Negotiating with Insight

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A Case Study on Eye Tracking, Facial Analysis and Future Concepts for Understanding and Teaching Sales Negotiations

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Table of Content

List of Illustrations

List of Abbreviations

AOI - Area of Interest

AI - Artificial Intelligence

B2B - Business to Business

B2C - Business to Consumer

BNCOW – Business Negotiation Competencies in Online World

ET - Eye Tracking

FA – Facial Analysis

FACS - Facial Action Coding System

FER – Facial Expression Recognition

HEI - Higher Education Institutions

KPI - Key Performance Indicator

RT - Reaction Time

SaaS - Software as a Service

TSL – Technical Sales Lab

UAS – University of Applied Sciences

USP - Unique Selling Proposition

Abstract

The increasing digitalization and globalization of business necessitate a re-evaluation of traditional negotiation practices. This thesis explores the integration of advanced technologies, such as eye-tracking (ET) and facial analysis (FA), into negotiation training to address these modern challenges. The study is conducted within the framework of the Business Negotiation Competencies in Online World (BNCOW) project and employs the state-of-the-art facilities at the Technical Sales Lab (TSL) at the University of Applied Sciences Düsseldorf.

Traditional negotiation training methodologies often fail to incorporate the nuances of digital communication and the emotional intelligence required in virtual settings. This gap can lead to suboptimal negotiation outcomes in modern, technologically driven environments.

The research utilizes ET and FA technologies to analyze the emotional and cognitive states of negotiators. Participants engage in a series of controlled negotiation scenarios, both online and face-to-face, with their emotional responses and eye movements monitored in real-time. Data is collected on facial expressions, gaze patterns, and negotiation outcomes, providing insights into the interplay between emotional states and negotiation strategies.

The integration of ET and FA technologies significantly enhances negotiation training by providing feedback on participants' emotional and cognitive states. The study found that participants trained with these technologies demonstrated improved negotiation performance, increased self-awareness, and more effective strategic adjustments. Emotional states such as anger, joy, and confidence were shown to influence negotiation tactics and outcomes in distinct ways, underscoring the importance of emotional intelligence.

Advanced technologies such as ET and FA offer powerful tools for modernizing negotiation training. By incorporating these technologies, training programs can better prepare negotiators for the complexities of digital interactions, leading to improved outcomes and reduced anxiety in negotiation scenarios. This thesis contributes to the development of innovative training methodologies that bridge the gap between traditional negotiation principles and the demands of the digital age.

Introduction
Background and Context

Whether in personal or professional life, negotiation is a fundamental skill, ranging from activities resolving interpersonal conflicts to negotiating multimillion-dollar business deals. Effective negotiation is one of the key abilities for achieving desired outcomes while maintaining positive relationships. As stated by Fisher, Ury, and Patton in their seminal work, *Getting to Yes: Negotiating Agreement Without Giving In*, negotiation is about finding mutually acceptable solutions to conflicts and creating value in the process (Fisher et al., 2011).[1]

Due to technological advancements and globalization business negotiations have undergone significant transformations. Digital communication platforms are on the rise and have revolutionized the way negotiations are conducted. Global negotiations, with parties on different parts of the globe, are possible without the need for physical presence, saving time and energy. This shift resolves into both opportunities and challenges. On the one hand, digital platforms facilitate more frequent and efficient interactions; on the other hand, they demand new competencies and strategies to navigate the complexities of virtual negotiations. The Fourth Industrial Revolution, characterized by the fusion of technologies blurring the lines between the physical, digital, and biological spheres, has further emphasized the need for modern negotiators to adapt to rapidly changing environments (Schwab, 2017).[2] Since 2020, the COVID-19 pandemic has poured gasoline on the fire, so that this trend, compelling businesses, and individuals had to rely heavily on online platform for communication and negotiations. The importance of digital knowledge and effective negotiations in an online world has shifted drastically (Dwivedi et al., 2020).[3]

In this context, it is essential to revisit the traditional principles of negotiation and adapt them to the digital age. A whole new set of skills and competencies are required in online negotiations, including proficiency in using digital tools, understanding non-verbal cues through video conferencing, and managing asynchronous communication.

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[1] Fisher, R., Ury, W., & Patton, B. (2011). *Getting to yes: Negotiating agreement without giving in* (3rd ed.). Penguin Books.
[2] Schwab, K. (2017). *The fourth industrial revolution*. Crown Business.
[3] Dwivedi, Y. K., Hughes, D. L., Coombs, C., Constantiou, I., Duan, Y., Edwards, J. S., Gupta, B., Lal, B., Misra, S., Prashant, P., Raman, R., Rana, N. P., Sharma, S. K., & Upadhyay, N. (2020). Impact of COVID-19 pandemic on information management research and practice: Transforming education, work, and life. *International Journal of Information Management, 55*, 102211.

The principles of effective negotiation remain the same, but their application must be adapted to fit the context in which they are employed (Lewicki et al.,2020).[4]

Due to the integration of advanced technologies such as facial analysis and eye tracking new practices and opportunities are enhancing negotiation training and practice. A deeper insight into the emotional and cognitive state of the negotiator can be provided. Understanding and managing emotions is a critical component of effective negotiation, and technology can play a pivotal role in this process (Goleman, 2006).[5]

Overall, the background and context of this study underscore the evolving nature of business negotiations in the digital age. The integration of advanced technologies offers promising avenues for enhancing negotiation skills and outcomes. By examining the role of facial analysis and eye tracking this thesis aims to contribute to the development of effective training methodologies that prepare individuals for the complexities of modern negotiations.

BNCOW

The Business Negotiation Competencies in Online World (BNCOW) project is an innovative initiative aimed at addressing the evolving demands of modern international business negotiations, particularly within the context of online interactions. In response to the challenges posed by the Fourth Industrial Revolution and further accelerated by the COVID-19 pandemic, BNCOW recognizes the increasing importance of equipping students with the necessary competencies to navigate digital business landscapes effectively.

One of the primary objectives of the BNCOW project is to enhance the capacity of European Higher Education Institutions (HEIs) to prepare students for contemporary international business environments. The project focuses on three key areas: enhancing student competencies, creating a community of practice, and facilitating talent recruitment. By increasing student competencies, BNCOW aims to provide them with the mindset and skills required to succeed in digital negotiations. This includes a deep understanding of negotiation principles and the ability to apply them effectively in online settings.

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[4] Lewicki, R. J., Barry, B., & Saunders, D. M. (2020). *Essentials of negotiation* (7th ed.). McGraw-Hill Education.
[5] Goleman, D. (2006). *Social intelligence: The new science of human relationships*. Bantam Books.

The creation of a European Community of Practice is another cornerstone of the BNCOW initiative. This community fosters collaboration among European HEIs, facilitating the exchange of best practices and innovative teaching methodologies. One significant aspect of this collaboration is the organization of European-level business negotiation competitions. These competitions provide students with valuable experiential learning opportunities, allowing them to apply theoretical knowledge in practical scenarios and receive feedback from peers and professionals. BNCOW also seeks to bridge the gap between academia and industry by facilitating interactions between students and companies. Through local and European online business negotiation competitions, companies can observe and recruit talented individuals, thereby enhancing students' employability in the short term. This aspect of the project not only benefits students but also allows companies to identify and engage with potential future employees who possess the necessary negotiation skills and competencies.

At the University of Applied Sciences Düsseldorf, the BNCOW project has been instrumental in developing new elective courses and adapting existing curricula to include advanced topics in digital negotiations. These courses are designed to provide students with a comprehensive understanding of negotiation dynamics in digital contexts, incorporating insights from fields such as psychology, communication studies, and information technology. By leveraging the latest technological tools and methodologies, the BNCOW project aims to create a robust framework for teaching and learning business negotiations in an increasingly digital world.

In summary, the BNCOW project represents a forward-thinking approach to business negotiation education, addressing the unique challenges and opportunities presented by the digital age. Through collaboration, innovation, and practical application, BNCOW aims to equip students with the skills and knowledge necessary to excel in contemporary business negotiations.

Technical Sales Lab

The Technical Sales Lab at the University of Applied Sciences Düsseldorf represents a cutting-edge initiative aimed at revolutionizing the teaching of sales negotiations through the integration of advanced technologies and innovative pedagogical approaches. Established as part of the BNCOW project, the Technical Sales Lab

provides a dynamic and immersive learning environment where students can develop and refine their negotiation skills in both physical and virtual contexts.

One of the primary features of the Technical Sales Lab is its state-of-the-art facilities, which include three modern group study rooms equipped with advanced technological tools. These tools include facial analysis software and eye-tracking systems that enable students to gain deeper insights into the emotional and cognitive aspects of negotiation. By analyzing facial expressions and eye movements, students can better understand their own behaviors and those of their counterparts, leading to more effective and strategic negotiation outcomes.

Technical Sales Lab - University of Applied Sciences Duesseldorf
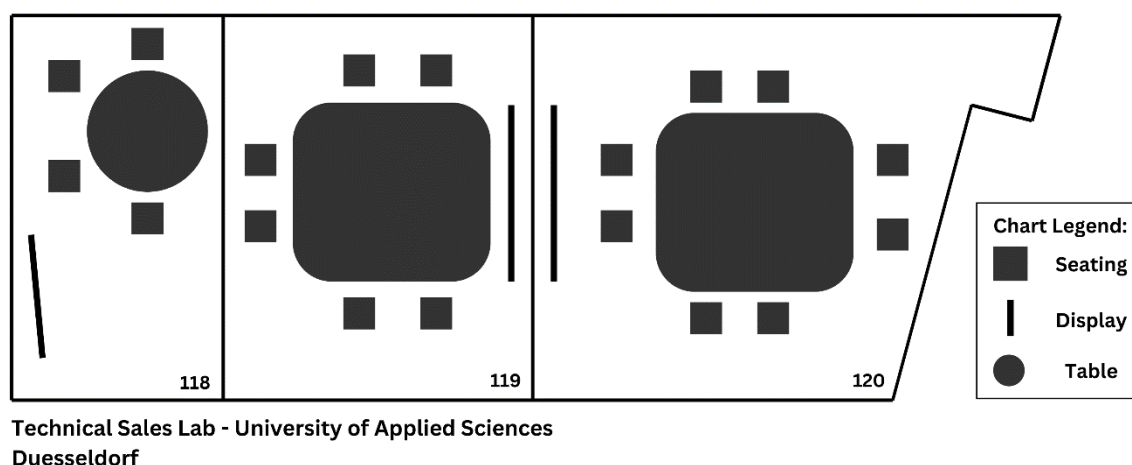
Figure 1: Overview of the TSL

The lab's design fosters a collaborative learning atmosphere, allowing students to interact with professors, mentors, industry partners, and peers in a setting that mirrors real-world business environments. This hands-on approach is crucial for bridging the gap between theoretical knowledge and practical application. Students engage in realistic negotiation scenarios, both face-to-face and online, where they can practice and hone their skills in a controlled and supportive setting. These simulations are often conducted with industry experts, providing students with invaluable feedback, and exposing them to current industry practices and standards.

Courses offered within the Technical Sales Lab, such as "Digital Negotiations" and "Negotiation Management: Strategies & Techniques," are specifically designed to address the complexities of modern sales negotiations. These courses incorporate a multidisciplinary approach, drawing on insights from psychology, communication

studies, and information technology to offer a comprehensive understanding of negotiation dynamics. The curriculum emphasizes the importance of non-verbal communication, emotional intelligence, and strategic decision-making, preparing students to navigate the intricacies of both traditional and digital negotiation landscapes.

In addition to its advanced technological capabilities, the Technical Sales Lab promotes an experiential learning model. This model allows students to engage in interactive exercises, case studies, and role-playing scenarios that simulate real negotiation challenges. For example, students might participate in negotiations involving rent increases, business interviews, or sales transactions, where they must apply their knowledge and skills to achieve mutually beneficial outcomes. These exercises not only deepen their understanding of negotiation principles but also cultivate critical thinking, adaptability, and resilience.

The impact of the Technical Sales Lab extends beyond the classroom, as it serves as a hub for collaboration between academia and industry. Through partnerships with companies and participation in business negotiation competitions, students gain exposure to potential employers and real-world business challenges. This engagement enhances their employability and prepares them for successful careers in sales and negotiation.

The essence of the Technical Sales Lab at UAS Düsseldorf exemplifies a forward-thinking approach to business negotiation education. By integrating advanced technologies and fostering a collaborative and experiential learning environment, the lab equips students with the skills and knowledge necessary to excel in contemporary business negotiations.

Objectives of the Study

This study is framed by research questions that guide the analysis of integrating advanced technologies into teaching sales negotiations. The following key questions will be discussed as part of the outcome:

How effective are current negotiation training programs in enhancing students' negotiation skills and outcomes?

What are the best practices for integrating advanced technologies, such as facial analysis and eye-tracking, into sales training programs?

How can negotiation training programs be designed to enhance student competencies and reduce the fear of negotiating, particularly in digital contexts?

What future concepts and methodologies can be proposed for teaching sales negotiation in both traditional and digital environments?

How can the gap between academic research and industry practices be bridged to ensure that negotiation training is relevant and practical for real-world applications?

These research questions aim to explore the effectiveness of current training programs, identify best practices for integrating new technologies, propose innovative teaching methodologies, enhance student competencies, and bridge the gap between academia and industry. By addressing these questions, the study seeks to contribute to the development of more effective and relevant negotiation training programs that prepare students for the complexities of modern business negotiations.

Structure of the Thesis

This thesis is divided into several key sections that systematically address the objectives, field tests, and research questions. The **introduction** provides an overview of the study's significance, introduces the BNCOW project as well as the Technical Sales Lab at UAS Düsseldorf, and outlines the primary objectives of the research, setting the stage for the following chapters.

In the **literature review**, the historical perspective on negotiation and the evolution of negotiation theories and practices will be examined. Additionally, the foundational principles of eye-tracking and facial analysis technologies, along with current trends in sales negotiation training, will be explored to provide a comprehensive understanding of the field's modern practices.

The research design and methods used to study the impact of technologies on negotiation training will be explained in the **methodology**.

The practical application and the results of using eye-tracking in the TSL are described in the **field tests**. As well as the effectiveness of the BNCOW project's impact on helping improve the curriculum at UAS Düsseldorf by implementing new negotiation teaching concepts.

Due to the large data sizes and methodological challenges in this thesis, the problems of practical difficulties will be discussed in the **limitations** section. Moreover, possible biases and implications for larger student cohorts will be looked at.

Finally, the main findings and their broader theoretical implications, as well as the practical application in real-world negotiation training and practice, are investigated in the **discussion** section. Especially the suggested areas for further investigation based on the study's results and limitations are highlighted. Furthermore, the discussion summarizes the study, reiterating its main contributions, and research questions and reflecting on the potential impact of integrating advanced technologies into negotiation training.

By following this structured approach, the thesis aims to provide a thorough and systematic exploration of the integration of advanced technologies in teaching sales negotiations, offering valuable insights for both academic and practical applications.

Literature Review

This literature review aims to provide a comprehensive examination of the evolution and current trends in negotiation research, emphasizing three distinct but interconnected areas. The first part, **Historical Perspectives on Negotiations and Their Main Principles**, delves into the foundational theories and principles that have shaped negotiation practices over time. This section traces the development of negotiation strategies, highlighting key historical milestones and influential figures who have contributed to the theoretical framework of negotiation.

The second part, **Advances in Eye Tracking and Facial Analysis**, explores the main fundamentals of these technologies and their application in understanding negotiation processes. ET technology provides insights into where individuals focus their attention during negotiations, revealing patterns in visual attention that correlate with decision-making and strategic thinking. FA technology, on the other hand, helps decode the emotional states and non-verbal cues of negotiators, offering a deeper understanding of their intentions and reactions. By integrating these technologies, researchers can design more effective negotiation scenarios and training cases that reflect real-world dynamics. This section examines the core principles of ET and FA, explaining how they can be utilized to enhance our understanding of negotiation behavior and improve training methods.

The third part, **Current Trends in Sales Negotiation Training**, investigates contemporary methods and practices in training individuals for effective sales negotiations. This section reviews the latest approaches and tools used in training programs, focusing on how they integrate findings from both historical perspectives and modern technological advancements. The goal is to understand how current training methods prepare individuals to navigate complex negotiation scenarios in today's dynamic market environment.

Additionally, the review includes an examination of **Additional References** that provide further context on human behavior, cognitive processes, and rationality. These references offer valuable insights into the psychological and behavioral aspects of negotiation, enriching the understanding of how individuals approach and manage negotiation situations.

