INNOVATION, TECHNOLOGIES, EDUCATION ET COMMUNICATION I-TEC
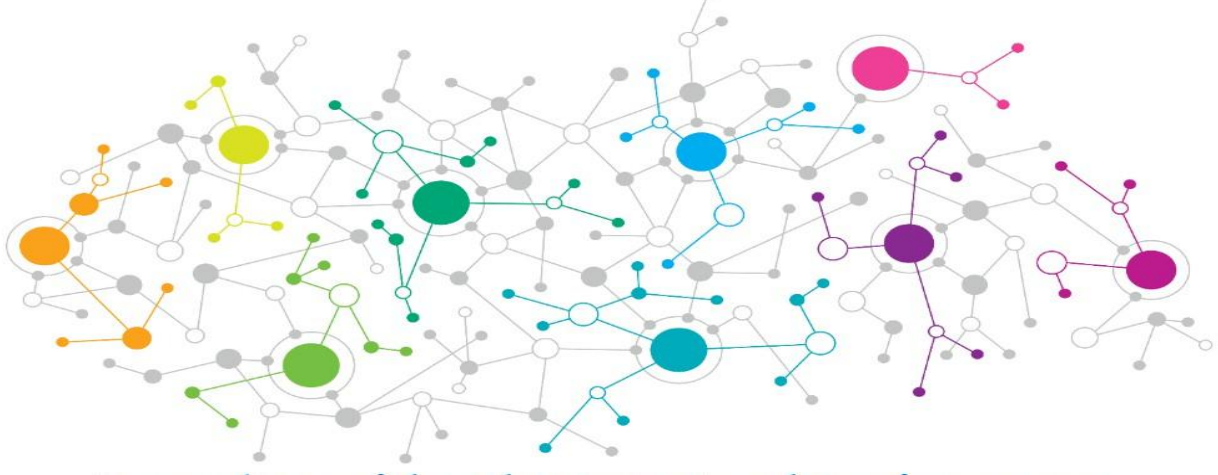
Proceedings of the 5ᵗʰ International Conference on Education, Research, and Innovation:

"Empowering Learners & Unlocking Their Full Potential"
|| April 08-09, 2025|| Oujda, Morocco||

Edited by

Isam Mrah

Edition:
Faculté Des Lettres et Sciences Humaines Université Mohammed Premier-Oujda

2025

ICERI 2025 Proceedings

Empowering Learners & Unlocking Their Potential

Mohammed I University

Faculty of Letters & Human Sciences, Oujda, 2025

A Conceptual Framework and Related Issues for Understanding AI in Negotiation Soft Skill Development Within Moroccan Higher Education

[a] Mohamed Nfida, Nassira Houat [b]

[a] *Mohammed I University, Faculty of Letters & Human Sciences-FLHSO, Oujda, Morocco*
Email: mohamed.nfida.dr@ump.ac.ma
0009-0003-5897-1846

[b] *Mohammed I University, ENCG, Oujda, Morocco*
Email: n.houat@ump.ac.ma

Abstract

The present paper discusses the conceptual research about Artificial Intelligence (AI) in soft skills like negotiation. AI is gaining importance in Moroccan higher education in all STEM and non-STEM areas, especially in negotiation skills training to improve the outcomes. From last few years, AI and negotiation training have experienced crucial developments in all types of virtual agents. Although there is a plethora of research on AIED, research on defining AI negotiation agents and how they work in the literature is sparse. This conceptual paper attempts to discuss Artificial Intelligence concept, its history, and its position within the ill-defined domain, negotiation skills before any step to assess its effectiveness. So, the prime objectives are (i) To understand the concept of Artificial Intelligence (AI) and the sophisticated features like Machine Learning, Deep Learning, Neural Networks, Big Data, Algorithms, and Natural Language Processing. (ii) To present the changing conceptions of literacy and the crucial role of AI Literacy for the 21st century skills. (iii) To discuss and understand soft skills/negotiation skills concepts and different types of AI Negotiation tools, as computer-based simulation, AI agents, intelligent tutoring systems, AI-driven negotiation training platforms, serious games,

multiplayer online simulation, and virtual reality simulation, as well as in the Arab world, particularly Morocco.

