

Thinking With Machines: How Cognitive Mediation Shapes the Use and Growth of Chatbots

Lect. Abdul-Haq Abdul-Kareem Abdullah (Ph.D.),

University of Thi-Qar, College of Arts, Dept. of English

E-mail of the corresponding author: abdulhaqalsahlani@utq.edu.iq

Abstract. The increased use of chatbots throughout everyday activities has resulted in a fundamental change for people who use information. The research investigates how chat-based AI systems affect the cognitive development of users in learning and communication and decision-making because their cognitive changes occur without their awareness. Researchers aim to study the transformation through Cognitive Mediation Networks Theory which explains how people think by using their intellectual abilities to interact with instruments and communication systems and their cultural context. The study examines chatbot functions as people gain understanding about how these systems work because they select one of two paths which demonstrate data processing capabilities while remaining strict to the established human thinking process. At Nibble, participants negotiate through interaction with a software application instead of engaging with a human negotiator. The system operates correctly yet the interaction lacks the same experience. The viewer cannot perceive how another person displays their emotions through their face. The viewer cannot see any brief intervals when the speaker must choose which reply to deliver. The text operates in a way that delivers information using a method which is excessively direct. The text does not express my opinion about whether this change represents positive or negative value. The primary point establishes that people now engage in interactions which have become common as they proceed through time. People begin using the systems yet they remain unconscious about how these systems transform their communication methods during active use.

Keywords: cognitive mediation theory (CMT), shared reasoning, automated dialogue, knowledge shaping, online interactions

التفكير مع الآلات: دور الوساطة المعرفية في تشكيل استخدام روبوتات الدردشة وتطورها

م.د. عبد الحق عبد الكريم عبد الله السهلاني

جامعة ذي قار – كلية الآداب – قسم اللغة الانكليزية

البريد الإلكتروني للمؤلف: abdulhaqalsahlani@utq.edu.iq

أدى التزايد المتسارع في استخدام روبوتات الدردشة ضمن الأنشطة اليومية إلى إحداث تحول جوهري في الطريقة التي يتعامل بها الأفراد مع المعلومات. يهدف هذا البحث إلى استقصاء الكيفية التي تؤثر بها أنظمة الذكاء الاصطناعي القائمة على المحادثة في التطور المعرفي للمستخدمين في مجالات التعلم والتواصل واتخاذ القرار، حيث إن التحولات المعرفية التي تحدث لديهم غالباً ما تقع دون وعي مباشر منهم. يسعى الباحث إلى دراسة هذا التحول من خلال نظرية شبكات الوساطة المعرفية، التي تفسر الكيفية التي يفكر بها الأفراد عبر توظيف قدراتهم الذهنية في التفاعل مع الأدوات والأنظمة الاتصالية ضمن سياقاتهم الثقافية. كما

تبحث الدراسة في وظائف روبوتات الدردشة مع ازدياد فهم المستخدمين لألية عمل هذه الأنظمة، إذ يميل المستخدمون إلى اتباع أحد مسارين يبرزان قدرات معالجة البيانات لدى هذه الأنظمة، مع بقاء هذه التفاعلات مقيدة بالبنية الأساسية لعمليات التفكير البشري. في تطبيق **Nibble**، يتفاوض المشاركون من خلال التفاعل مع تطبيق برمجي بدلاً من التفاوض مع شخص بشري. يعمل النظام بكفاءة، غير أن تجربة التفاعل تفتقر إلى بعض عناصر الخبرة الإنسانية المعتادة؛ إذ لا يستطيع المستخدم رؤية تعابير الوجه التي تعبر عن المشاعر لدى الطرف الآخر، كما لا يمكنه ملاحظة اللحظات القصيرة التي يتردد فيها المتحدث قبل اختيار رده المناسب. وبهذا تصبح الرسائل النصية وسيلة لنقل المعلومات بأسلوب مباشر إلى حدٍ كبير. لا يسعى النص إلى إصدار حكم قيمي حول ما إذا كان هذا التغيير إيجابياً أم سلبياً؛ بل يركز أساساً على حقيقة أن الأفراد باتوا يخرطون تدريجياً في أنماط جديدة من التفاعل أصبحت مألوفة مع مرور الوقت. ومع استمرار استخدام هذه الأنظمة، غالباً ما يبقى المستخدمون غير واعين للطريقة التي تعيد بها هذه التقنيات تشكيل أساليب تواصلهم أثناء التفاعل الفعلي معها.