Historical Perspectives on Negotiation and Their Main Principles

Negotiation as a structured field of study has undergone significant evolution, shaped by foundational theories and practical insights over several decades. One of the earliest and most influential works in this domain is Fisher and Ury's *Getting to Yes: Negotiating Agreement Without Giving In* (1981). This seminal book introduced the concept of principled negotiation, a method that emphasizes mutual gains and objective criteria over positional bargaining. Fisher and Ury's approach revolutionized negotiation by advocating for separating people from the problem, focusing on interests rather than positions, generating options for mutual gain, and insisting on objective criteria. This methodology has become a cornerstone in negotiation literature and practice, promoting outcomes that are beneficial for all parties involved (Fisher et al., 1981). [6]

Building on these ideas, Raiffa's *The Art and Science of Negotiation* (1982) provided a comprehensive analytical framework that bridged theoretical models with practical applications. Raiffa's work introduced quantitative methods such as utility theory, game theory, and decision analysis, which are crucial for understanding and improving negotiation strategies. His emphasis on systematic analysis and preparation underscored the importance of balancing cooperative and competitive tactics in negotiation, thereby influencing a generation of negotiation scholars and practitioners (Raiffa, 1982). [7]

In 1985, Lewicki et al. published *Negotiation*, offering a thorough examination of negotiation strategies and tactics. Their work is notable for its detailed exploration of both distributive and integrative bargaining. Distributive bargaining focuses on dividing a fixed resource, often leading to win-lose outcomes, while integrative bargaining seeks mutually beneficial solutions. The authors also delve into psychological aspects, ethical considerations, and the role of communication in negotiation, providing a comprehensive framework that remains influential (Lewicki et al., 1985). [8]

Lax and Sebenius's *The Manager as Negotiator: Bargaining for Cooperation and Competitive Gain* (1986) introduced the concept of the "negotiator's dilemma," where

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[6] Fisher, R., Ury, W., & Patton, B. (2011). *Getting to yes: Negotiating agreement without giving in* (3rd ed.). Penguin Books.
[7] Raiffa, H. (1982). *The art and science of negotiation*. Harvard University Press.
[8] Lewicki, R. J., Barry, B., & Saunders, D. M. (1985). *Negotiation*. McGraw-Hill.

the challenge lies in balancing value creation with value claiming. They argued that effective negotiators need to foster cooperation to create value while also competing to claim their fair share. This dual focus on cooperation and competition has become a recurring theme in negotiation literature, emphasizing the complexity of achieving optimal outcomes (Lax et al., 1986).[9]

Rackham's *SPIN Selling* (1988) contributed empirical insights into sales negotiation, introducing the SPIN (Situation, Problem, Implication, Need-Payoff) technique. Based on extensive research, Rackham demonstrated that successful sales negotiations depend on understanding the client's problems and showing how one's, product or service can provide solutions. This method has significantly influenced sales negotiation practices, emphasizing the importance of asking the right questions to uncover the buyer's needs (Rackham, 1988).[10]

In the early 1990s, several key contributions further advanced the field. Ury's *Getting Past No: Negotiating in Difficult Situations* (1991) provided practical strategies for overcoming resistance and achieving agreement in challenging negotiations. Complementing Fisher and Ury's earlier work, this book introduced techniques such as "going to the balcony" (gaining perspective), "stepping to their side" (acknowledging the counterpart's points), and "building a golden bridge" (making it easy for the counterpart to agree), which are designed to de-escalate conflicts and facilitate constructive dialogue (Ury, 1991).[11]

Bazerman and Neale's *Negotiating Rationally* (1992) challenged traditional negotiation notions by incorporating insights from behavioral economics and psychology. They highlighted cognitive biases such as overconfidence, anchoring, and escalation of commitment that hinder effective decision-making. By understanding and mitigating these biases, negotiators can make more rational and informed decisions. Their emphasis on objective analysis and systematic thinking has been pivotal in advancing negotiation strategies (Bazerman et al., 1992).[12]

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[9] Lax, D. A., & Sebenius, J. K. (1986). *The manager as negotiator: Bargaining for cooperation and competitive gain*. Free Press.
[10] Rackham, N. (1988). *SPIN selling*. McGraw-Hill.
[11] Ury, W. (1991). *Getting past no: Negotiating in difficult situations*. Bantam Books.
[12] Bazerman, M. H., & Neale, M. A. (1992). *Negotiating rationally*. Free Press.

The anthology *Communication and Negotiation* edited by Putnam and Roloff (1992) underscored the critical role of communication in negotiation processes. This collection of essays examined how verbal and non-verbal communication, language, and cultural differences impact negotiation outcomes. The interdisciplinary nature of this work highlighted the importance of effective communication strategies in achieving successful negotiations (Putnam et al., 1992).[13]

Sebenius's 1992 article "Negotiation Analysis: A Characterization and Review" provided a detailed review of negotiation analysis, characterizing negotiation as a multifaceted process influenced by economic, psychological, and social factors. Sebenius emphasized the importance of integrative bargaining and the role of negotiation analysts in facilitating better outcomes. His work highlighted the interdisciplinary nature of negotiation research and its practical implications (Sebenius, 1992).[14]

Leigh Thompson's *The Mind and Heart of the Negotiator* (1998/2012) offered an in-depth look at the psychological aspects of negotiation. The fifth edition incorporated new research findings and practical insights, discussing cognitive biases, emotional intelligence, and empathy in negotiations. Thompson's practical advice on preparation, conflict management, and achieving win-win outcomes has made her work a comprehensive resource for understanding negotiation behavior (Thompson, 1998).[15]

In 1999, Fehr and Schmidt introduced a model integrating fairness into economic and negotiation theories with their article "A Theory of Fairness, Competition, and Cooperation." Published in the *Quarterly Journal of Economics*, their model addressed how concerns about fairness and equity influence negotiation behavior. They argued that individuals are willing to sacrifice their own economic gains to ensure fair outcomes for all parties, a theory that has been widely cited in both economics and negotiation literature (Fehr et al., 1999).[16]

Shell's *Bargaining for Advantage: Negotiation Strategies for Reasonable People* (1999/2006) synthesized classical and contemporary negotiation strategies, offering a

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[13] Putnam, L. L., & Roloff, M. E. (Eds.). (1992). *Communication and negotiation*. Sage Publications.
[14] Sebenius, J. K. (1992). Negotiation analysis: A characterization and review. *Management Science, 38*(1), 18-38.
[15] Thompson, L. (1998/2012). *The mind and heart of the negotiator*. Pearson Education.
[16] Fehr, E., & Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *Quarterly Journal of Economics, 114*(3), 817-868.

practical guide for negotiators. Shell emphasized preparation, understanding the negotiation context, and adapting strategies to fit specific situations. His concept of "information-based bargaining" focuses on gathering and using information effectively to gain strategic advantage. The updated edition of his book includes new research findings and case studies, making it a valuable resource for both novice and experienced negotiators (Shell, 1999).[17]

In the early 2000s, behavioral and cultural insights further enriched negotiation literature. Camerer's *Behavioral Game Theory: Experiments in Strategic Interaction* (2003) combined psychology and economics to study negotiation behavior, revealing that people often deviate from purely rational behavior due to cognitive biases and social preferences. This work is essential for understanding the psychological foundations of negotiation strategies (Camerer, 2003).[18]

The Handbook of Negotiation and Culture edited by Gelfand and Brett (2004) explored how cultural differences impact negotiation processes and outcomes. This anthology provided a comprehensive overview of cross-cultural negotiation strategies, cultural dimensions, and the role of cultural intelligence. The interdisciplinary contributions underscored the importance of understanding cultural norms and values in global negotiation contexts (Gelfand et al., 2004).[19]

Thompson's (2005) *The Truth About Negotiations* debunks common myths and provides evidence-based strategies to enhance negotiation outcomes. This book is structured to address various phases of negotiation, from preparation to execution and follow-up. Thompson emphasizes the significance of setting realistic goals, understanding the interests and motivations of the counterpart, and developing effective communication skills. The book also explores the role of emotions in negotiations, offering strategies to manage stress and build rapport (Thompson, 2005).[20]

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[17] Shell, G. R. (1999/2006). *Bargaining for advantage: Negotiation strategies for reasonable people*. Penguin Books.
[18] Camerer, C. F. (2003). *Behavioral game theory: Experiments in strategic interaction*. Princeton University Press.
[19] Gelfand, M. J., & Brett, J. M. (Eds.). (2004). *The handbook of negotiation and culture*. Stanford University Press.
[20] Thompson, L. (2005). *The truth about negotiations*. FT Press.

Watkins (2006) in *Shaping the Game: The New Leader's Guide to Effective Negotiating* provides strategic guidance for leaders engaged in negotiations. Watkins emphasizes the importance of shaping the negotiation agenda, framing issues to one's advantage, and building coalitions. He introduces the concept of "negotiation architecture," which involves designing the negotiation process to increase the likelihood of favorable outcomes. The book also discusses the role of power and influence in negotiations and offers practical tools for leaders to navigate complex negotiation environments (Watkins, 2006).[21]

Malhotra and Bazerman's (2007) *Negotiation Genius* offers a comprehensive guide to overcoming obstacles in negotiations. This text stands out for its practical approach, combining rigorous academic research with real-world applications. The authors present techniques for negotiators to prepare effectively, manage psychological dynamics, and deploy strategic moves. One of the key contributions of this book is its emphasis on the psychological aspects of negotiation, such as the importance of understanding one's own biases and those of the counterpart. The book also introduces concepts like the "BATNA" (Best Alternative to a Negotiated Agreement) and strategies for creating and claiming value (Malhotra et al., 2007).[22]

Thompson, Wang, and Gunia's 2010 review article "Negotiation" in the *Annual Review of Psychology* summarized the latest research trends and theoretical developments in the field. They highlighted key findings from studies on negotiation strategies, cognitive and emotional factors, and cultural influences. The article also discussed emerging areas of research, such as the impact of technology on negotiation processes and the role of neuroscience in understanding negotiation behavior (Thompson et al., 2010).[23]

The historical perspectives on negotiation reveal a rich evolution of theories and practices that have shaped the field. From the early foundational works that introduced principled negotiation and analytical frameworks to contemporary insights on cognitive biases, cultural influences, and practical strategies, the literature provides a comprehensive understanding of negotiation dynamics. These works collectively highlight the interdisciplinary nature of negotiation research and its practical

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[21] Watkins, M. (2006). *Shaping the game: The new leader's guide to effective negotiating*. Harvard Business Review Press.
[22] Malhotra, D., & Bazerman, M. H. (2007). *Negotiation genius: How to overcome obstacles and achieve brilliant results at the bargaining table and beyond.* Bantam.
[23] Thompson, L., Wang, J., & Gunia, B. C. (2010). Negotiation. *Annual Review of Psychology, 61*(1), 491-515.

implications, offering valuable guidance for achieving successful outcomes in various negotiation contexts. To gain a deeper understanding of negotiations, it is essential to examine current trends in sales negotiation training since 2010, considering the economy's shift towards the digital age. Prior to this examination, it is important to explore the basics of eye-tracking and facial analysis to identify potential opportunities for implementing these advanced technologies in negotiation training.

Advances in Eye-Tracking and Facial Recognition Technologies

Eye-tracking and facial recognition technologies have undergone significant advancements over the past decades, impacting fields such as psychology, marketing, healthcare, and aviation. These technologies provide deep insights into human behavior, emotions, and interactions, making them invaluable for both research and practical applications. This review examines the key literature on these technologies, focusing on their development, methodologies, and applications.

In the early 2000s, Duchowski provided a comprehensive overview of eye-tracking methodologies, covering both theoretical and practical aspects. His work laid the groundwork for understanding how eye-tracking technology can be applied in different research fields. Duchowski discussed the technical aspects of eye-tracking devices, data collection methods, and the interpretation of eye movement data (Duchowski, 2003). [24]

Building on these methodologies, Holmqvist and colleagues expanded on Duchowski's work by offering a more detailed examination of eye-tracking methods. They provided practical advice on designing eye-tracking studies, choosing appropriate measures, and analyzing eye-tracking data. Their guide covers various eye-tracking technologies and emphasizes the importance of selecting appropriate methodologies for specific research questions and contexts (Holmqvist et al., 2011).[25]

Liversedge, Gilchrist, and Everling compiled research on eye movements across various disciplines, highlighting the importance of eye movements in understanding cognitive processes such as reading, visual search, and attention. Their multidisciplinary perspective offers a comprehensive resource for researchers studying

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[24] Duchowski, A. T. (2003). *Eye tracking methodology: Theory and practice*. Springer.
[25] Holmqvist, K., Nyström, M., Andersson, R., Dewhurst, R., Jarodzka, H., & van de Weijer, J. (2011). *Eye tracking: A comprehensive guide to methods and measures*. Oxford University Press.

the cognitive and neural mechanisms underlying eye movements (Liversedge et al., 2011).[26]

Significant advancements in facial recognition technology were demonstrated by Bartlett and colleagues, who conducted a study on the automatic recognition of facial actions in spontaneous expressions. Their research demonstrated how machine learning algorithms can accurately identify and classify facial expressions in real-time, highlighting the potential of machine learning in affective computing and human-computer interaction (Barlett et al., 2003).[27]

Cohn and De la Torre discussed the integration of automated face analysis with affective computing, focusing on how advancements in machine learning and computer vision enable the automatic detection and analysis of facial expressions. They highlighted the potential for these technologies to enhance human-computer interactions by allowing systems to respond to users' emotional states in real-time (Cohn et al., 2014).[28]

Ekman's seminal work on basic emotions provided a foundational understanding of facial expressions. He proposed that certain emotions are universally expressed and recognized through specific facial expressions, and his development of the Facial Action Coding System (FACS) provided a systematic way to code facial movements associated with different emotions. Ekman's research has been instrumental in developing facial recognition technologies that can accurately interpret emotional expressions across cultures (Ekman, 2003).[29]

Matsumoto and Hwang explored the possibility of training individuals to recognize micro expressions—brief, involuntary facial expressions that reveal true emotions. Their research demonstrated that with proper training, individuals could improve their

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[26] Liversedge, S. P., Gilchrist, I. D., & Everling, S. (2011). *The Oxford handbook of eye movements*. Oxford University Press.
[27] Bartlett, M. S., Hager, J. C., Ekman, P., & Sejnowski, T. J. (2003). Measuring facial expressions by computer image analysis. *Psychophysiology, 36*(2), 253-263.
[28] Cohn, J. F., & De la Torre, F. (2014). Automated face analysis for affective computing. In *The Oxford handbook of affective computing* (pp. 131-150). Oxford University Press.
[29] Ekman, P. (2003). *Emotions revealed: Recognizing faces and feelings to improve communication and emotional life*. Times Books.

ability to detect these subtle cues, which has significant implications for fields such as security, psychology, and interpersonal communication (Matsumoto, 2011).[30]

Mandal and Awasthi emphasized the importance of considering cultural differences when developing and applying facial recognition technologies. Their work provides insights into how facial expressions are interpreted across different cultures, emphasizing that understanding these differences is crucial for creating accurate and reliable systems that perform well in diverse contexts (Mandal et al., 2015).[31]

Orekha explored the use of facial emotion recognition for mental health monitoring, discussing how FER can be utilized to detect and monitor emotional states, offering potential benefits for mental health diagnostics and therapy. Continuous analysis of facial expressions by FER systems can provide real-time feedback to therapists and help in the early detection of mental health issues (Orekha, 2020).[32]

Patel delved into the technical aspects of facial emotion recognition, explaining how machine learning algorithms can be trained to decode facial expressions and providing a practical guide for implementing FER systems. Patel's work offers insights into data collection, algorithm training, and system deployment, making it valuable for developers and researchers (Patel, 2021).[33]

Krumhuber examined the role of facial movements in emotion recognition, highlighting the importance of dynamic facial movements in accurately interpreting emotions. Her research underscores the need for advanced algorithms that can analyze temporal changes in facial expressions to improve the accuracy of emotion recognition systems (Krumhuber, 2021).[34]

AIMS Press discussed the development of a robust convolutional neural network (CNN) for facial emotion recognition and its implementation in a real-time graphical user interface (GUI). Their work highlighted the advancements in deep learning that

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[30] Matsumoto, D., & Hwang, H. S. (2011). Evidence for training the ability to read microexpressions of emotion. *Motivation and Emotion, 35*(2), 181-191.
[31] Mandal, M. K., & Awasthi, A. (2015). Understanding facial expressions of emotion: A cultural perspective. *Psychological Studies, 60*(4), 461-470.
[32] Orekha, O. (2020). Applications of facial emotion recognition for mental health monitoring. *Journal of Affective Disorders, 277*, 805-816.
[33] Patel, S. (2021). Implementing facial emotion recognition systems: A practical guide. *International Journal of Computer Vision, 129*(6), 1514-1533.
[34] Krumhuber, E. G. (2021). The role of dynamic facial expressions in emotion perception. *Emotion Review, 13*(2), 139-149.

have enhanced the accuracy and efficiency of FER systems, making them more suitable for real-time applications (AIMS Press, 2022).[35]

Advancements in eye-tracking and facial recognition technologies have significantly impacted various fields, providing new ways to understand and interpret human behavior and emotions. From early methodological developments to contemporary applications in mental health, marketing, and aviation, these technologies continue to evolve, offering valuable tools for research and practical use. The reviewed literature highlights the interdisciplinary nature of these advancements and their broad implications, ensuring their relevance and utility in diverse contexts. In particular, the potential for their application in negotiations warrants further research in the future.

