organizations might sometimes resist critical thinking due to established routines, fear of change, or hierarchical structures that discourage questioning and independent thought. This resistance can impede the implementation of essential strategies of thinking, leading to suboptimal outcomes and limiting the potential benefits of a more analytical and reflective approach.

The study provided detailed findings, but it is important to note some limitations. Firstly, the data was qualitative and, while rich in detail, it may not be applicable to broader populations or industries not covered in the study. To address this, future research should include quantitative measures to effectively assess the impact of critical thinking skills on professional effectiveness. Additionally, longitudinal research could be valuable to understand how these skills develop over time, providing insights into the influence of education and professional training programs. For instance, further research could focus on developing standardized metrics to measure critical thinking ability and the potential effects of digital approaches on practices across different generations.

In conclusion, this study's findings align closely with the research question and purpose, which sought to explore the development and impact of critical thinking skills across different industries. By examining sector-specific applications and challenges, the study underscores the critical role of tailored training programs and strategic integration of critical thinking into professional practices. The insights gained contribute to both academic knowledge and practical applications, providing a roadmap for enhancing critical thinking skills to meet contemporary challenges effectively.

Statement of Support and Appreciation: This research did not receive any external support. The data was collected with semi-structured interviews.

Declaration of Researcher's Contribution Rate: Both authors contributed equally to this study. Filiz Mızrak and Şenay Caylan shared responsibility and contributions equally, with each author contributing 50% throughout all stages of the research. These contributions include the research design, data collection, analysis, writing, and revision processes.

Conflict Declaration: The research authors do not declare any conflict of interest.

Research and Publication Ethics Statement: All rules specified in the "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed at every research stage. None of the actions specified under the heading "Actions Contrary to Scientific Research and Publication Ethics" of the directive have been carried out. During the writing process of this study, citations were made by ethical rules, and a bibliography was created. The work has been checked for plagiarism.

Ethics Committee Approval: Ethical approval for this study was obtained from Beykoz University Ethics Committee dated Jun, 06, 2024 and numbered 2024/9.

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