الكلمات المفتاحية: نظرية الوساطة المعرفية (CMT)، الاستدلال المشترك، الحوار المؤتمت، تشكيل المعرفة، التفاعلات عبر الإنترنت.

1. Introduction

People now use chatbots in their daily activities because these systems became common without anyone notifying them about their presence. People who use the system speak to it as though it were a person because its responses create an experience that feels like natural conversation. The exchange is not mutual. The chatbot uses its current knowledge to answer questions because it lacks memory and emotional capability. The system produces words which match the current time yet lack any real-life experience. The system uses existing patterns to generate its output. The words sound correct but lack any personal experience which would give them meaning. Human beings think together with their fellow humans.

Our thinking patterns developed through our experiences with the materials and objects which we use in our daily life. People express ideas by using books and tools and their own spoken language. People develop their thoughts through interactions with other people. People develop their thoughts through interactions with the objects which exist in their environment. Books and screens and shared language and everyday objects create lasting impacts on how people develop their thoughts. Thought exists beyond isolation because it relies on its surrounding environment.

The theory of Cognitive Mediation Networks explains how people develop their cognitive abilities through their interactions with their environment. The theory proposes that people develop their cognitive abilities through their interactions with their surroundings which include physical objects and different types of symbols. Users of a chatbot share their process of meaning-making when they ask for help or request an explanation. The person is not thinking entirely alone in that

moment. The chatbot serves as a tool that helps individuals understand their ideas between their present state and their final understanding.

The system does not engage in cognitive processes yet it guides the user towards specific responses through its answer output. A chatbot does not move through emotions or hesitation the way a person does. The system produces language which creates sounds yet it does not understand the meaning of these words. The two elements create small changes which people usually find difficult to see during the early stages of their development. A person might not notice anything at all.

The daily activities which people do create ongoing effects which will shape their life. The person develops new habits about explaining things and searching for answers which accumulate through time. The person develops new habits about explaining things and searching for answers which accumulate through time. Routines carry significant importance because they establish clear patterns. Frequently used items cause gradual changes in user behavior which affect their self-explanation, answer searching, and decision-making about logical concepts.

1.1 The Problem of the Study

People who use chatbots on a regular basis for educational purposes and problem-solving tasks will develop new thinking patterns which they will not recognize. People will respond to tasks by delivering their answers through quicker methods or more simplified processes. The research investigates how individuals develop their reasoning abilities through unexpected cognitive shifts which happen during their normal activities.

The patterns of thought will shift when people start to respond with answers which are shorter and more direct while showing less emotional or ambiguous content. The research aims to explore how these cognitive processes develop over time while assessing their impact on human brain functions.

The research study includes two primary research questions.

1. How do chatbots contribute to the development of a new level of collective cognitive functioning human intelligence by cognitive mediation theory?
2. What are the consequences for human growth and commerce due to the swift advancement of chatbots and their conceptual analytical models?

1.2 The Hypotheses

The current research study makes these two fundamental assumptions to support its findings:

1. Chatbots change the way people think because they interact with others and handle information.
2. Chatbots can deliver smooth responses, but they fail to handle emotional content and cultural nuances and their limitations hinder their ability to make interpretations. The following domains need human expertise because they cannot be completely replicated through coding techniques.

1.3 Purpose of the Study

The study aims to investigate:

1. how chatbots participate in human thinking processes and,
2. how this participation affects the daily learning and communication activities that people do.

1.4 Significance of the Study

This paper holds significance because its alterations occur through silent processes. People start using chatbots by stating their requirements and they proceed to their next activities. The users treat the process as automatic with no need for further consideration. You receive a response after submitting your question during the entire interaction. The present moment creates no distinct experience. People usually require time before they can identify any transformations in their surroundings. The process of transformation occurs at an extremely gradual pace which makes it seem nearly invisible. People develop new behaviors which include expecting quicker responses and depending on chatbots to create complete sentences instead of writing their own text. Users who observe this tendency can continue their usage of the technology without interruption. It just means taking a moment now and then to ask, “Do I want to say it this way, or is the chatbot saying it for me?”

1.5 The Limits

The research study examines chatbots which interact with users through written text and spoken words. The study excludes examination of robots and visual AI systems and specialized industrial applications. The research uses English language materials as its main source for examples and the research team used existing knowledge as their analysis base without doing new experiments.

Literature Review

2.1 Human Cognitive Conceptualization

Cognitive psychology studies how people think because it investigates human cognitive processes. Cognitive psychologists use experiments and observations and surveys and brain imaging techniques to study cognitive processes that people use

in their different cognitive functions. Cognitive psychologists research multiple areas which include attention and memory and language and intellect and creativity and decision making and social cognition.