Current Trends in Sales Negotiation Training

After closely examining the advanced technologies of ET and FA, it is necessary to conduct an in-depth investigation into the current trends in sales negotiation training. All these articles and books were relatively newly published (all after 2010) and contain the newest standards for teaching sales. This part of the literature review explores current trends in sales negotiation training, highlighting the impact of recent advancements in technology, psychological insights, and strategic approaches on sales training programs and their effectiveness.

The integration of technology into sales training has fundamentally transformed how sales professionals are educated and developed. Ingram, LaForge, and Leigh (2012) discuss the changing landscape of sales in the new millennium in their article in *Industrial Marketing Management*. They propose a joint agenda for sales training that includes cross-functional collaboration, integration of new technologies, and a focus on customer-centric approaches. Their work emphasizes the importance of aligning sales training programs with broader business strategies to drive growth and innovation. By fostering collaboration between sales and other departments, such as marketing and product development, organizations can create a more cohesive and effective sales strategy (Ingram et al., 2012).[36]

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[35] AIMS Press. (2022). Developing robust CNNs for real-time facial emotion recognition. *AIMS Electronics and Electrical Engineering, 6*(3), 201-213.
[36] Ingram, T. N., LaForge, R. W., & Leigh, T. W. (2012). Sales training in the new millennium: A joint agenda. *Industrial Marketing Management, 41*(3), 377-386.

Cron, Baldauf, Leigh, and Grossenbacher explored the strategic role of the sales force in driving organizational success in their study published in the *Journal of the Academy of Marketing Science*. They surveyed senior sales executives to understand their perceptions of the strategic importance of the sales force. The findings indicated that a well-trained sales team is crucial for implementing strategic initiatives and achieving a competitive advantage. The study emphasized the need for continuous training to keep the sales force aligned with organizational goals and responsive to market changes. Senior executives highlighted the importance of training programs that not only enhance sales skills but also integrate with broader business strategies (Cron et al., 2014).[37]

Honeycutt et al. (2015) investigated the impacts of sales training on performance improvement, job satisfaction, and return on investment (ROI). Their research, published in the *Journal of Personal Selling & Sales Management*, found that effective sales training programs significantly enhance sales performance, leading to increased revenue and market share. Moreover, these programs contribute to higher job satisfaction and lower turnover rates among sales staff. The study underscored the importance of designing comprehensive training programs that address both the technical and motivational aspects of sales roles. By investing in robust training initiatives, organizations can ensure a high ROI through improved sales metrics and employee retention (Honeycutt et al., 2015).[38]

Weilbaker and Crockett (2018) conducted a longitudinal investigation that examined the role of technology in sales training. They found that the use of virtual simulations, online modules, and customer relationship management (CRM) software significantly enhances the learning experience. These tools provide interactive and flexible learning environments that can be tailored to the individual needs of salespeople. The study highlighted the benefits of technology in providing real-time feedback, increasing engagement, and allowing for repetitive practice in a risk-free environment. This shift towards digital training platforms is a response to the evolving demands of the sales

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[37] Cron, W. L., Baldauf, A., Leigh, T. W., & Grossenbacher, S. (2014). The strategic role of the sales force: Perceptions of senior sales executives. *Journal of the Academy of Marketing Science, 42*(5), 471-489.
[38] Honeycutt, E. D., Thelen, S. T., Thelen, T., & Hodge, S. K. (2015). Impacts of sales training on performance improvement, job satisfaction, and ROI. *Journal of Personal Selling & Sales Management, 35*(1), 53-70.

landscape, where rapid changes in technology and consumer behavior require sales professionals to continually update their skills (Weilbaker et al., 2018).[39]

Voss and Raz (2016), in their book *Never Split the Difference: Negotiating as If Your Life Depended on It*, apply techniques used in high-stakes hostage negotiations to business negotiations. Their approach emphasizes the importance of tactical empathy, active listening, and the strategic use of calibrated questions. These psychological techniques are increasingly being incorporated into sales training programs to improve negotiation outcomes. Voss and Raz argue that by understanding and leveraging the psychological drivers behind client decisions, sales professionals can achieve better results. Their methods, which include mirroring and labeling, are designed to disarm clients and create an environment conducive to cooperative problem-solving (Voss & Raz, 2016).[40]

Housel (2020), in his book *The Psychology of Money*, provides a deep dive into the psychological aspects of financial decision-making. Understanding these psychological factors can help sales professionals better connect with clients by anticipating their needs and responding appropriately to their emotional states. Housel's insights into human behavior, particularly regarding wealth and financial decisions, underscore the importance of empathy and emotional intelligence in sales training. By incorporating these psychological principles, sales training programs can teach salespeople how to build trust and rapport with clients, leading to more successful negotiations (Housel, 2020).[41]

Williams and Spiro (2020) conducted a longitudinal study on the impact of sales training on performance, published in the *Journal of Marketing Education*. Their findings indicate that ongoing training and development are critical for maintaining high performance levels in sales teams. The study highlighted the necessity of adaptive training programs that evolve with market trends and technological advancements. Continuous learning opportunities, such as workshops, seminars, and e-learning modules, were shown to be effective in keeping sales professionals updated on the

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[39] Weilbaker, D. C., & Crockett, D. (2018). Longitudinal investigation of technology in sales training. *Journal of Sales Education, 4*(2), 113-134.
[40] Voss, C., & Raz, T. (2016). *Never split the difference: Negotiating as if your life depended on it*. Harper Business.
[41] Housel, M. (2020). *The psychology of money: Timeless lessons on wealth, greed, and happiness*. Harriman House.

latest strategies and tools. This continuous development is essential for maintaining a competitive edge in the rapidly changing sales environment (Williams et al., 2020).[42]

Berger, Holopainen, and Seidenstricker (2020) analyze reading offers in Finland and Germany, providing insights into cultural differences in sales approaches and training. Their study, included in *Advances in Human Factors, Business Management and Leadership*, emphasizes the importance of understanding cultural nuances and adapting training programs accordingly. The findings suggest that culturally tailored training programs can lead to more effective communication and better negotiation outcomes in international sales contexts (Berger et al., 2020).[43]

A systematic literature review by Fischer, Seidenstricker, and Poeppelbus on the triggers and consequences of digital sales (2022) provides a comprehensive overview of the impact of digital transformation on sales training. The review highlights the shift towards digital sales tools and platforms, the need for digital literacy among sales professionals, and the consequences of digital transformation on sales strategies and outcomes. As sales processes become increasingly digitized, training programs must evolve to include digital sales skills, such as using social media for lead generation, understanding analytics, and leveraging CRM systems (Fischer et al., 2022).[44]

The current trends in sales negotiation training reflect a dynamic landscape influenced by technological advancements, psychological insights, and strategic imperatives. Effective sales training programs integrate technology to enhance engagement and flexibility, incorporate psychological techniques to improve negotiation skills and align with strategic business goals to drive performance. As the sales environment continues to evolve, continuous learning and adaptation are essential for maintaining competitive advantage and achieving success in sales negotiations. The reviewed literature highlights the importance of comprehensive and adaptive training programs that address the unique needs of different industries and sales roles, ensuring that sales

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[42] Williams, K. C., & Spiro, R. L. (2020). The longitudinal impact of sales training on performance. *Journal of Marketing Education, 42*(2), 123-136.

[43] Berger, S., Holopainen, J., & Seidenstricker, S. (2020). Reading offers in Finland and Germany: Cultural insights into sales training. In *Advances in Human Factors, Business Management and Leadership* (pp. 235-244). Springer.

[44] Fischer, Seidenstricker & Poeppelbus (2022) Triggers and consequences of digital sales transformation: A systematic literature review. *Journal of Sales Transformation, 10*(1), 45-62.

professionals are equipped with the skills and knowledge necessary to excel in their careers.

Additional References

For a deeper understanding of negotiations, it is essential to delve deeply into the realms of behavioral economics and cognitive biases to comprehend the fundamental aspects of human behavior, as well as the ways in which individuals judge, decide, and understand the processes of our modern world.

Dan Ariely's *Predictably Irrational* (2008) delves into the hidden forces shaping our decisions, highlighting the systematic and predictable patterns of irrational behavior. Ariely uses a series of engaging experiments to illustrate how cognitive biases such as anchoring, availability heuristic, and loss aversion influence our choices. His work emphasizes that these irrational behaviors are not random but follow predictable patterns that can be understood and anticipated. For instance, Ariely discusses how price perceptions can be manipulated through anchoring, where initial exposure to a high price sets a benchmark that influences subsequent price evaluations. This book challenges the traditional economic assumption of rationality, showing that even mundane decisions are susceptible to irrational influences (Ariely, 2008).[45]

Camerer and Loewenstein's comprehensive chapter in *Advances in Behavioral Economics* (2004) provides a historical and theoretical overview of behavioral economics. They trace the evolution of the field from its early roots in psychology to its status as a significant sub-discipline of economics. Key concepts discussed include prospect theory, mental accounting, and hyperbolic discounting. Prospect theory, developed by Kahneman and Tversky, suggests that people value gains and losses differently, leading to inconsistent risk behavior. Mental accounting refers to the cognitive process of categorizing and treating money differently depending on its source or intended use. Hyperbolic discounting explains why people tend to prefer smaller, immediate rewards over larger, delayed ones. Camerer and Loewenstein argue that incorporating these psychological insights into economic models results in

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[45] Ariely, D. (2008). *Predictably irrational: The hidden forces that shape our decisions*. HarperCollins.

a more accurate representation of human behavior, which can improve predictions and policy prescriptions (Camerer et al., 2004).[46]

The groundbreaking work of Tversky and Kahneman, "Judgment under Uncertainty: Heuristics and Biases" (1974), introduced the concept of heuristics—mental shortcuts that simplify decision-making under uncertainty. They identified several types of heuristics, including availability heuristic (judging the probability of events based on how easily examples come to mind), representativeness heuristic (assessing the likelihood of an event based on how similar it is to a prototype), and anchoring and adjustment (relying too heavily on an initial piece of information when making decisions, and inadequately adjusting from that anchor). Their work revealed that these heuristics often lead to systematic biases, such as overconfidence and framing effects, where the way information is presented can significantly influence decisions. This seminal paper laid the foundation for the field of behavioral economics by demonstrating that human judgment deviates from rationality in predictable ways (Tversky et al., 1974).[47]

Daniel Kahneman's *Thinking, Fast and Slow* (2011) synthesizes decades of research on cognitive processes into a dual-system framework. System 1 operates automatically and quickly with little effort and no voluntary control, relying on intuition and heuristics. System 2 allocates attention to effortful mental activities that demand it, such as complex computations. Kahneman explains how System 1's rapid, intuitive responses can lead to cognitive biases, while System 2's slower, more deliberate processes can correct these biases but are often underutilized due to mental laziness or cognitive load. He discusses several key biases and heuristics, such as loss aversion (the tendency to prefer avoiding losses over acquiring equivalent gains), the endowment effect (the tendency to overvalue items simply because we own them), and framing effects (the influence of how a choice is presented on decision outcomes, even if the underlying information is identical). Kahneman's work highlights the pervasive impact of these biases on various aspects of life, including financial decisions, health choices, and public policy (Kahneman, 2011).[48]

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[46] Camerer, C. F., & Loewenstein, G. (2004). Behavioral economics: Past, present, future. In C. F. Camerer, G. Loewenstein, & M. Rabin (Eds.), *Advances in behavioral economics* (pp. 3-51). Princeton University Press.
[47] Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185* (4157), 1124-1131.
[48] Kahneman, D. (2011). *Thinking, fast and slow*. Farrar, Straus and Giroux.

In *Yes! 50 Scientifically Proven Ways to Be Persuasive* (2007), Goldstein, Martin, and Cialdini distill social psychology research into practical techniques for influencing others. They explore principles of persuasion such as reciprocity (the obligation to return favors, which can be leveraged to gain compliance), commitment and consistency (the desire to be consistent with previous actions and commitments, which can be used to secure agreement), social proof (the influence of seeing others perform a behavior, which can be a powerful motivator), authority (the tendency to obey figures of authority, which can enhance persuasiveness), liking (the impact of personal affinity on persuasion), and scarcity (the perceived value increase of items that are seen as rare or in limited supply). The book provides evidence-based strategies for applying these principles in various contexts, from marketing and sales to personal relationships (Goldstein et al., 2007).[49]

In *Noise: A Flaw in Human Judgment* (2021), Kahneman, Sibony, and Sunstein explore the concept of noise—random variability in judgments that leads to inconsistent decisions. Unlike biases, which are systematic deviations, noise represents unpredictable errors that can significantly undermine decision quality. They identify sources of noise, such as occasion noise (variability in decisions caused by irrelevant factors, such as mood or time of day) and system noise (differences in judgments across individuals within the same system, such as varying sentences given by judges for similar cases). The authors propose strategies to reduce noise, including decision hygiene (procedures and protocols to standardize decision-making processes) and structured decision-making (using algorithms and checklists to guide decisions and reduce variability). This book extends the discussion of cognitive biases by highlighting another significant factor that affects judgment and decision-making (Kahneman et al., 2021).[50]

The implications of these works are far-reaching, impacting economics, psychology, marketing, and public policy. By highlighting how human behavior deviates from rationality, these authors provide valuable insights for designing interventions and policies that account for these deviations.

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[49] Goldstein, N. J., Martin, S. J., & Cialdini, R. B. (2007). *Yes! 50 scientifically proven ways to be persuasive*. Free Press.
[50] Kahneman, D., Sibony, O., & Sunstein, C. R. (2021). *Noise: A flaw in human judgment*. Little, Brown Spark.

Behavioral economics has revolutionized economic policy by incorporating cognitive biases and heuristics into the design of interventions. For example, the concept of nudges—subtle changes in the choice architecture that encourage better decisions without restricting freedom—has been widely adopted in public policy. This approach leverages insights from behavioral economics to design more effective policies that align with how people think and behave. Policies that incorporate behavioral insights, such as automatic enrolment in retirement savings plans, have proven to significantly increase participation rates and improve financial security (Thaler et al., 2008; Kahneman, 2011).[51]

The literature on behavioral economics and decision-making provides a comprehensive understanding of the cognitive processes that drive human behavior. From the foundational work of Tversky and Kahneman on heuristics and biases to the practical applications of persuasion techniques by Goldstein, Martin, and Cialdini, these sources highlight the complex interplay between rationality and irrationality in decision-making. The integration of these insights into various fields has led to more effective policies, marketing strategies, and personal decision-making practices, underscoring the importance of understanding the hidden forces that shape our choices.

Overall, the literature shows that a base understanding of the human mind, cognitive behavior, negotiations, and advanced technologies can be a very powerful tool, especially in the modern world, where online meetings and needed technical skills get more advanced than ever.

The literature review encompasses a broad exploration of negotiation theories, ET and FA technologies, and current trends in sales negotiation training. It highlights the evolution of negotiation strategies from foundational theories by Fisher and Ury's principled negotiation to contemporary insights integrating behavioral economics and psychology. The advancements in ET and FA technologies are discussed, illustrating their potential to decode visual attention and emotional states during negotiations. The review also emphasizes the impact of digital transformation and psychological techniques on modern sales training, suggesting that a combination of historical

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[51] Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press.

insights and technological advancements can significantly enhance negotiation training and practices.

The indications and possibilities are clear that the integration of advanced technologies, like ET and FEA, can enhance student competencies and help them understand their own behaviors. Especially, regarding the future of teaching sales negotiation in traditional and digital environments.

To gain a deeper understanding of this technology and our own emotions, it is necessary to thoroughly examine the methodology employed in this study and consider multiple case designs for further research.

Methodology

Understanding and Interpreting Emotions

Emotions play a critical role in human interaction and communication. The ability to accurately understand and interpret emotions is essential for effective interpersonal communication, particularly in contexts such as sales negotiations where emotional cues can significantly influence outcomes. Recent advancements in technology, particularly in FA and ET, have provided new avenues for exploring and understanding human emotions with greater precision and depth.

Facial analysis involves the use of advanced software to detect and interpret facial expressions. Facial expressions are universal indicators of emotions, as described in Ekman's (1993) work on basic emotions, which include happiness, sadness, anger, fear, disgust, and surprise. Technologies such as Affectiva and Noldus FaceReader have made it possible to automatically analyze facial expressions by detecting key facial landmarks and movements (Ekman,1993).[52]

In this study, iMotions software is utilized for its comprehensive capabilities in integrating and analyzing data from various biometric sensors, including facial recognition and eye-tracking. According to Ekman and Friesen (1978), facial expressions are a reliable source of information about a person's emotional state. These expressions are composed of micro-expressions, which are brief, involuntary facial movements that reveal genuine emotions. By using high-definition cameras and iMotions software, researchers can capture these micro-expressions to gain insights into an individual's emotional state (Ekman, 2003).[53]

Eye-tracking technology provides another layer of understanding by monitoring where and how long individuals focus their gaze. Eye movements, including fixations, saccades, and pupil dilation, offer valuable information about cognitive and emotional processes (Duchowski, 2003).[54]

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[52] Ekman, P. (1993). Facial expression and emotion. American Psychologist, 48(4), 384-392.
[53] Ekman, P. (2003). *Emotions revealed: Recognizing faces and feelings to improve communication and emotional life*. Macmillan.
[54] Duchowski, A. T. (2003). Eye tracking methodology: Theory and practice. Springer.