Keywords: Artificial Intelligence (AI), AI negotiation, negotiation training, virtual agents

Introduction

In today's digital era, soft skills and AI integration have become inextricably interconnected. For instance, it is mandated and recommended by many researchers in many parts of the world like the United States (Eidenmüller, 2025), England (Brynjolfsson et al. 2014), Canada (Smith et al., 2020), and Italy (Kasneci, 2023) to utilize AI in higher education for STEM and non-STEM fields as negotiation. As for the Arab region, many initiatives have been taken to support the idea of using AI in higher education across the Middle East (e.g.: Yanes et al., 2020; Alhashmi et al., 2021) and North Africa (MENA) region (e.g.: Abuzakiyeh, 2018; Hussin et al., 2021) where many Arab universities intend to use AI across various disciplines and set up AI research labs. In other terms, global training industry has historically been focused on presenting a face-to-face setting for negotiation training and other soft skills at ESP and specialized classrooms. However, the expansion of Artificial Intelligence (AI) has made significant changes on the traditional negotiation mode (face-to-face). To understand AI negotiation and assess the effectiveness of Intelligent Tutoring Systems (ITSs), it is so important to become familiar with the significant changes of conceptual definitions and historical revolution, especially with the endless technological advances. Importantly, grasping AI mechanisms and how they work can also help students to control negotiation process. In this respect, this paper and its sections deal with the definitions of key words and historical developments related to AI and negotiation soft skill in ESP/or specialized classes within higher education around the globe and particularly in the Arab world. Therefore, the first step of the present study is to understand artificial intelligence (AI) and its advanced characteristics, including machine learning, deep learning, natural language processing, neural networks, big data, algorithms, and more. The second step is to discuss how literacy is evolving and how AI literacy is crucial for 21st century skills. Finally, the paper will have a particular stress at different types of AI negotiation tools and their positions in the Arab world, especially Morocco.

1. AI Revolution

Artificial intelligence is not easy to define as there is no agreed definition; it is a cross disciplinary concept. Over the past century, it has been defined and classified in many different ways. The early AI scholar McCarthy coined the term Artificial Intelligence (AI) in 1956 by proposing it as the science and engineering of making intelligent machines. For more relevancy to his scientific view, artificial intelligence (AI), a subfield of computer science, can be defined as the effective use of computer technologies through improved programming techniques (Joost, 2009). These definitions on their faces fail to include many of the day-to-day disciplines and are limited only to computer science. The given term has, in fact, no clear or established concept as it is frequently related/or generated from a discipline perspective, industry, or application and several dictionary definitions fail to support the idea that AI has a clear meaning. As a result to that, only one dictionary (The New International Webster's Comprehensive Dictionary of the English Language, Encyclopedic Edition), for instance, provides four definitions of Artificial Intelligence, with some improved ideas, as:

1. An area of study in the field of computer science; it is the study of techniques to use computers more effectively.
2. It is related to the development of computers able to engage in human-like thought processes such as learning, reasoning, and self-correction.
3. The extension of human intelligence through the use of computers, as in times past physical power was extended through the use of mechanical tools.
4. The machines that can be improved to assume some capabilities normally thought to be like human intelligence such as learning, adapting, self-correction.

As one can see, AI has often been characterized not only as an exact science, but rather as a multi-faceted area; the concept has become differentiated from one discipline to another since each group brings their own terminology and perspective (Luckin et al., 2016). In addition to that, most researchers have started to integrate human intelligence in their definitions as stated in the previous dictionary's definitions and similar to a pioneered definition presented by Simmons and Chappell (1988) where they proposed the term as "behaviour of a machine which, if a human behaves in the same way, is considered intelligent" (p. 14). The behaviour of a machine should be twinned with human behaviour and intelligence. For better understanding of the concept and dismantling the complexities in the following definitions, it is advisable first to briefly review its history.

To date, the historical evolution of AI research has gone through a number of stages. There are, in fact, ten milestones in the timeline of AI. The first five stages came with the events and inventions of Turing Machine in 1936, Cybernetics in 1943, Turing Imitation Game in 1950, Dartmouth Conference in 1956, and Perception in 1958. The other stages were Lisp in 1960, the appearance of Expert Systems in 1970, Fifth Generation Project in 1985, and Neural Networks in 1990 which led to intelligent systems as a new starting stage for modern AI tools (Cantú-Ortiz et al., 2020). Knowing the history of AI can give us a better understanding where it is today and where it may go during upcoming years. To stay relevant, AI research entered the so-called 'AI Winter' when funding stopped and researchers lost interest, causing the field to collapse. However, the turning point came with John McCarthy who first coined the term Artificial Intelligence (AI) in 1956.