The mental domain of language users depends on their ability to use language as a fundamental mental resource. The system operates in interactive settings where people work together and develop their cognitive abilities through shared activities. If language operates as a communication system and people use it to exchange their mental images between different minds, then all cognitive functions that deal with language must connect with all cognitive functions that handle mental image development and thought processes. The research into language requires scientists to study both the linguistic elements and their relationships to advanced mental processes which include the mechanisms of concept development.

The cognitive system of the conceptual framework operates by handling and applying human knowledge about the world. People use this knowledge to understand physical objects and events and the social norms that exist in their environment. The research includes knowledge about mental states that people experience when they face various human mental processes which include intention and emotional and attitude construction. Knowledge exists through two things which people understand as reality and through their ability to think about imaginary and fictional worlds. Human beings create their understanding through three mental processes which include the experience of their inner world and their intentions and their feeling states and their emotional states. The conceptual systems provide methods to establish global information storage. Reasoning mechanisms establish links between knowledge segments to help users achieve logical deductions while various mechanisms prepare users to apply their knowledge base through different communication channels. The mechanisms choose which perceptual data should be organized into particular types so they can become part of the established conceptual knowledge base (Nuyts, 2001, p.5-6).

The common components which exist within communication systems serve as fundamental elements which people use to understand human-machine communication systems. Humans use human communication to develop and share meaning while human-machine communication enables people and machines to reach shared understanding through their information exchange. The communication process requires both human beings and machines as essential elements because their absence would stop all communication activities which depend on their presence (Guzman, 2018, p.17). Robots need a different approach because they possess characteristics which make them different from humans, so scientists need to discover new techniques that enable them to use robots as

informative sources. Robots receive better public evaluation through scientific achievements which prove individual success and people have confidence in scientific progress through this process (Lee and Liang, 2018: p.136).

Höflich (2013, cited in Mays and Katz, 2023, p.8) suggests that we should change our current understanding of human-robot interactions which people see as two-way exchanges by adding human-human interactions as a third component of the relationship between humans and robots. The social interaction happens through various social settings which include social media platforms where people publicly share their personal thoughts and beliefs and life experiences.

2.2 Cognitive Mediation Theory

The theory of mediation functions as an all-inclusive framework that integrates various perspectives and research approaches to study how media and technology affect human interactions with their environments. The essential elements of mediation theory consist of the following components:

1. Mediation is described as a technique that enables communication and negotiation for resolving conflicts between parties with different interests and values and goals. The element establishes the foundation which defines mediation practice through its particular techniques and concepts and ethical standards while it shows which situations lead to which outcomes through mediation practice.
2. Mediation as a process represents a technological phenomenon through which human perception and behavior and knowledge development are shaped and transformed. This section investigates how technologies create human experiences through their functions as technological systems which mediate human experience to develop specific philosophical and ethical and design issues which address the main focus of this research paper.
3. mediation describes how people use cultural and social methods to evaluate and change their surroundings. This element examines how media and technology drive power dynamics and belief systems and established social patterns which provide people with the power to fight back and gain strength to create social change through their activities (Spenser and Brogan 2006 3-43).

The most essential technological aspect that shapes human perception exists through human-machine communication mediation. Technologists' studies like the study of Leah Lievrouw (2014) observe that mediation is the "ongoing, articulated, and mutually determining relationship" (Nagy and Neff, 2023, p.275). People tend to view technologies as fixed systems because they lack understanding about the advanced algorithmic mechanisms which control technological operations. People need to understand that their relationship with technology depends on mutual connection because both elements exist in a state of interdependency (Lievrouw,

2009). The process of reciprocal significance redefinition brings changes to users and their actions and their perspectives about technology's role in societal development (Couldry, 2008).

2.3 Key Concepts in Cognitive Mediation Theory

Richard Lazarus (1922-2002) developed the cognitive mediation theory while he worked as an American psychologist. This theory explains how people think and feel about stress through their appraisal process. Human beings automatically assess all situations because they possess an inherent cognitive ability to do so. People experience different emotional states through their mental processing of environmental stimuli which produces a specific reaction to that stimulus. The process of cognitive evaluation determines how people will emotionally respond to stimuli which includes their experience of tension or terror. Schorr (2001, p.23-4) outlined Lazarus's major appraisals of this theory:

- a) The primary appraisal process involves organizations assessing how important an event is by studying its meaning for their operations.
- b) b- The organismal appraisal process requires assessment of an organism's ability to manage the results which emerge from the event.