For instance, prolonged fixation on a specific object can indicate interest or anxiety, while rapid eye movements may suggest scanning for information or discomfort (Holmqvist et al., 2011).[55]

In this study, Neon Glasses from Pupil Labs are used to capture detailed eye-tracking data. These state-of-the-art glasses allow for precise tracking of gaze direction, fixation points, and pupil dilation. The integration of eye-tracking data from Neon Glasses with facial analysis in iMotions software allows for a more comprehensive understanding of emotional responses. As participants interact with various stimuli, eye-tracking data can reveal which elements draw their attention and for how long, while facial analysis can provide context by identifying the corresponding emotional expressions.

To accurately understand and interpret emotions through facial analysis and eye-tracking, the following methodology is employed:

1. **Participants**: A diverse group of participants is selected to ensure a broad range of emotional responses.
2. **Controlled Environment**: Experiments are conducted in a controlled environment, called the TSL, to minimize external variables that could affect emotional responses.
3. **Stimuli**: Participants are exposed to multimedia content designed to elicit specific emotions such as anger, fear, joy, confidence, excitement, and frustration.
4. **Data Collection**: High-definition cameras and Neon Glasses from Pupil Labs are used to record facial expressions and eye movements simultaneously. Data is then analyzed using iMotions software.
5. **Analysis**: Data is analyzed using iMotions software, which detects facial landmarks and eye-tracking metrics. Machine learning algorithms are applied to identify patterns and correlations between the observed behaviors and reported emotional states, as well as the implication of gaze maps.

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[55] Holmqvist, K., Nyström, M., Andersson, R., Dewhurst, R., Jarodzka, H., & van de Weijer, J. (2011). *Eye tracking: A comprehensive guide to methods and measures*. Oxford University Press.

To further refine the understanding of specific emotions, detailed case studies are developed for emotions such as anger, fear, joy, confidence, excitement, and frustration. Each case study involves:

- **Anger**: Analysis of furrowing brows, tightened lips, and increased gaze fixation on provoking elements (Ekman, 2003).
- **Fear**: Observation of widened eyes raised eyebrows, and rapid eye movements (Ekman, 1993).
- **Joy**: Identification of smiling, crow's feet around the eyes, and prolonged gaze on positive stimuli (Ekman & Friesen, 1978).[56]
- **Confidence**: Detection of steady gaze relaxed facial muscles, and consistent eye contact.
- **Excitement**: Detection of raised eyebrows, wide eyes, and dynamic eye movements.
- **Frustration**: Noting furrowed brows, tightened lips, and frequent shifting of gaze.

In this thesis, the usage of the Affectiva technology in iMotions will be used to determine, whether a participant is feeling these kinds of emotions. Affectiva in iMotions works through analyzing roughly 23 different facial expressions and interpret them by using neuronal networks. Affectiva is a separate company from iMotions and has access to 18 years of data from 90 different countries, in total having over 17.4 million face videos, making it over 8 billion facial frames. This technology is used by 26% of Global Fortune 500 companies.[57]

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[56] Ekman, P., & Friesen, W. V. (1978). *Facial Action Coding System (FACS)*. Consulting Psychologists Press.
[57] Affectiva. (n.d.). Homepage. Retrieved July 24, 2024, from https://www.affectiva.com/
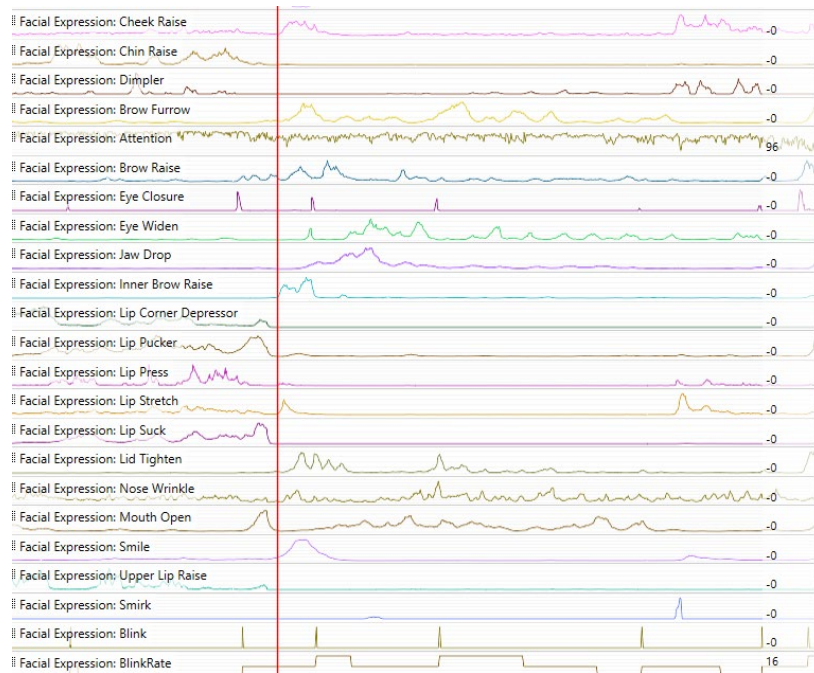
Figure 2: Overview of all Measured Facial Expressions in iMotions

These neuronal networks then interpret the emotions in anger, fear, joy, confidence, excitement, frustration, engagement, and others. Due to the limitations of this bachelor's thesis, I will only focus on the mentioned ones and especially on the engagement of the contestants. That concludes that the case designs are only theoretical and can be used for further research in the future.
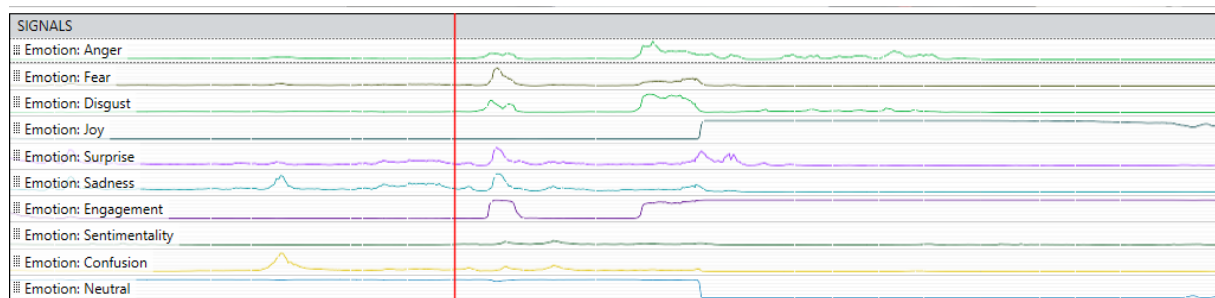
Figure 3: Overview of the Measured Emotions in iMotions

Generally, ethical considerations are paramount in studies involving human emotions. Participants must provide informed consent and be fully aware of the study's nature. Their anonymity and confidentiality are strictly maintained, and measures are taken to minimize any potential biases in data collection and analysis.

Understanding and interpreting emotions through facial analysis and eye-tracking provides valuable insights into human emotional responses. This methodology enables

researchers to capture and analyze subtle emotional cues, enhancing the ability to teach and apply these insights in practical scenarios such as sales negotiations. The integration of technologies such as iMotions software and Neon Glasses from Pupil Labs represents a significant advancement in the field of emotion research, offering new opportunities for deeper and more accurate understanding.

In the following section, detailed case designs for each emotion—anger, fear, joy, confidence, and frustration—are provided, illustrating the methodology for inducing and measuring emotional states during negotiations. These designs leverage FA and ET technologies to understand emotional influences on negotiation strategies and outcomes.

Expected outcomes are based on psychological theories, such as anger leading to competitive strategies and joy fostering cooperation. Pre-experiment surveys assess baseline emotional states and negotiation styles to ensure accurate measurement.

These case designs offer a framework for exploring emotions' impact on negotiation and provide a method for future research consolidation. By varying stimuli and scenarios, researchers can understand how emotions influence negotiation tactics and outcomes. This integration of FA and ET technologies enhances negotiation research and training, offering new opportunities for academic and practical advancements in sales negotiation.

Case Design for Anger

Objective: To examine how anger influences negotiation strategies and outcomes.

Participants: Recruit 30 participants with an understanding of negotiations.

Procedure:

1. **Pre-experiment Survey:** Assess baseline emotional state and negotiation style.
2. **Induction of Anger:** Show a video clip designed to induce anger (e.g., a frustrating customer service scenario).
3. **Negotiation Task:**

- o **Scenario:** Participants negotiate the price of a high-demand product with a supplier. The supplier initially offers an unreasonably high price is very loud and has an aggressive negotiation style.
- o **Task:** Participants must negotiate the price down to a mutually agreeable level.
4. **Data Collection:** Use facial analysis software to detect signs of anger (e.g., furrowed brows, tightened lips) and eye-tracking to monitor gaze patterns.

Expected Outcome: Participants experiencing anger will adopt more competitive negotiation strategies and achieve less favorable outcomes (Van Kleef et al., 2004).[58]

Case Design for Fear

Objective: To investigate the impact of fear on negotiation behavior and results.

Participants: Recruit 30 participants.

Procedure:

1. **Pre-experiment Survey:** Assess baseline emotional state and negotiation style.
2. **Induction of Fear:** Show a video clip designed to induce fear (e.g., a suspenseful scene from a horror movie).
3. **Negotiation Task:**
   - o **Scenario:** Participants negotiate a job offer where the stakes are high (e.g., a critical career opportunity). The employer (confederate) presents potential downsides and risks associated with the job.
   - o **Task:** Participants must negotiate salary, benefits, and job conditions.
4. **Data Collection:** Use facial analysis to detect signs of fear (e.g., widened eyes, raised eyebrows) and eye-tracking to monitor gaze patterns.

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[58] Van Kleef, G. A., De Dreu, C. K., & Manstead, A. S. (2004). The interpersonal effects of anger and happiness in negotiations. *Journal of Personality and Social Psychology, 86*(1), 57-76.

Expected Outcome: Fear is expected to result in more risk-averse behavior and less assertive negotiation tactics (Brooks et al., 2011).[59]

Case Design for Joy

Objective: To explore how joy affects negotiation approaches and success.

Participants: Recruit 30 participants.

Procedure:

1. **Pre-experiment Survey:** Assess baseline emotional state and negotiation style.
2. **Induction of Joy:** Show a video clip designed to induce joy (e.g., a humorous scene from a comedy).
3. **Negotiation Task:**
   - **Scenario:** Participants negotiate a collaborative partnership between two companies. The potential partner (confederate) is open to mutual benefits but starts with a conservative offer.
   - **Task:** Participants must negotiate terms that maximize benefits for both parties.
4. **Data Collection:** Use facial analysis to detect signs of joy (e.g., smiling, laughter) and eye-tracking to monitor gaze patterns.

Expected Outcome: Joyful participants will likely adopt more cooperative negotiation strategies and achieve more mutually beneficial outcomes (Van Kleef et al., 2004).[60]

Case Design for Confidence

Objective: To determine how confidence influences negotiation tactics and effectiveness.

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[59] Brooks, A. W., & Schweitzer, M. E. (2011). Can nervous nelly negotiate? How anxiety causes negotiators to make low first offers, exit early, and earn less profit. *Organizational Behaviour and Human Decision Processes, 115*(1), 43-54.
[59] Van Kleef, G. A., De Dreu, C. K., & Manstead, A. S. (2004). The interpersonal effects of emotions in negotiations: A motivated information processing approach. *Journal of Personality and Social Psychology, 87*(4), 510-528.

Participants: Recruit 30 participants.

Procedure:

1. **Pre-experiment Survey:** Assess baseline emotional state and negotiation style.
2. **Induction of Confidence:** Provide positive feedback or a success story related to past negotiations.
3. **Negotiation Task:**
   - **Scenario:** Participants negotiate a high-stakes contract with a potential client. The client (confederate) initially expresses doubts about the participant's capabilities.
   - **Task:** Participants must convince the client of their value and negotiate favorable contract terms.
4. **Data Collection:** Use facial analysis to detect signs of confidence (e.g., direct eye contact, relaxed facial muscles) and eye-tracking to monitor gaze patterns.

Expected Outcome: Confident participants will likely exhibit more assertive and strategic negotiation behaviors, leading to more favorable outcomes (Brooks et al., 2011).[61]

Case Design for Frustration

Objective: To analyze how frustration impacts negotiation behavior and outcomes.

Participants: Recruit 30 participants.

Procedure:

1. **Pre-experiment Survey:** Assess baseline emotional state and negotiation style.
2. **Induction of Frustration:** Show a video clip designed to induce frustration (e.g., a complex puzzle task with an unsolvable element).
3. **Negotiation Task:**

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[61] Brooks, A. W., & Schweitzer, M. E. (2011). Can nervous nelly negotiate? How anxiety causes negotiators to make low first offers, exit early, and earn less profit. *Organizational Behavior and Human Decision Processes, 115*(1), 43-54.

- o **Scenario:** Participants negotiate a difficult merger between two companies with conflicting interests. The opposing negotiator (confederate) is intentionally difficult and uncooperative.
- o **Task:** Participants must reach a merger agreement despite the challenges.

4. **Data Collection:** Use facial analysis to detect signs of frustration (e.g., clenched jaw, frowning) and eye-tracking to monitor gaze patterns.

Expected Outcome: Frustrated participants are expected to exhibit more aggressive and less cooperative negotiation strategies, potentially leading to suboptimal outcomes (Sinaceur et al., 2006).[62]

Consolidation of Case Designs

This study will employ a series of experimental designs to examine how different emotions affect negotiation outcomes. Each experiment will focus on a specific emotion, using facial analysis and eye-tracking technology to capture and analyze participants' responses. The selected emotions are anger, fear, joy, confidence, excitement, and frustration. These emotions were chosen based on their prevalence in negotiation contexts and their impact on decision-making processes (Van Kleef et al., 2004).[63]

Objective: To investigate how different emotions (anger, fear, joy, confidence, excitement, and frustration) influence negotiation strategies and outcomes. This consolidated approach will efficiently study multiple emotions within a single experimental framework.

Participants: Recruit 60 participants with experience in negotiations. Participants will be randomly assigned to one of six emotion induction groups (anger, fear, joy, confidence, excitement, frustration), with 10 participants per group.

Procedure:

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[62] Sinaceur, M., & Tiedens, L. Z. (2006). Get mad and get more than even: When and why anger expression is effective in negotiations. *Journal of Experimental Social Psychology, 42*(3), 314-322.
[63] Van Kleef, G. A., De Dreu, C. K. W., & Manstead, A. S. R. (2004). The interpersonal effects of emotions in negotiations: A motivated information processing approach. *Journal of Personality and Social Psychology, 87*(4), 510-528

1. **Pre-experiment Preparation:**
   - **Recruitment:** Participants will be screened for prior negotiation experience.
   - **Consent:** Obtain informed consent from all participants.
   - **Random Assignment:** Randomly assign participants to one of six emotion induction groups.

2. **Pre-experiment Survey:**
   - **Baseline Emotional State:** Assess baseline emotional state using the Positive and Negative Affect Schedule (PANAS).[64]
   - **Negotiation Style:** Assess participants' negotiation style using the Thomas-Kilmann Conflict Mode Instrument (TKI).[65]

3. **Emotion Induction:** Each group will undergo an emotion induction process tailored to elicit the target emotion.
   - **Anger:**
     - **Video Clip:** Show a video clip designed to induce anger (e.g., a frustrating customer service scenario).
     - **Reflection Task:** Ask participants to recall and write about a personal experience where they felt very angry.
   - **Fear:**
     - **Video Clip:** Show a video clip designed to induce fear (e.g., a suspenseful scene from a horror movie).
     - **Reflection Task:** Ask participants to recall and write about a personal experience where they felt very afraid.
   - **Joy:**
     - **Video Clip:** Show a video clip designed to induce joy (e.g., a humorous scene from a comedy).
     - **Reflection Task:** Ask participants to recall and write about a personal experience where they felt very happy.
   - **Confidence:**
     - **Positive Feedback:** Provide participants with positive feedback on their negotiation skills.

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[64] Crawford, J. R., & Henry, J. D. (2004). The Positive and Negative Affect Schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology, 43*(3), 245–265.
[65] Thomas, K. W., & Kilmann, R. H. (1978). Comparison of four instruments measuring conflict behavior. *Psychological Reports, 42*, 1139–1145.

- **Reflection Task:** Ask participants to recall and write about a personal experience where they felt very confident.
  - **Excitement:**
    - **Video Clip:** Show a video clip designed to induce excitement (e.g., a thrilling sports event).
    - **Reflection Task:** Ask participants to recall and write about a personal experience where they felt very excited.
  - **Frustration:**
    - **Video Clip:** Show a video clip designed to induce frustration (e.g., a complex puzzle task with an unsolvable element).
    - **Reflection Task:** Ask participants to recall and write about a personal experience where they felt very frustrated.