Furthermore, Lazarus has identified two different methods for dealing with problems through his research. The first method involves direct actions to change the way living beings interact with their surroundings. The second method involves cognitive reappraisal processes which can either elicit or diminish emotional reactions (see Lazarus, 1968b; Lazarus et al., 1970). The assessment results of cognitive mediation theory display variation according to the examination level and the emotional type and the specific situation and the individual characteristics of the people being studied.

This theory offers several advantages to researchers who study human behavior. Firstly, it provides an effective framework for understanding the complex and diverse emotional experiences that people encounter. Secondly, it establishes relationships between emotional states and cognitive processes and goal-directed behavior. Thirdly, it provides researchers with essential knowledge to manage emotional states and conduct emotional interventions.

2.4 Human Intelligence and Cognitive Mediation Network Theory

The Cognitive Mediation Network Theory (CMNT) functions as a novel assessment tool which studies human intelligence by investigating the intellectual alterations that occurred after people adopted information and communication technologies during the last 50 years. De Souza et al. (2012, p. 2320-30) explain

CMNT core principles about human cognition and data processing by presenting these fundamental beliefs as their main summary:

1. The human species have their most important evolutionary benefit through their ability to create and store and access and change and apply knowledge in different ways.
2. Human cognitive processes result from a specific method of handling information.
3. The human brain, when isolated, serves as a limited and ultimately inadequate tool for processing information (This claim is adopted by many scholars: (see Hannan, 2003; Kurtzweil, 2002; Merkle, 1988, 1989; Miller, 1956; Ward, 1997; White, 2003).
4. All organized physical systems can execute logical operations to varying degrees.
5. Human beings complete their brain-based information processing through their interactions with physical systems that have external organization.

The CMNT, as a result, refers to the process of human reliance on external structures to enhance their information processing capabilities as "mediation." Such a process includes three essential elements which are: physical objects and neural internal processing together with internal mental mechanisms, and external mechanisms.

2.5 The Role of Cognitive Mediation in AI

AI, which stands for Artificial Intelligence, represents a specialized field of computer science that develops systems which can perform tasks that typically require human intelligence through logical reasoning and learning and decision-making abilities. AI serves as a cognitive mediation tool because it enables people to enhance their mental abilities or it creates entirely new ways of thinking. AI refers to the scientific field which studies computer system development that enables machines to perform tasks which typically require human intelligence, including visual perception and speech recognition and decision-making and language translation operations. The fields of AI research include automated reasoning and robotics and computer vision and natural language processing according to E. Höne (2019, 8).

Mediators must recognize AI as a subject for negotiation, as it is probable to be included in\ or influence forthcoming peace discussions. The mediators and their teams can use AI for their operations while using it as equipment to start their dialogues. Future mediation processes will not depend on AI technology in all situations. The targeted implementation of specific instruments will enhance

mediation processes while improving mediator efficiency. Understanding the tools requires people to learn about the available opportunities and the problems that will come into existence. The CMNT describes Internal Mechanisms as operating like computer "device drivers". The system creates virtual representations of its External Mechanism which people can use to interact with it. The system provides cognitive abilities which allow users to process information. The researchers designed the system to use logical concepts and schemata and skills which people have developed through their internalized functional patterns.

Thus, an individual's environment consists of two parts which include physical elements and social cultural systems that create cognitive systems which function as interconnected ecosystems (Souza, Neto and Roazzi, 2023, p. 7).

Research Methodology and Data Analysis

3.1 Artificial Intelligence and Chatbots

The chatbot system known as ChatGPT has become popular because it produces text which resembles human writing and it can successfully complete difficult tasks. Its existence has the power to create major changes in society while impacting individual lives. The CMNT reports that people will experience social transformation and psychological transformation after AI chatbots become available throughout the world. The theory predicts that new cognitive abilities will develop through innovative technology which will use its operational systems to create impacts on society. The term "Sophotechnic Mediation" can be used to describe the operation and patterns of such a system. The word "Sophotechnic" originates from two Greek words "sophos" which means "wise" and "technetos" which means "artificial" (Souza Neto and Roazzi 2023 page 7).

Now, the question that should be addressed here is: *how do these chatbots work?*

The initial model of ChatGPT used 175 billion parameters which researchers developed through their analysis of a dataset that contained millions of data points. The dataset included hundreds of billions of words which researchers had gathered from multiple online sources including the Internet. The corpus underwent pre-processing through three methods which included tokenization that divided text elements into tokens and stemming that reduced tokens to their base form and stop-word removal which eliminated words with grammatical function yet no meaning. The system uses highly efficient "Transformer Neural Networks" to perform its required computational tasks because these networks contain a "self-attention mechanism" which helps the system understand long-distance relationships and contextual details within the text.

However, the exceptional performance of *ChatGPT* depends on its application of the statistical and mathematical method known as "Embedding" which functions as its core mechanism. The technique enables users to extract meaning from sentences by creating word mappings that establish relationships between words based on their probability of occurring together in human writing. The fundamental elements of language convert into pathways which exist within a semantic domain that contains visible patterns which can be obtained as knowledge. The text generation process introduces uncertain elements through the application of the "Temperature" parameter which boosts "creative" output and generates more genuine results. The process could be simply explained in Figure (1) below:

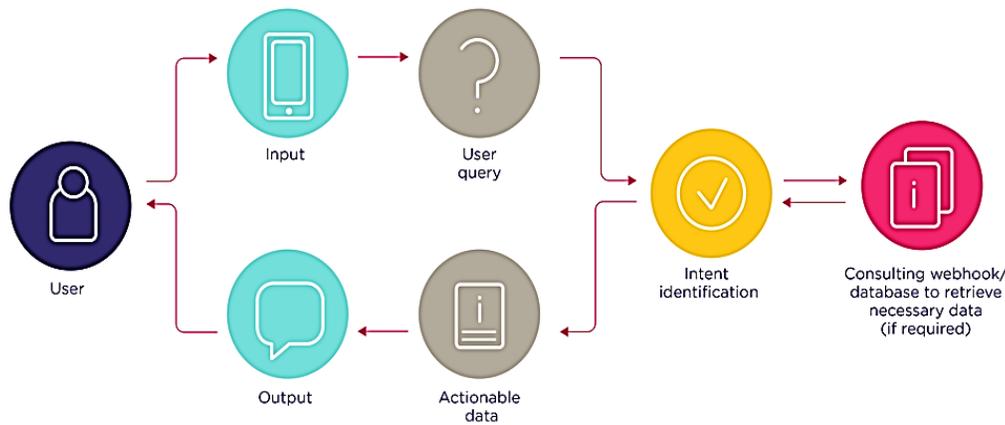


Figure (1) Chatbot Simple Work Model

Besides, The diagram shown in Figure (2) below shows the operation of chatbots according to software engineering principles and the natural language processing system which chatbots use to respond to user inquiries:

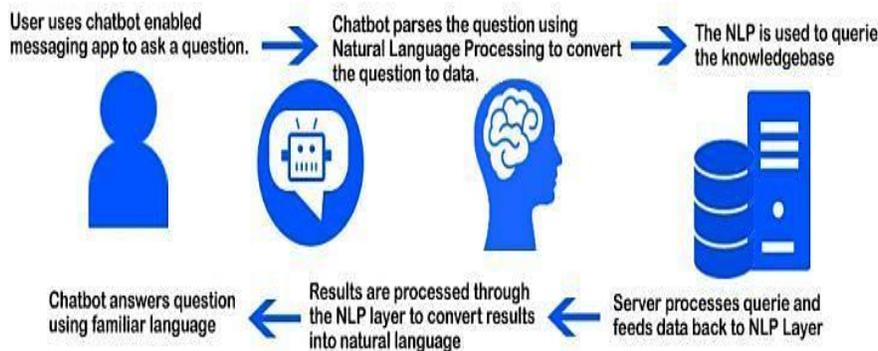


Figure (2) Chatbot and Natural Language Processing

In both scenarios, human beings manage the beginning of communication because they collect inputs to create output results and handle the incoming inquiries from others.

3.2 Nibble as a Case Study

The accompanying case study in the current paper is one belonging to the chatbots that use mediation theory. The foremost chatbots using this specific theory as a model include:

1. The MediBot system offers online mediation services through its chatbot platform for resolving family conflicts.
2. The Ombuds Bot system provides chat-based support to organizational ombudsmen who need help resolving workplace disputes.
3. The Negotiation Bot system offers users training and coaching programs that teach negotiation skills through its chatbot platform.

The Nibble negotiation chatbot which people call *Negotiation Bot* can be found at the URL <https://www.nibbletechnology.com/demo>. The chatbot studies incremental negotiation and mediation techniques which use artificial intelligence (AI) to improve human communication and conflict resolution. The Nibble AI chatbot helps online shoppers and e-commerce businesses reach agreements about product pricing and quantity through negotiation. Hence, the interactive platform has been designed to produce results that both parties in the process will find beneficial to their needs.