4. **Negotiation Task:** All participants will engage in the same simulated negotiation task to ensure consistency across emotion groups.
   - **Scenario:** Participants negotiate a business contract for a high-demand product with a supplier (confederate). The supplier initially offers an unreasonably high price.
   - **Instructions:** Participants are instructed to negotiate the price, delivery time, and payment conditions to reach a mutually agreeable level.

   Details:

   - **Role of Supplier (Confederate):** The Confederate is trained to respond consistently across all negotiations, maintaining a neutral yet firm stance. He starts aggressive and stubborn, after good negotiating the supplier will soften up and even start being nice.
   - **Negotiation Elements:** Price (starting high), delivery time (starting at an extended period), and payment conditions (initially strict).

5. **Data Collection:**
   - **Facial Analysis:** Using FA software to detect emotional expressions during the negotiation task. Key indicators include:
     - Anger: Furrowed brows, tightened lips.
     - Fear: Widened eyes, raised eyebrows.
     - Joy: Smiling, laughter.
     - Confidence: Direct eye contact and relaxed facial muscles.

- Excitement: Elevated eyebrows, animated expressions.
- Frustration: Clenched jaw, frowning.

- **Eye-Tracking:** Use ET technology to monitor gaze patterns and attention focus during the negotiation task. Key metrics include:
  - Fixation duration on key elements (e.g., price, terms).
  - Number of fixations on the counterpart's face.

- **Negotiation Outcome Measures:**
  - Final agreed price.
  - Time taken to reach an agreement.
  - Any Questions left open.
  - Participants' satisfaction with the negotiation outcome (post-negotiation survey).

6. **Post-experiment Survey:**
   - **Emotional State:** Assess participants' emotional state post-negotiation using PANAS.
   - **Perceived Effectiveness:** Assess participants' perceived effectiveness and satisfaction with the negotiation process using a Likert scale questionnaire.[66]

Data Analysis:

1. **Emotional Expression Analysis:**
   - Compare facial expressions and eye-tracking data across different emotion groups to identify distinct patterns.
   - Using iMotions software to quantify the intensity and frequency of the participants emotional expressions.

2. **Negotiation Outcome Analysis:**
   - Analyze the final agreed prices, negotiation times, and satisfaction ratings across emotion groups.
   - Perform statistical tests (e.g., ANOVA) to identify significant differences between emotion groups. Discuss the outcome to third objective third parties, like unbiased professionals.

3. **Interaction Effects:**

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[66] Wuensch, K. L. (2005). What is a Likert scale? and how do you pronounce 'Likert?'. East Carolina University.

- o Investigate potential interaction effects between baseline negotiation style and induced emotion on negotiation outcomes.

Expected Outcomes:

1. **Anger:** Participants experiencing anger will adopt more competitive negotiation strategies and achieve less favorable outcomes.
2. **Fear:** Fearful participants will exhibit more risk-averse behavior and less assertive negotiation tactics.
3. **Joy:** Joyful participants will adopt more cooperative strategies and achieve mutually beneficial outcomes, leading to possible win-win-situations.
4. **Confidence:** Confident participants will exhibit more assertive and strategic negotiation behaviors, leading to favorable outcomes.
5. **Excitement:** Excited participants will show heightened engagement and creativity in negotiations, leading to innovative solutions.
6. **Frustration:** Frustrated participants will exhibit more aggressive and less cooperative strategies, potentially leading to suboptimal outcomes.

This study aims to comprehensively examine how different emotions—anger, fear, joy, confidence, excitement, and frustration—influence negotiation strategies and outcomes. By employing a series of experimental designs that leverage FA and ET technologies, it is possible to capture and analyze participants' emotional and cognitive responses during negotiations.

Expected outcomes suggest distinct negotiation behaviors and results based on the induced emotions, providing insights into how emotions shape negotiation strategies and effectiveness. However, due to the limitations of this bachelor's thesis, these designs are theoretical and cannot be fully implemented within the scope of this study.

The following section will discuss the planned field tests, which aim to build upon these theoretical designs and explore practical applications in real-world settings. By addressing the limitations and proposing future research directions, a deeper understanding of emotional influences in negotiations can be achieved, facilitating the development of advanced training programs that integrate these insights.

Field Tests

After understanding the methodology and identifying possible tests and cases, testing the hardware and software was necessary, as well as rethinking our current curriculum to include valuable knowledge of cognitive behavior.

To achieve valuable insights, this study conducted three main field tests. Firstly, the iMotions software, in combination with Neon-Pupil eye-tracking glasses, was tested in a short two-minute attention test with 27 different students from UAS Düsseldorf, all studying engineering-related subjects such as Industrial Engineering, Electrical Engineering, and Environmental Engineering.

Secondly, a field test was conducted during an interactive lecture in the elective module "Technical Optics" by Prof. Dr. Alexander Braun, using eye-tracking and facial analysis. This test aimed to measure student engagement during the lecture, determine where attention spans faded, and identify which types of animations, highlights, and interactions were most effective, especially in a mathematically challenging course like his.

Lastly, a field test was designed and observed in an elective module by Prof. Dr. Kati Lang called "Negotiation Management: Strategies & Techniques." This test aimed to evaluate and question the current methods of teaching technical sales and sales negotiations in a traditional manner.

Testing Eye-Tracking at TSL

In the study, participants were shown a 2-minute video containing various tasks, each lasting 8 seconds, designed to evoke stress, engagement, confusion, joy, surprise, and sadness.[67] After each task, the solution was immediately shown. Each participant was asked to perform a clap before starting the experiment to enable post-processing of the latency error between the glasses and the webcam. Interestingly, most participants enjoyed clapping their hands so much that the measured joy was between 70-90 percent for approximately 2 to 4 seconds.

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[67] VerlagDashoeferGmbH. (2018). Die 8-Sekunden-Challenge: Aufmerksamkeitstest. YouTube.
https://www.youtube.com/watch?v=vrAmkZ9Wn30

The **first task** involved showing the participants a riddle image for 8 seconds, during which they were expected to identify a specific element among similar elements. This task was designed to induce a state of focus and attention.

Participants were shown an image consisting of a grid filled with the number "5". Among these, the letter "S" was sporadically placed. The objective was for the participants to locate all the letters "S" within the 8-second time frame. The peer group of this field test consisted of 19 male contestants and 8 female contestants, in total of 27 participants, with an average age of 23.59. Due to technical issues, data from only 24 participants were valid. Out of the 24 valid participants, 79.17% were male and 20.83% were female, correctly representing the average female-male distribution in our department.[68]
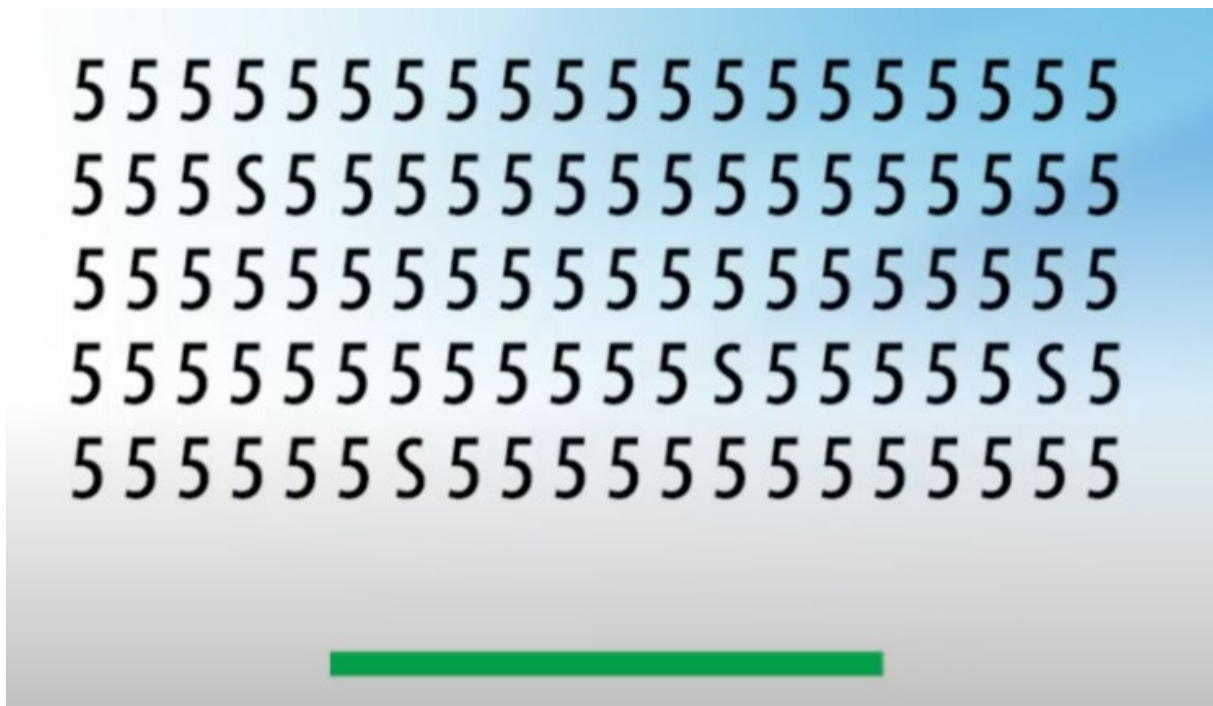

Figure 4: Task One: How Many "S"?

The heat map of the participants' gaze patterns during the task reveals the areas of the image where their attention was most concentrated. The average gazes during this task were 32.9583, indicating a high focus on the task and a lot of scanning of the frame.

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[68] Hochschule Düsseldorf. (2022). Gender Report 2022. https://www.hs-duesseldorf.de/hochschule/verwaltung/finanzen/budgetierung-controlling/Documents/GenderReport_2022.pdf

For gazes and fixations during these 8 seconds, fixations in the range of 27 to 40 (3 to 4 gazes per second) are relatively normal. A high number of fixations could indicate high focus and or stress.
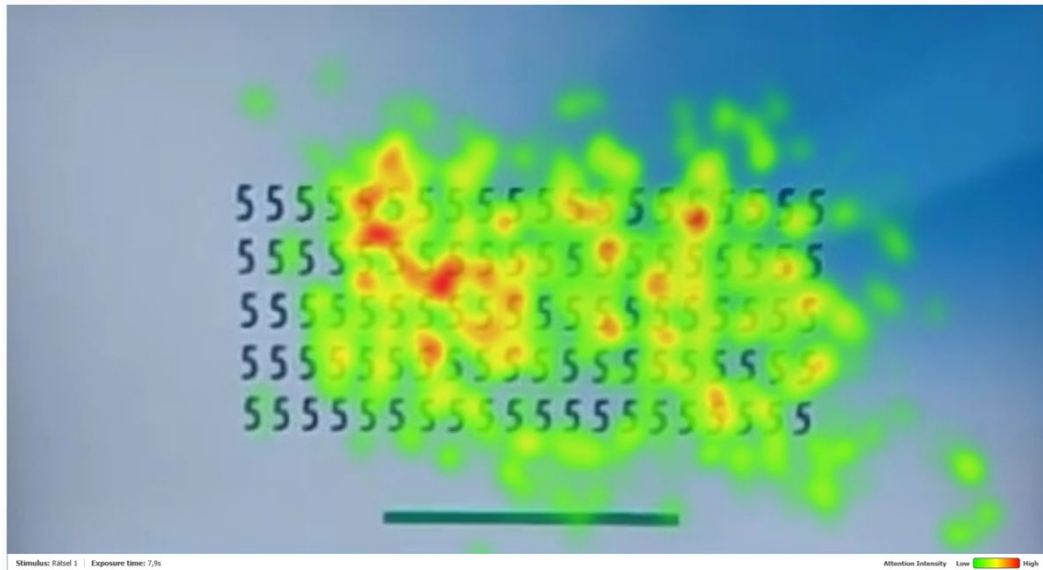

Figure 5: Gaze Map of "How many "S"?"

The heat map indicates that participants predominantly focused on the center of the image, as evidenced by the areas marked in red, indicating high attention intensity. This suggests that most participants began their search from the top left and moved on to the center and then scanned the surrounding areas.

37.5% (9 participants) correctly identified the letter "S" four times in the given 8 seconds and solved this task while 62.5% (15 participants) did not.

The **second task** involved showing the participants another riddle image for 8 seconds, during which they were expected to identify a specific mistake among a series of numbers, although the mistake was not in the numbers but in the text. In the question "Sehen Sie den den Fehler" (translating to "Do you see the error?") the word "den" is used twice making it a grammatical error in the German language. This task was designed to test their attention to detail and ability to spot anomalies.

Participants were shown an image consisting of a sequence of numbers from 1 to 15. The objective was to identify an error in this frame, it was never mentioned that the error could only occur inside the number sequence, but a lot of students interpreted it this way.
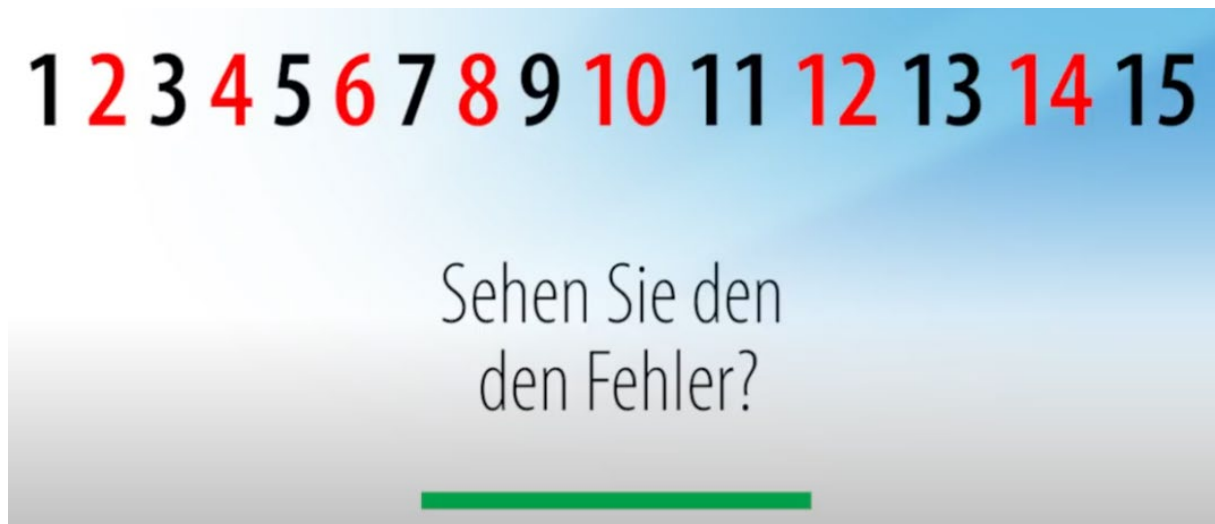
Figure 6: Task Two: Do You Find the Mistake?

The heat map of the participants' gaze patterns during the task reveals the areas of the image where their attention was most concentrated. The heat map reveals that most students primarily focused their attention on the number sequence, starting with the number one and progressing step by step to number fifteen. After the number fifteen, most participants jumped back to one and started looking again at number one. Eventually, some of the students peeked at "Sehen Sie den den Fehler", but out of these students who read the line after going through it, still many did not get the error. The average number of fixations during this task was 32.79167.
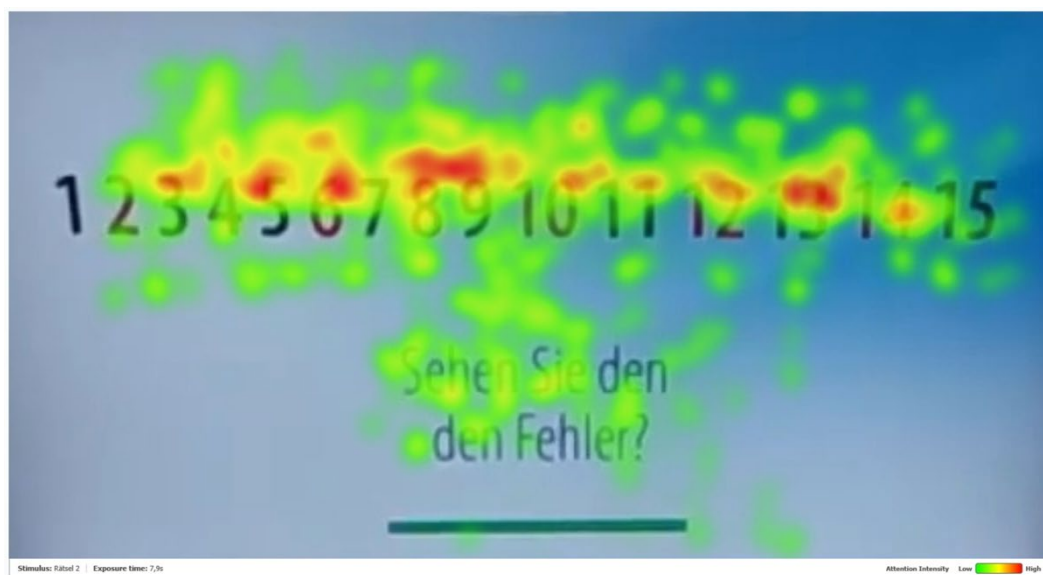

Figure 7: Gaze Map of "Do You Find the Mistake?"

Resulting in 12.5% (3 participants), who correctly identified the mistake, while 87.5% (21 participants) did not.

The high concentration of gaze around the numbers suggests that participants were actively searching for the error in the sequence. The spread of gaze intensity along the sequence shows that participants were methodically scanning the numbers to identify the mistake. The presence of multiple high-intensity areas along the sequence indicates that participants were thoroughly checking each number. The fact that only 12.5% of participants correctly solved the riddle indicates the task's difficulty and suggests that additional factors such as cognitive load or stress may have influenced performance, which could explain the relatively high fixation number.

In general, heat map analysis provides valuable insights into the visual search strategies employed by participants under time constraints. Understanding these patterns can aid in designing better training programs for sales negotiation, where quick identification of key information is crucial.

The **third task** involved showing the participants another riddle image for 8 seconds, during which they were expected to identify an element that did not fit with the others. This task was designed to test their pattern recognition and attention to detail.

Figure 8: Task Three: Which Face Does Not Fit?

Looking at the heat map during the task, it reveals the areas of the image where their attention was most concentrated. The average number of fixations during this task was 32.5833.

Figure 9: Gaze Map of "Which Face Does Not Fit?"

The heat map indicates that participants predominantly focused on the central and lower parts of the image, as evidenced by the areas marked in red, indicating high attention intensity. This suggests that most participants were finding the face quickly and stared at this region for a while. 91.67% (22 participants) correctly identified the face that did not fit, while 8.33% (2 participants) did not. One student found the different face in less than 0,1 seconds.

The presence of a single high-intensity area around the differing face indicates that participants successfully located the face quickly. The fact that 91.67% of participants correctly solved the riddle indicates that the task was relatively easier compared to previous tasks.

The **fourth task** involved showing the participants another riddle image for 8 seconds, during which they were expected to identify an element that did not fit with the others. The catch in this task is, that after 4 seconds the headline switches from "Was passt nicht?" (translating to "What does not fit here?") to "Hier passt alles!" (translating to "Everything fits here!). It was designed to trick the participants to trigger surprise and engagement.

Figure 10: Task Four "What Is Wrong Here?"

The areas with high concentration are fairly similar to the last task, although in this task there was no difference, suggesting that the students, tried to replicate their easy success from the last task to this one. The average number of fixations during this task was 31.967.
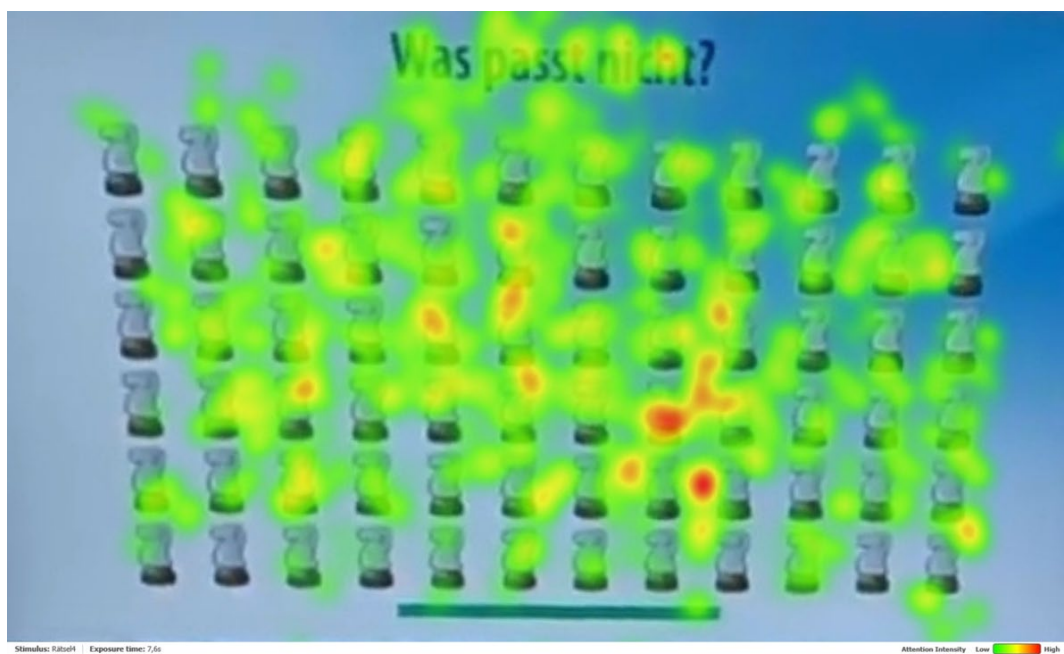

Figure 11: Gaze Map of "What Is Wrong Here?"

The heat map indicates that participants predominantly focused on the entire grid of chess figures, as evidenced by the areas marked in red, indicating high attention intensity. This suggests that most participants were scanning nervously the figures to identify the headline change.

12.5% (3 participants) correctly identified the change, while 87.5% (21 participants) did not.

The high concentration of gaze spread throughout the grid suggests that participants were systematically scanning the image to find the headline change. The spread of gaze intensity indicates that participants were checking each chess figure and the text for inconsistencies. The presence of multiple high-intensity areas shows that participants were thoroughly examining the image. The fact that only 12.5% of participants correctly solved the riddle indicates the task's difficulty and suggests that additional factors such as cognitive load or stress may have influenced performance. The low success rate in this task suggests that the headline change was particularly challenging to detect.

The **fifth task** involved showing the participants another riddle image for 8 seconds, during which they were expected to identify differences between two similar images of the flag of Swaziland. The right Swaziland flag has one more stripe in the middle than the left one. This task was designed to test their attention to detail and ability to spot subtle differences, as well as to trigger engagement and confusion.

Figure 12: Task Five: Spot the Difference in the Flag of Swaziland

The average number of fixations during this task was 33.75, which indicates that a lot of comparing and quick fixations between the left and right flag were made. The heat map proves this theory by revealing the areas of most interest.
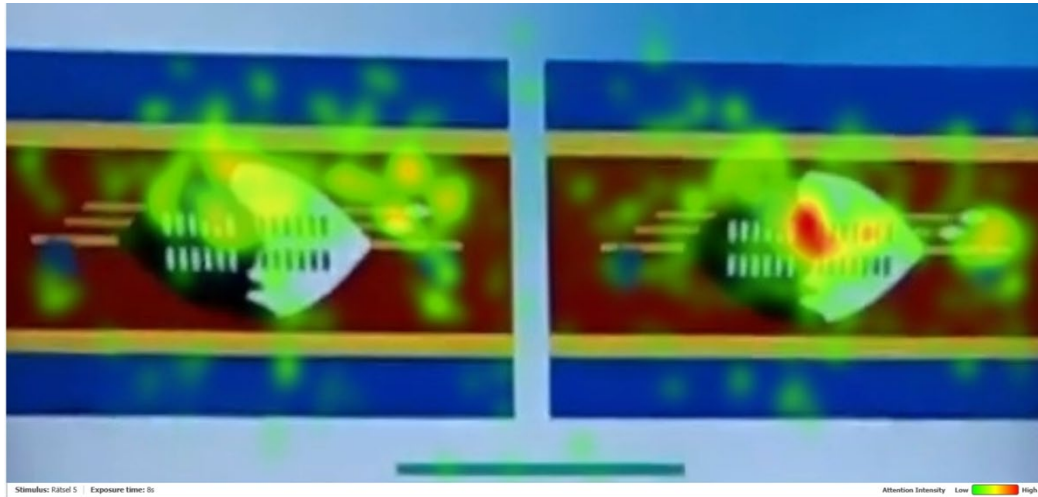

Figure 13: Gaze Map of "Spot the Difference in the Flag of Swaziland."

The heat map indicates that participants predominantly focused on the central parts of both flags, as evidenced by the areas marked in red, indicating high attention intensity. This may be because most of the students were raised in Germany or other European countries where they learned to read from left to right. This implies that the focus was on the right side to spot the difference, thus explaining the large red heat point. This suggests that most participants were comparing specific elements of the flags, such as the number of stripes on the flag and the ends of the spears, to identify the differences.

This challenging task resulted in only 4.17% (1 participant) correctly identifying the difference, while 95.83% (23 participants) did not. The very low success rate in this task suggests that the differences were particularly challenging to detect.

The **sixth task** involved showing the participants another riddle image for 8 seconds, during which they were expected to identify differences between two similar images of the Petronas Twin Towers. This task was constructed to test their attention to detail and ability to spot subtle differences, specifically in the inclination of the towers and the color of the sky. Unfortunately for the contestants, both pictures are identical, so this task was designed to trick the contestants and trigger anger, confusion, and disgust.

Figure 14: Task Six: Find the Difference

The participants' attention was most concentrated on each tower, especially on the bridge in the middle and the tops of the towers, as shown by the heat map. Once again, the average number of fixations during this task was higher than in other tasks, with 33.25 fixations, indicating the stress and confusion the participants experienced.
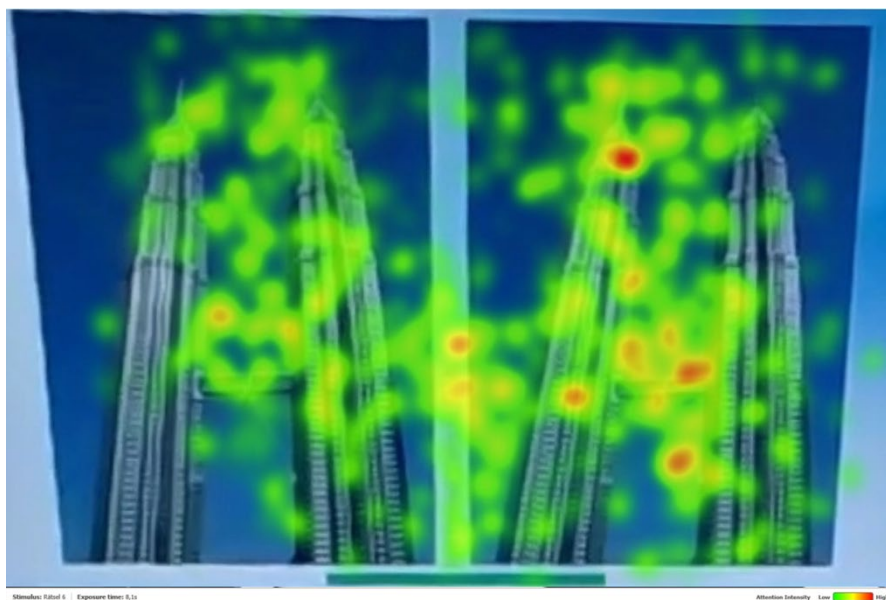

Figure 15: Gaze Map of "Find the Difference"

None of the participants correctly identified, that there were no differences between the images, which indicates a very high difficulty for this task.

Overall Conclusion of the first Field Test:

The field test involved six different riddles designed to evaluate the visual search strategies, attention to detail, and cognitive load handling of the participants. Across all tasks, varying degrees of success were observed, providing valuable insights into the participants' abilities to perform under time constraints and identify key information quickly.

1. **Task One**: Identifying the letter "S" among a grid of "5"s had a moderate success rate, indicating a balanced difficulty level.
2. **Task Two**: Identifying a mistake in a sequence of numbers had a low success rate, suggesting higher difficulty.
3. **Task Three**: Finding a differing face among similar faces had a very high success rate, indicating lower difficulty.
4. **Task Four**: Identifying the inconsistency in a grid of chess figures had a very low success rate, indicating high difficulty.
5. **Task Five**: Spotting the difference in the flags of Swaziland had a very low success rate, indicating high difficulty.
6. **Task Six**: Finding the difference in the images of the Petronas Twin Towers had no successful identifications, indicating very high difficulty.

Key Insights:

- **Attention Focus**: Participants generally focused on central areas first and then scanned outward, indicating a common initial search strategy.
- **Search Patterns**: Participants employed methodical search patterns, especially in tasks with high difficulty.
- **Task Difficulty**: Success rates varied significantly, with some tasks proving to be significantly more challenging than others.
- **Cognitive Load**: Tasks with higher cognitive load, such as those requiring comparison of similar images, had lower success rates.
- **Fixation Metrics**: Over the 2-minute duration of the study, participants exhibited an average total of 448 fixations, resulting in 3.783 fixations per second. Implying that the tasks were challenging, in the form of searching and scanning for objects.
- **Emotional Responses**: On average, the emotions recorded were:

- o 9.82% Anger
- o 17.82% Contempt
- o 21.28% Disgust
- o 9.2% Fear
- o 51.06% Joy
- o 14.35% Sadness
- o 8.11% Surprise
- o 43.87% Engagement

Out of all the emotions measured, 77,08% could be calculated with a p-value of 0.05. The short period of the experiment and not fully triggering all the emotions may have influenced this result leading to not being able to calculate all of them to 100%.

Despite not triggering all emotions, the measured data can be interpreted to the degree that the overall high engagement and joy percentage, shows that these engineering students representing our department like to be challenged by little games and that it is quickly possible to produce high levels of joy especially short-termed. The relatively low anger, contempt, and sadness rate shows that the students quickly accept their mistakes so that it does not influence their behavior in the other tasks.

Understanding visual search strategies and the impact of cognitive load on task performance can inform the design of more effective training programs. Training that enhances quick identification of key information and reduces cognitive load can improve negotiation skills and outcomes. Further studies can explore the impact of varying task complexity on visual search efficiency and cognitive load management. Expanding the participant pool and incorporating additional metrics, such as reaction times and a more specific focus on their emotional behavior during each task, can provide deeper insights into cognitive processes during visual search tasks. Due to the limitations of this bachelor's thesis, this was not explored and analyzed in this study.

Field Test for Testing Interactive Presentations

In this field test, an interactive presentation was held by Prof. Dr. Alexander Braun from UAS Düsseldorf in his elective module "Technical Optics". The focus was to examine the engagement rate of students and identify factors that trigger higher engagement. The test involved two pairs of students: the first pair participated for approximately 1 hour and 15 minutes, and the second pair participated for roughly 45 minutes. The experimental design included the presence of the researcher and a colleague to ensure the experiment proceeded smoothly.

Experimental Setup

- **Location**: Technical Sales Lab, University of Applied Sciences Duesseldorf
- **Participants**: Two students at a time
- **Duration**:
  - First pair: ~1 hour and 15 minutes (including breaks)
  - Second pair: ~45 minutes (including breaks)
- **Observers**: Researcher and colleague
- **Objective**: Measure student engagement and identify factors that increase engagement.
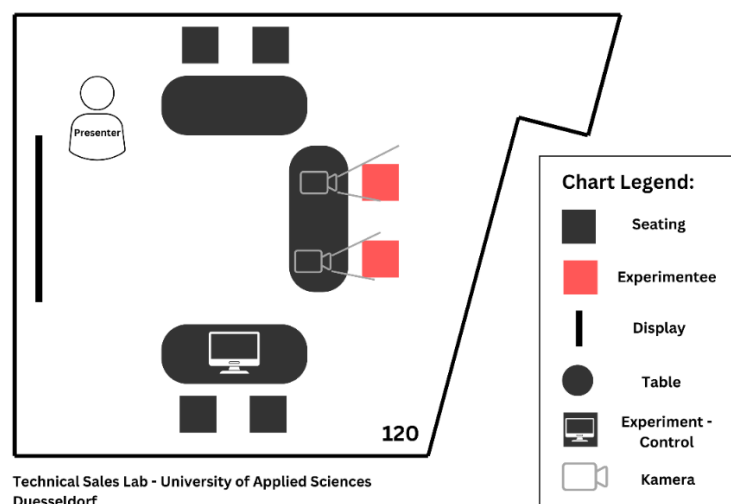

Figure 16: Setup of the Field Test for Interactive Presentations in the TSL

The following are subdivided segments, each around 10 minutes long. The gaze maps reflect all their fixations during the segment time. Because Prof. Braun moved around the room and utilized the space during this interactive presentation, the gaze maps are

very widespread. For example, fixations can be found on the left door where Prof. Braun moved back and forth. Each gaze map shows just one frame from approximately 120,000 frames per segment.[69]

Gaze-Map Analysis for Each Segment:

First Pair of students (1 hour 15 minutes)
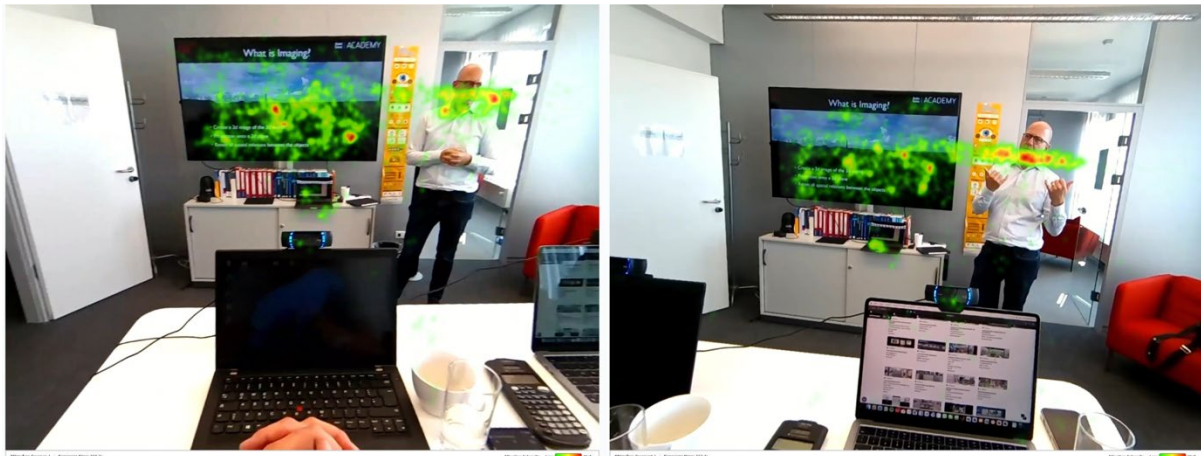
Figure 17: Gaze-Map of the First Segment - Student 1 (Left) - Student 2 (Right)

	Student 1	**Student 2**
First Segment Time	10.71 min	10.52 min
Engagement Rate	40.08 %	27.98 %

In the first segment, the students reacted quite differently to Prof. Braun's teaching style. On the one hand, Student 1 interacted more with the slides on the screen and the teacher's gestures than with the spoken words. In comparison, Student 2 was actively listening and focusing on the spoken words, as seen by the high concentration of red around Prof. Braun's mouth.