The negotiation starts when the first list is presented which shows the required options and the items that will be talked about during the negotiation. The process begins through its initial actual implementation. See Figures (3) and (4) below:

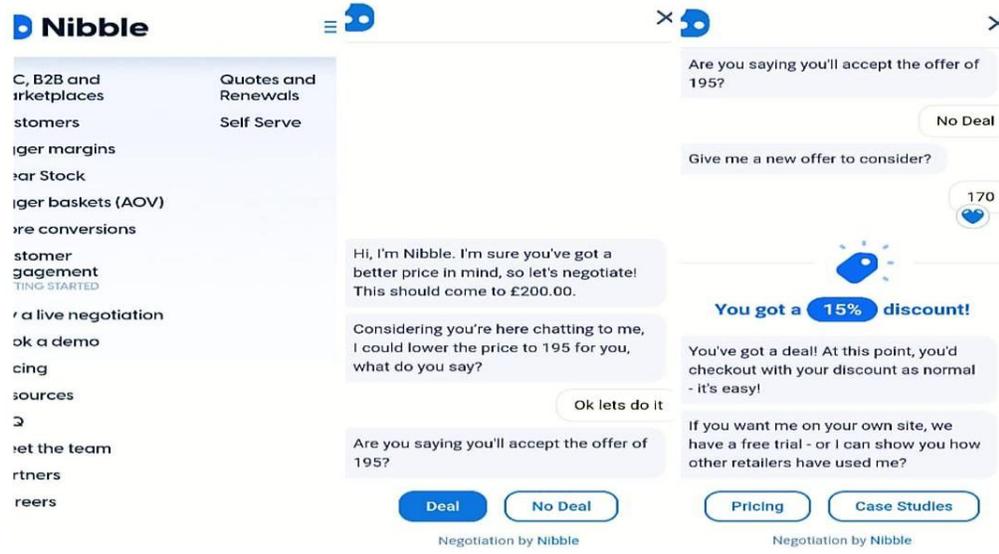


Figure (3) The First steps of starting a negotiation in Nibble.