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[69] Neon-Glasses record with 200 FPS, multiplied by 60 seconds per minute, multiplied by 10 minutes
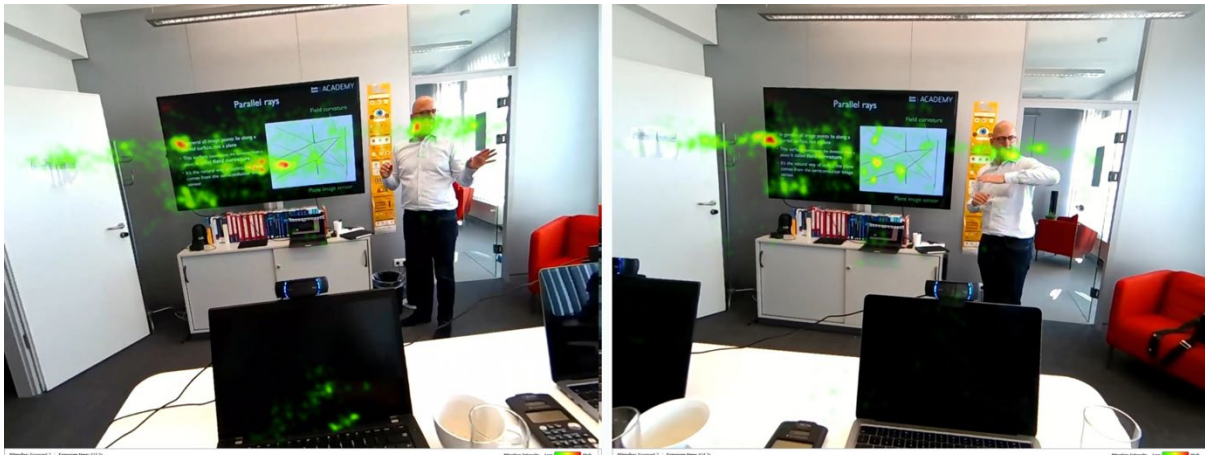
Figure 18: Gaze-Map of the Second Segment - Student 1 (Left) - Student 2 (Right)

	Student 1	**Student 2**
Second Segment Time	10.71 min	10.52 min
Engagement Rate	24.97 %	25.38 %

In the second segment, Prof. Braun started to move around more frequently, resulting in a wider gaze map, which can especially be seen on the door on the left-hand side of the frames. Additionally, the text on the teacher's slides was predominantly focused on. Furthermore, a steady decline in the engagement rate of Student 1 is evident. To ensure that everything went smoothly with the recording, a short 5-minute break was taken after the second segment.

Figure 19: Gaze-Map of the Third Segment - Student 1 (Left) - Student 2 (Right)

	Student 1	**Student 2**
Third Segment Time	9.95 min	9.96 min
Engagement Rate	54.04 %	38.66 %

After the short break, an astonishingly high rate of engagement from the students was immediately observed. Moreover, not only does the professor's presentation begin to interest the students, but the possibility of drinking their coffee or glass of water also becomes increasingly interesting to them.
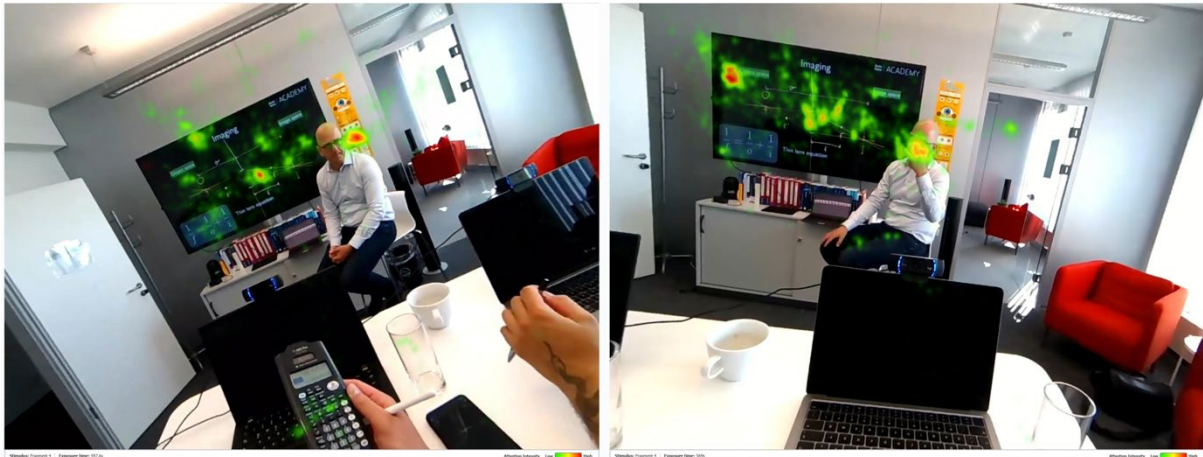
Figure 20: Gaze-Map of the Fourth Segment - Student 1 (Left) - Student 2 (Right)

	Student 1	**Student 2**
Fourth Segment Time	9.95 min	9.96 min
Engagement Rate	32.89 %	18.95 %

In the fourth segment, the engagement rate of the students starts to drop again, possibly because Prof. Braun began to sit down instead of walking around the room. A first calculation task was also given, which may have led to a potential decline in the students' attention when they reached a breaking point and were unable to solve the problem.

Figure 21: Gaze-Map of the Fifth Segment - Student 1 (Left) - Student 2 (Right)

	Student 1	Student 2
Fifth Segment Time	9.95 min	9.96 min
Engagement Rate	47.02 %	29.55 %
Overall Engagement (five segments)	**39.80 %**	**28.10 %**

In the fifth segment, the engagement rate was higher than in the previous segment. One possible reason could be that after starting their calculations and reaching a point where they were helpless, the students began engaging with each other and the professor by asking questions and comparing their methods of solving the problem. The first and second students showed overall relatively high engagement rates of 39.80% and 28.10%, respectively. In comparison to normal presentations, where the attention is between 10-25%, this form of interactive presentation seems to be effective, especially with animations on the slides leading to high spikes of joy and excitement. After finishing the task, the participants were switched to the second pair of students.

Second Pair of Students (45 minutes)

Figure 22: Gaze-Map of the Sixth Segment - Student 3 (Left) - Student 4 (Right)

	Student 3	Student 4
Sixth Segment Time	11.81 min	11.80 min
Engagement Rate	30.37 %	31.90 %

In the sixth segment, the gaze maps display larger green areas around the bottom of the frame, indicating that students wrote more notes on their iPads and notepads. When looking down at their notes, the camera cannot fully identify their faces all the

time, resulting in footage that cannot be processed. This unprocessed footage in this segment and in the following segments leads to lower engagement rates than the actual engagement.
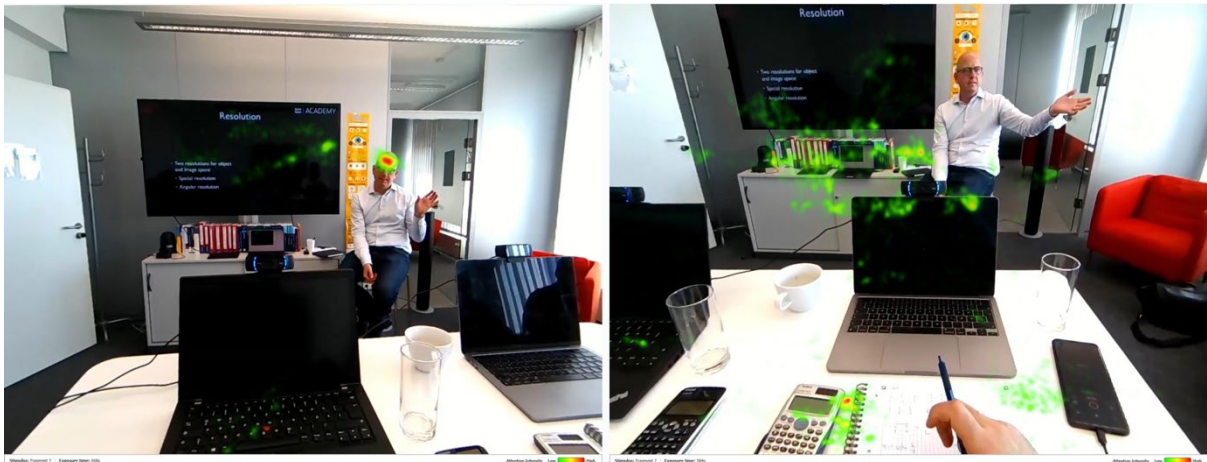
Figure 23: Gaze-Map of the Seventh Segment - Student 3 (Left) - Student 4 (Right)

	Student 3	Student 4
Seventh Segment Time	11.81 min	11.80 min
Engagement Rate	25.78 %	28.88%

Since the seventh segment predominantly focused on an exercise the engagement rate lowered again.

Figure 24: Gaze-Map of the Eighth Segment - Student 3 (Left) - Student 4 (Right)

	Student 3	Student 4
Eighth Segment Time	11.81 min	11.80 min
Engagement Rate	26.94 %	35.73 %

In the eighth segment, the students were still calculating their answers. Student 4 had a problem while calculating and asked for help from the professor, resulting in higher engagement than Student 3, who solved the problem by himself without any help.
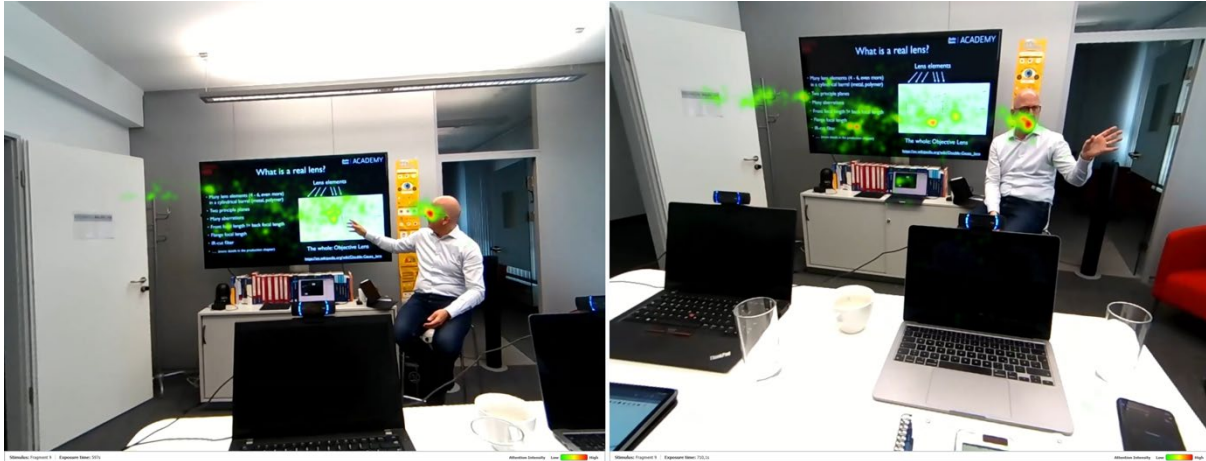

Figure 25: Gaze-Map of the Ninth Segment - Student 3 (Left) - Student 4 (Right)

	Student 3	Student 4
Ninth Segment Time	10.71 min	10.63 min
Engagement Rate	25.22 %	45.37 %
Overall Engagement (four segments)	**27.08 %**	**35.47 %**

The last segment was an explanation of the calculated task and how they can proceed in an upcoming exam. During this segment, both students asked questions; however, Student 4 asked more questions and talked more, resulting in a very high engagement rate. Overall, both students again showed relatively high engagement rates for approximately 45 minutes of listening and calculating.

Unfortunately, a lot of recorded data could not be processed and was filtered out using a p-value of 0.05, due to a bad camera angle while writing down. For further research, a second camera or a different experimental design is needed to achieve better footage.

Overall Conclusion of this Field Test for Interactive Presentations

The gaze-map analysis of the students during the interactive presentation indicates varying levels of engagement across different segments. By closely examining the areas of high gaze concentration, it is possible to infer which parts of the presentation

captured the students' attention the most and which parts failed to engage them effectively. This information is crucial for optimizing the content and delivery of lectures to maintain student engagement throughout the session.

Key Findings from the Gaze-Map Analysis:

1. **Engagement Peaks:** Specific segments of the presentation showed higher engagement than others. Simple basics, like animations, gestures, and questioning their problems, were truly effective.

2. **Engagement Dips:** Segments with less engagement indicate where students lost interest or found it challenging to follow along. Calculations were interesting until a student sought help; their engagement dipped immensely when they encountered a problem.

3. **Interactive Elements:** Incorporating more interactive elements, such as questions, discussions, or multimedia content, can help maintain student engagement throughout the presentation.

Overall, the feedback from the students on Prof. Braun's teaching was positive, and they liked his teaching style. This could introduce a slight bias, as they already liked the course. Additionally, being in an interactive learning environment like the TSL, rather than a normal classroom, and the exciting setup with the Neon-Glasses might have influenced their behavior. Further studies should focus on expanding the participant pool and incorporating additional metrics such as reaction times, verbal feedback, and physiological responses (e.g., heart rate) to provide a more comprehensive understanding of student engagement. Moreover, testing various teaching methods and presentation styles can offer insights into the most effective strategies for keeping students engaged in technical subjects.

Field Test of Testing the New Concept of Teaching Negotiations at UAS Düsseldorf and Implementing the Principles of BNCOW

Over the last two semesters, this field test and a new concept of teaching negotiations at UAS Düsseldorf have been tried, aligning with the principles of the BNCOW project, which aims to address the demands of modern business negotiations, particularly in digital environments. This field test examines the practical application of these principles within the university's curriculum.

The field test was designed to assess the effectiveness of the new teaching methodology, integrating facial analysis, eye-tracking technology, and the foundational principles of BNCOW. The objective was to provide students with hands-on experience and advanced skills in sales negotiations through a combination of theoretical knowledge and practical exercises.[70]

Methodology of the New Concept

1. Course Structure - The course "Digital Negotiations" was initially introduced as an elective for industrial engineering students. It focused on various aspects of negotiation, including distributive and integrative bargaining, cognitive biases, and emotional intelligence. Building on the success of this course, a more advanced module, "Negotiation Management: Strategies & Techniques" was developed. This module incorporated more detailed theoretical content, historical case studies, and the latest negotiation strategies.

2. Teaching Environment - The courses were conducted in the newly established TSL, which features modern group study rooms equipped with state-of-the-art technology. This environment allows for interactive learning and real-time engagement with professors, industry partners, and peers.

3. Technologies Used

- **Facial Analysis and Eye-Tracking Software**: Implemented to provide students with insights into their negotiation behaviors and the responses of their

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[70] Witt, N.-A. (2024). *Teaching Technical Sales Negotiations at UAS Düsseldorf: A BNCOW - Progress Report*. Hochschule Düsseldorf. from https://ei.hs-duesseldorf.de/forschung/technical_sales_lab/Seiten/research.aspx

counterparts. These technologies help students understand nonverbal cues and improve their negotiation tactics. At the TSL iMotions Software is used.