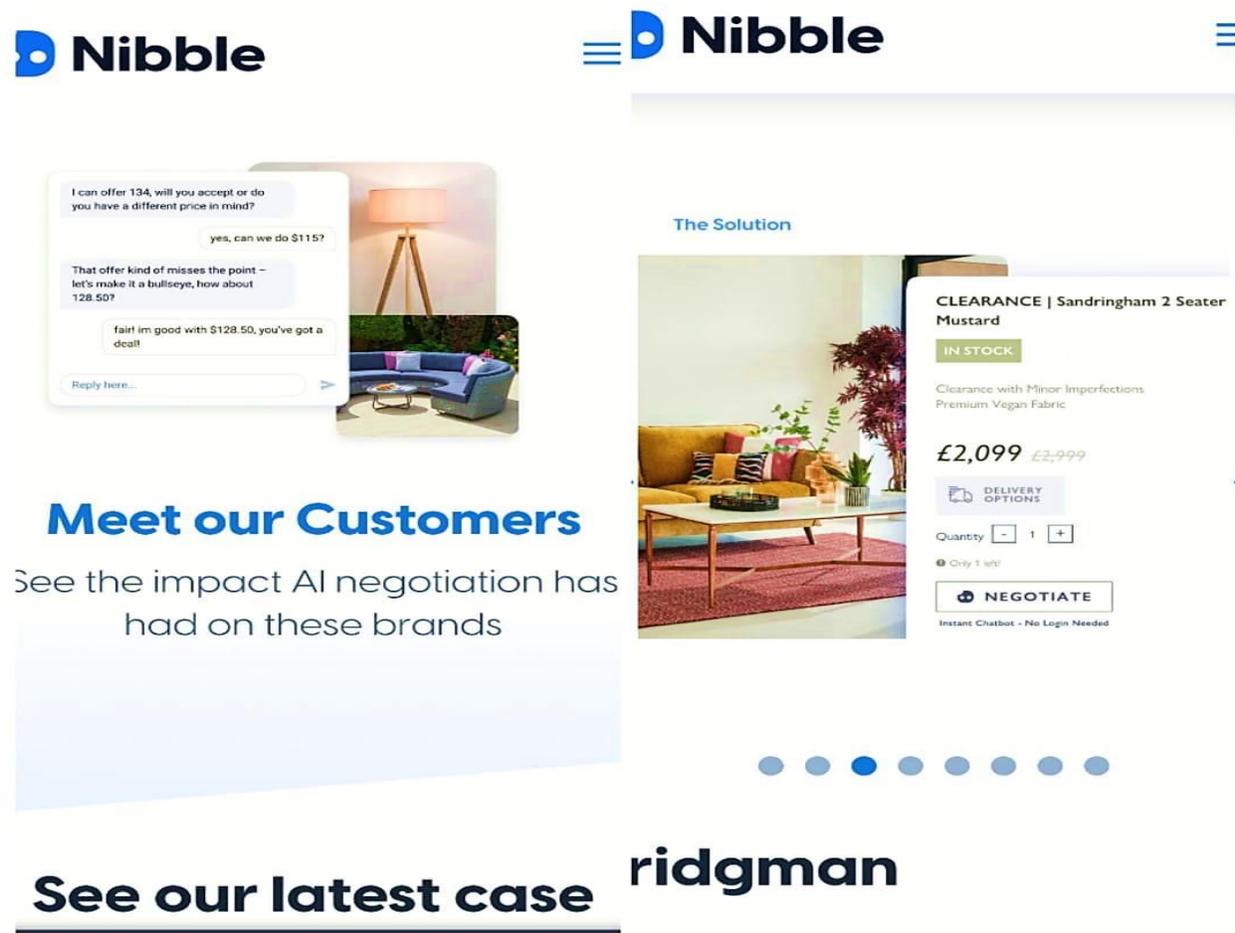


Figure (4) Nibble's e-commerce Products

The artificial intelligence bot handles product negotiations through its operational system. Using Prinz (2022) as a model for conducting digital studies with programmed chatbot systems, the negotiation in such a bot cocening any product is a sort of mediation “between positive displayed emotions and encounter satisfaction” (p.106). the negotiation process which begins when the bot asks The form and wording of this inquiry are primarily psychological because the word "mind" is employed instead of "necessary" or "affordable within your budget" see Figure (3).

Consequently, the Nibble chatbot negotiation system exists to handle business negotiation needs. The system makes it possible for online customers to negotiate product prices and purchase amounts with e-commerce businesses. Nibble uses its intelligent AI algorithm to start direct discussions with users about the deal which leads to advantageous outcomes for all participants in the conversation.

The chatbot negotiation system of Nibbles operates according to this particular instance which the researcher himself presents directly from the bot. The Nibble chatbot negotiating system creates an enjoyable shopping experience which helps retailers increase their sales and profit margins:

- **Nibbles:** Hi there, welcome to our store! I’m Nibbles, your shopping assistant. I can help you get the best price for this product.
- **The Researcher as a Customer:** How does that work?
- **Nibbles:** It’s simple. You just tell me how much you are willing to pay, and I’ll see if I can match it or make a counteroffer. We can go back and forth until we agree on a fair price.
- **The Researcher as a Customer:** OK, sounds interesting. Let me try. How about \$50 for this watch?
- **Nibbles:** Hmm, that’s a bit low. This watch is worth much more than that. It has a sleek design, a durable strap, and a 2-year warranty. Plus, it’s one of our bestsellers.
- **The Researcher as a Customer:** Well, I’m on a tight budget. Can you do better than the original price of \$100?
- **Nibbles:** I understand. How about this: I can offer you a 10% discount, which brings the price down to \$90. That’s a great deal for a high-quality watch like this.
- **The Researcher as a Customer:** Hmm, not bad. But I was hoping for something lower. Can you do \$80?
- **Nibbles:** I appreciate your interest, but I can’t go that low. That would be below our cost. The best I can do is \$85. That’s a 15% discount and the lowest price you’ll find anywhere. Trust me, you won’t regret buying this watch. It’s a smart investment.
- **The Researcher as a Customer:** OK, you’ve convinced me. I’ll take it for \$85.

- **Nibbles:** Awesome! You've made a wise choice. To complete your purchase, just click on the button below. And don't forget to leave a review and tell your friends about us. Thank you for shopping with us, and have a wonderful day!

4. Discussions and Results

Nibble uses a chatbot which merchants can add to their Shopify and Magento and WooCommerce online stores. The chatbot is situated in a product screen corner which potential customers can click to start negotiating with it. Nibble can discuss and reach agreements on multiple points including pricing and quantity and free items. Nibble can begin user negotiations through various triggers which include dwell time and page return and exit intent.