- **Digital Platforms**: Used to simulate realistic negotiation scenarios and facilitate online negotiations, reflecting the current trends in digital business interactions.
- **Artificial Intelligence**: Used to help the students prepare for their negotiations and to help them to understand sales of the future.

4. Practical Exercises - Students participated in various negotiation scenarios, including:

- Rent increase negotiations
- Business interviews
- Salary negotiations
- Requests for workplace flexibility
- Buyer-seller negotiations in different contexts

5. Industry Experts – Students met, negotiated, and engaged with top industry experts, gaining valuable insights.

These scenarios were designed to mimic real-world situations, providing students with valuable practical experience and lowering the students' fear of negotiating in the corporate world. Each scenario was followed by a debriefing session where students could analyze their performance and receive feedback.

Observations During the Course

Throughout the course, several key observations were made regarding the student's engagement and learning progress:

In the beginning, the students received a short introduction to the art of negotiations and their first assignment, which took place the following week. The students were immediately faced with a state-of-the-art negotiation against industry experts. This negotiation was designed to throw them into the deep end, allowing them to make significant mistakes in a safe learning environment.

After discussing and exploring their mistakes, they received theoretical input on negotiations, strategies, and cognitive behavior over the next few weeks. With each

negotiation, the students became more comfortable and able to express their demands and achieve better goals. At the end of the course, after each student presented their interactive learning teaching unit, one final industry expert workshop was conducted. This workshop featured a startup founder who not only inspired the students but also shared all his past mistakes.

Overall, the key insights can be summarized:

1. Engagement and Motivation - Students exhibited high levels of engagement and motivation, particularly during the practical exercises. The hands-on nature of the course, coupled with the opportunity to interact with industry experts, fostered a dynamic and stimulating learning environment. Students were eager to participate and often went above and beyond the course requirements, seeking additional resources and practicing negotiation techniques outside of class hours.

2. Technological Adaptation - The integration of facial analysis and eye-tracking technology was initially met with curiosity. Observing their peers and themselves through these advanced tools enabled a deeper understanding of nonverbal communication and its impact on negotiation outcomes.

3. Collaborative Learning - The collaborative nature of the course was a significant factor in its success. Group exercises and peer feedback sessions helped students learn from each other and develop a sense of camaraderie. This collaborative spirit was further enhanced by the involvement of industry experts, who provided real-world perspectives and invaluable feedback. The student's ability to work together and support each other's learning was a testament to the effectiveness of the course design.

Student Feedback

The feedback collected from students was overwhelmingly positive and highlighted several key areas of impact:

1. Practical Application - Students appreciated the practical focus of the course. They valued the opportunity to engage in realistic negotiation scenarios and to receive immediate feedback on their performance. Many students reported that the practical exercises helped them internalize theoretical concepts and develop confidence in their

negotiation skills and reduce their fear of negotiating, not only in the corporate world but also in their personal lives.

2. Technological Insights - The use of facial analysis and eye-tracking technology was frequently mentioned as a highlight of the course. Students felt that these tools provided a unique and powerful way to understand the subtleties of negotiation dynamics. They noted that being able to see how their nonverbal cues affected the negotiation process was particularly enlightening.

3. Industry Interaction - The involvement of industry experts was highly valued by the students. They appreciated the chance to learn from professionals with real-world experience and to receive feedback that was grounded in practical knowledge. This interaction not only enriched their learning experience but also provided networking opportunities that could be beneficial for their future careers.

4. Comprehensive Learning - Students found the interdisciplinary approach of the course to be very effective. The integration of insights from psychology, communication studies, and information technology provided a well-rounded understanding of negotiation dynamics. This comprehensive approach helped students feel more prepared to handle a variety of negotiation scenarios.

Conclusion and Future Outlook

The field test at UAS Duesseldorf demonstrated the potential of innovative teaching methods and advanced technologies in enhancing negotiation education. The success of this pilot program suggests that such approaches could be scaled and adapted to other educational institutions.

Moving forward, the curriculum will continue to evolve, incorporating feedback from students and industry partners. The goal is to create a dynamic learning environment that prepares students for the complexities of modern business negotiations. Future iterations of the course will explore additional technologies and methodologies to further enhance the learning experience.

By fostering a culture of continuous improvement and collaboration, UAS Duesseldorf aims to stay at the forefront of negotiation education, equipping students with the skills and competencies needed to excel in the digital business landscape.

Limitations

Evaluation

In the evaluation of the study, several limitations were identified that might have impacted the overall findings. One major limitation is the sample size. Due to the constraints of time and resources, the study was conducted with a relatively small number of participants. This limited sample size may not fully represent the broader population, thereby affecting the generalizability of the results. Larger sample sizes in future research could provide a more comprehensive understanding and increase the robustness of the findings.

Another significant limitation is the scope of the technology used. While eye-tracking and facial recognition technologies provide valuable insights, they also come with inherent limitations. The accuracy of these technologies can be affected by various factors such as lighting conditions, participant movements, and calibration issues. For instance, poor lighting or excessive movement can lead to inaccurate data, which might distort the results. Additionally, the reliance on technology may have led to an overemphasis on quantitative data, potentially overlooking qualitative aspects of negotiation dynamics such as emotional nuance and contextual subtleties.

The study's design also presents some limitations. The controlled environment in which the experiments were conducted does not fully capture the complexity and variability of real-world negotiations. While controlled settings allow for more precise measurements, they can also create artificial scenarios that might not accurately reflect real-life situations. Future studies should consider incorporating more naturalistic settings to enhance ecological validity.

Furthermore, the duration of the study posed limitations. Short-term experiments might not capture long-term effects and changes in behaviors. Longitudinal studies would be beneficial in understanding how the insights gained from eye-tracking and facial analysis can influence negotiation techniques over an extended period.

Challenges in Implementing the Findings for Large Groups

Scaling the findings of this study to larger groups presents several challenges. One of the primary issues is the logistical complexity of deploying eye-tracking and facial

recognition technologies in large-scale training sessions. These technologies require significant setup and maintenance, which can be resource-intensive and time-consuming. Each training session would need careful planning to ensure that all participants can be effectively monitored, and that the data collected is accurate and reliable.

Additionally, the cost associated with these advanced technologies may be prohibitive for some organizations, limiting their widespread adoption. High initial costs and ongoing maintenance expenses might deter smaller companies or institutions with limited budgets from integrating these technologies into their training programs.

Another challenge lies in the diversity of negotiation styles and cultural differences. What works for a small, homogeneous group in a controlled environment may not be as effective for a larger, more diverse audience. Customizing the training programs to accommodate various negotiation styles and cultural nuances would be essential but challenging. This customization requires a deep understanding of different cultural contexts and the ability to adapt the training material accordingly. Developing flexible training modules that can be tailored to specific needs and contexts could be a potential solution.

Bias in Negotiations & Mitigation Strategies

Bias in negotiations is a critical issue that can significantly affect the outcomes. This study acknowledges that biases may have influenced both the participants and the researchers. For instance, participants may have exhibited biases based on their previous experiences, cultural background, or personal preferences. These biases can skew the results and lead to inaccurate conclusions. Additionally, the researchers themselves might have biases that could influence the study design, data interpretation, and overall conclusions. Another bias that influenced especially the negotiation course is the fact that the students started to know each other better and better. After a while, they knew each other's negotiation style and got too comfortable talking to each other.

To mitigate these biases, several strategies were implemented. Firstly, efforts were made to create a diverse participant pool to capture a wide range of perspectives. However, achieving true diversity is challenging, and there may still be unrepresented

groups that could affect the findings. Secondly, the study incorporated multiple rounds of feedback and validation to ensure that the findings were robust and reliable. Despite these measures, it is important to recognize that eliminating bias entirely is challenging. The use of double-blind procedures and independent reviewers could further reduce bias in future research. Thirdly, even more industry partners could be invited to negotiate with the students to lower the bias of knowing the negotiator.

Conclusion on Limitations

In conclusion, while this study provides valuable insights into the use of facial analysis and eye-tracking technologies for understanding and teaching sales negotiation, it is not without limitations. The small sample size, technological constraints, challenges in scaling to larger groups, and the presence of biases all pose significant hurdles. Recognizing these limitations is crucial for interpreting the findings accurately and for guiding future research in this area.

Future research should aim to address these limitations by exploring larger and more diverse participant groups, improving the reliability and accuracy of the technologies used, and developing more effective strategies to mitigate biases. Additionally, exploring the integration of these technologies into more naturalistic and long-term studies could provide deeper insights into their practical applications. By doing so, it will be possible to build on the foundation laid by this study and advance the understanding and teaching of sales negotiation in a more comprehensive and inclusive manner.

Furthermore, collaboration with practitioners and experts in the field can provide valuable feedback and help refine the methodologies used. Engaging with a broader community of researchers and professionals can also facilitate the development of best practices and standards for the use of advanced technologies in negotiation training. Ultimately, the goal is to create more effective, equitable, and accessible training programs that can benefit a wide range of individuals and organizations.

Discussion
Summary of Key Findings and Research Questions

The integration of advanced technologies, such as ET and FA, into negotiation training programs significantly enhances the understanding of emotional and cognitive states during negotiations. These technologies provide real-time feedback, allowing students to gain deeper insights into their own behaviors and those of their counterparts, leading to improved negotiation skills and outcomes. The TSL at the UAS Düsseldorf, a key component of the BNCOW project, demonstrated the practical application of these technologies in a dynamic learning environment. This hands-on approach, combined with realistic simulation and role-playing scenarios, has proven effective in enhancing student competencies and engagement. Following the completion of this study, the next step is to examine the research questions.

How effective are current negotiation training programs in enhancing students' negotiation skills and outcomes?

Current negotiation training programs, when enhanced with advanced technologies like ET and FA, are highly effective in improving students' negotiation skills and outcomes. The study showed that students trained with these technologies demonstrated better negotiation performance, increased self-awareness, and more effective strategic adjustments compared to those trained with traditional methods. The feedback provided by ET and FA technologies allowed students to understand and modify their negotiation tactics based on emotional cues, leading to more favorable negotiation outcomes.

What are the best practices for integrating advanced technologies, such as facial analysis and eye-tracking, into sales training programs?

The study identified several best practices for integrating ET and FA technologies into sales training programs, but also the usage of AI. Firstly, the use of real-time feedback mechanisms is crucial, as it allows students to quickly grasp and respond to their emotional states and those of others. Secondly, conducting training in controlled environments, such as the TSL, ensures consistency and accuracy in data collection. Thirdly, implementing realistic simulation and role-playing scenarios helps bridge the gap between theoretical knowledge and practical application. Lastly, continuous

assessment using these technologies helps track progress and identify areas for improvement, ensuring ongoing development of negotiation skills.

How can negotiation training programs be designed to enhance student competencies and reduce the fear of negotiating, particularly in digital contexts?

To enhance student competencies and reduce the fear of negotiating, particularly in digital contexts, negotiation training programs should incorporate several key elements. Emotional awareness training, facilitated by FA technology, helps students understand and manage their emotions, reducing anxiety in negotiation scenarios. The use of digital simulation tools and virtual environments allows students to practice negotiations in a safe and controlled setting, gradually building their confidence. Programs should be designed with incremental complexity, starting with simple scenarios and increasing in difficulty, to help students develop their skills progressively. Providing opportunities for feedback from peers and industry experts further supports students' learning and reduces fear by fostering a supportive learning environment.

What future concepts and methodologies can be proposed for teaching sales negotiation in both traditional and digital environments?

Future concepts for teaching sales negotiation should include hybrid training models that combine traditional face-to-face instruction with digital simulations and virtual environments. Leveraging AI and machine learning to analyze negotiation patterns and provide personalized feedback can further enhance training effectiveness. Gamification, or the introduction of game-like elements into training programs, can increase engagement and make learning more interactive and enjoyable. Additionally, adopting cross-disciplinary approaches that integrate insights from psychology, communication studies, and information technology can provide a more holistic understanding of negotiation dynamics, preparing students for both traditional and digital negotiation environments.

How can the gap between academic research and industry practices be bridged to ensure that negotiation training is relevant and practical for real-world applications?

To ensure that negotiation training is relevant and practical for real-world applications, it is essential to bridge the gap between academic research and industry practices. This can be achieved through industry collaboration, where partnerships between academia and industry align training programs with current industry needs and practices. Incorporating real-world negotiation scenarios and case studies into the curriculum allows students to apply theoretical knowledge in practical settings. Establishing a continuous feedback loop, where industry professionals provide input on training programs, helps keep them up-to-date and relevant. Offering workshops and professional development opportunities for both students and instructors ensures that they stay current with the latest trends and practices in negotiation.

Theoretical Implications

The integration of advanced technologies such as ET and FA into negotiation training programs offers significant theoretical implications.

The study reinforces the idea that emotions significantly impact cognitive processes during negotiations. ET and FA technologies provide empirical evidence supporting theories of emotional intelligence and cognitive load. The feedback from FA helps in emotion regulation, leading to more effective strategies, while ET offers insights into cognitive stress by tracking eye movements. Monitoring emotional and cognitive states through ET and FA supports self-regulation theories, enabling dynamic strategy adaptation. This empirical evidence supports behaviorist learning theories, emphasizing environmental feedback in shaping behaviors.

Moreover, integrating insights from psychology, communication studies, and information technology enriches theoretical frameworks, offering a multidisciplinary perspective. AI and machine learning for personalized feedback align with adaptive learning theories, enhancing learning efficiency.

Lastly, the findings suggest future research directions, including exploring the long-term effects of ET and FA technologies, understanding cultural differences, and leveraging AI for more personalized learning experiences, supporting theories of technology-enhanced learning.

Practical Applications

The integration of advanced technologies such as ET and FA into negotiation training programs has significant practical applications, enhancing the training and development of negotiation skills.

Firstly, improving negotiation training: The study demonstrates that ET and FA technologies can significantly improve the effectiveness of negotiation training programs. By providing feedback on emotional and cognitive states, these technologies allow students to gain deeper insights into their own behaviors and those of their counterparts. This immediate feedback helps students to adjust their strategies dynamically during practice sessions, leading to better negotiation outcomes. The use of realistic simulations and role-playing scenarios further bridges the gap between theoretical knowledge and practical application, making the training more engaging and effective.

Secondly, business implications: Companies can leverage these technologies to train their sales teams more effectively. ET and FA technologies can help sales professionals understand the emotional cues of their clients, allowing them to tailor their approaches to better meet client needs. This enhanced understanding can lead to more successful negotiations and improved client relationships. Additionally, the feedback provided by these technologies can help sales teams continuously improve their skills, leading to increased sales performance and competitive advantage.

Thirdly, educational enhancements: HEI's can integrate these advanced technologies into their curricula to better prepare students for the complexities of modern negotiations. The TSL at the UAS Düsseldorf provides a model for how these technologies can be effectively incorporated into academic programs. By offering students hands-on experience with ET and FA technologies in controlled environments, educational institutions can enhance student competencies and engagement, ensuring that graduates are well-equipped for real-world negotiation challenges.

Fourthly, reducing fear and anxiety in negotiations: The study highlights the importance of emotional awareness training in reducing the fear and anxiety associated with

negotiations, particularly in digital contexts. FA technology helps students understand and manage their emotions, making them more comfortable and confident in negotiation scenarios. The use of digital simulation tools and virtual environments allows students to practice negotiations in a safe and controlled setting, gradually building their confidence and reducing anxiety.

Lastly, to ensure that negotiation training is relevant and practical for real-world applications, it is essential to bridge the gap between academic research and industry practices. This can be achieved through industry collaboration, where partnerships between academia and industry align training programs with current industry needs and practices. Incorporating real-world negotiation scenarios and case studies into the curriculum allows students to apply theoretical knowledge in practical settings. Establishing a continuous feedback loop, where industry professionals provide input on training programs, helps keep them up-to-date and relevant. Offering workshops and professional development opportunities for both students and instructors ensures that they stay current with the latest trends and practices in negotiation.

Recommendations for Future Research

The integration of advanced technologies such as ET and FA into negotiation training has opened several promising avenues for future research. Firstly, longitudinal studies should be conducted to explore the long-term effects of using ET and FA technologies in negotiation training, providing insights into sustained behavioral changes and skill development over time. Additionally, research should investigate the impact of cultural differences on the effectiveness of these technologies, enhancing cross-cultural negotiation theories and practices.

Furthermore, as AI and machine learning technologies evolve, their integration into negotiation training can offer more sophisticated and personalized learning experiences. Exploring these advancements will support theories of technology-enhanced learning and provide deeper insights into optimizing negotiation training methodologies. Finally, examining the practical applications and real-world outcomes of these technologies in diverse professional settings will help bridge the gap between academic research and industry practices, ensuring that negotiation training remains relevant and effective in dynamic environments.

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The following AI models and tools were used to enhance the fluency of the text and to create images: ChatGPT, GPT-4, GPT-40, Scholar GPT, Jenn AI, Litmaps AI, Deepl, Grammarly, Canva and other advanced language models and tools.