The Nibble negotiation chatbot establishes multiple links with mediation theory through the following connections

1. Nibble employs advanced AI technology to conduct personalized interactions with users about selling products which mirrors the way mediators use their communication skills and active listening techniques to decipher the essential interests and requirements of all parties involved.
2. Nibble can conduct negotiations about multiple factors which include pricing and quantity and free promotional items while it performs its function to create and assess possible outcomes and solutions through problem-solving and integrative bargaining which mediators use to establish and distribute value.
3. Nibble enables negotiation technique and presentation customization for retailers to match their brand standards through its ability to adjust its negotiation methods and presentation requirements which operates like mediators who change their methods to match the specific needs of each situation.

As a result, Chatbots provide multiple advantages to educational institutions and business operations and their use in communication while existing systems create security risks for human targets throughout their operation. The same situation can lead to people losing their trust when their security and privacy rights become threatened through a combination of secure authentication methods which should remain hidden from public knowledge.

5. Conclusions

Rounding off the research study, it investigates three interconnected areas: human mental development, artificial intelligence progress, and the scientific study of mediation. All together are used to determine how artificial intelligence technology affects human cognitive processes and social interactions between people.

However, human conceptualization describes the cognitive process through which people develop mental models of actual situations by creating concepts and categories and schemas and frames.

Speaking of its referential marker, AI refers to the capacity of machines to carry out tasks that often necessitate human intellect, such as natural language processing, image recognition, and decision-making. As for Mediation theory, it goes hand in hand with examining the psychological methods that mediators use to help parties resolve their disputes.

While also increasing the efficiency and effectiveness of the negotiation process, Nibble, as a case study here, can enhance the availability and affordability of negotiation services. That is to say, the parties involved are going to experience better trust and satisfaction from this improvement which functions like mediation benefits during conflict resolution.

Hence, the Nibble negotiation chatbot establishes a link with mediation theory through its ability to use AI as a *cognitive mediator*. It provides knowledge, advice, analysis, and support for various tasks and scenarios, such as e-commerce negotiation, workplace conflict resolution, and negotiation training and coaching.

References

- Bruno Campello de Souza, B., Neto, A., and Roazzi, A. (2023). “ChatGPT, the Cognitive Mediation Networks Theory and the Emergence of Sophotechnic Thinking: How Natural Language AIs Will Bring a New Step in Collective Cognitive Evolution”.
- Couldry, N. (2008). “Mediatization or mediation? Alternative understandings of the emergent space of digital storytelling”. New Media & Society.
- E. Höne, K. (2019) “Mediation and artificial intelligence: Notes on the future of international conflict resolution” Diplo Foundation Report.
- Guzman, A. (2018) “Introduction: “What Is Human-Machine Communication, Anyway?”” In Guzman, A. (2018) *Human-Machine Communication: Rethinking Communication, Technology, and Ourselves*.
- Lee, S. and Liang, Y. (2018) “Theorizing Verbally Persuasive Robots”. In Guzman, A. (2018) “Introduction: “What Is Human-Machine Communication, Anyway?”” In Guzman, A. (Eds.) (2023) *Human-Machine Communication: Rethinking Communication, Technology, and Ourselves*.
- Lievrouw, L. A. (2009). “New media, mediation, and communication study. Information, Communication & Society Appraisal
- Mays, K. and Katz, J. (2023). “Machines are Us: An Excursion in the History of HMC” In Guzman, A., McEwen, R. and Jones, S. (2023). *The Sage Handbook of Human-Machine Communication*.

- Nagy, P. and Neff, G. (2023) “Rethinking Affordances for Human-Machine Communication Research” In In Guzman, A., McEwen, R. and Jones, S. (Eds.)(2023). *The Sage Handbook of Human-Machine Communication*.
- Nuyts, J. (2001) *Epistemic Modality, Language, and Conceptualization*.
- Prinz, K. (2022). *The Smiling Chatbot: Investigating Emotional Contagion in Human-to-Chatbot Service Interactions*.
- Schorr. A. (2001). “The Evolution of an Idea”. In Schorr, A., Schorr, k. and Jhonstone, T. (Eds.) (2001) *Appraisal Processes in Emotions: Theory, Methods, and Research*.
- Spenser. D. and Brogan, M. (2006). *Mediation Law and Practice*.
- Online Links:
 - (<https://landbot.io/chatbots>)
 - (<https://www.sofmen.com/2018/08/23/chatbots/>)
 - (<https://www.nibbletechnology.com/demo>)