The above-mentioned historical changes in AI developments and day by day usage have made the term definition quite slippery; it has become as a part of the 21st century skills. These skills are up-dated in this digital era. According to the Glossary of Education, 21st Century Skills are considered as a broad set of knowledge, skills, work habits, and character traits that are believed— by educators, school reformers, college professors, employers, and others—to be critically important to success in today's world." To meet such skills, they are essential life skills like negotiation and AI literacy competencies that everyone can possess if they need success and go further ahead since we live nowadays in a digitalized and automated society. For that reason, AI has emerged as a catch-all concept to define a range of technologies that are related to smart technology systems. Baker and Smith (2019), as an illustration, point out that "AI does not refer to a single technology but is defined as "computers [that] perform cognitive tasks, usually associated with human minds, particularly learning and problem-solving" (p. 10). Similarly, UNESCO has supported the previous and influential definition by defining AI as machines that imitate some aspects of human intelligence like perception, learning, reasoning, problem-solving, language interaction and creative work (UNESCO, 2022).

Looking through the current lens, scholars have recently explained that AI is dedicated to making machines intelligent and developing their role in the environment and in realizing visions through achieving complex tasks (Chang et al., 2021). This definition is expanded upon by Sheikh (2023) and his colleagues. They point out that "it is a technology that enables machines to imitate various complex human skills" (p. 15). They define it in a composite way, linking machines with human skills; and this means, AI is not only a set of gadgets and technologies, as some probably assume, but rather a whole paradigm of human imitation of life activities. In other terms, AI is about maximizing the ability of machines to act well by

constructing intelligent entities like human ones. It is the automation of complex tasks that historically only humans could do, such as learning, problem-solving, and decision-making (Owoyemi et al., 2020). Generally speaking, comparing human and artificial intelligence is worthwhile, but one should not always link the definition of AI to human intelligence (Cope, et al 2020; Korteling, et al 2021). To sustain that, these former authors showed five main differences between human intelligence and artificial intelligence in terms of structure (biology versus digital systems), speed (humans being slower than computers), connectivity (human communication being slower and more intricate than AI systems), updatability and scalability (AI capacity for immediate improvement or to upscale), and energy consumption (the human brain being more efficient because it consumes less energy). The difficulty to provide a common definition for AI has also pushed some other researchers to categorize it into two main types related to its tasks: narrow or weak AI and general or strong AI. This point is explored by Roscoe Kerby in his article (2023) where he shows that there is a difference between the two types. Kerby affirms that narrow or weak AI is designed to perform specific tasks like image and speech recognition, whereas general or strong AI systems can perform any tasks that a human can, such as understanding language and learning from experience. Importantly, people utilization of AI is related to which task they need; they can use it, for instance, for business, work, study, teaching, soft skills development, and so on.

To be explicit, the present definitions of AI present a clear picture of what actually AI is and how it works. By looking at the previous definitions, it is seen that these definitions are based on two pillars: a technological machine and artificial brain. Hence, artificial intelligence (AI) includes all the intelligent means that can facilitate our communication and daily activities in all spheres. Recently, it has become inseparable part in our all walks of life whether we are businessmen, researchers, teachers, or students. We all have our share AI-based daily activities. AI is a tool that functions in various fields– it is for communication, business, science, maths, education, and so forth. Machine learning, deep learning, neural networks, big data, algorithms, and natural language processing can be regarded as the common features of AI negotiation tools. Therefore, it is important to examine these concepts to assess AI's effectiveness in understanding and negotiating with humans.

1.1. Machine Learning (ML)

The formal introduction of Machine Learning was between the 1980s and 2010 when algorithmic learning began to gain prominence on research agendas. Machine learning is considered as a system of computer that learns from past experiences through data. Jordan and

Mitchell (2015) state that ML as an aspect of AI, has emerged as "the method of choice for developing practical software for computer vision, speech recognition, natural language processing, robot control, and other applications" (p. 255). Baker and Smith (2019) add "when provided with sufficient data, a machine learning algorithm can learn to make predictions or solve problems, such as identifying objects in pictures or winning at particular games" (p. 10). Similarly, ML is an attempt to construct intelligent agents for a given learning task on the basis of artificial models largely rooted in computational modelling methods (Gori, 2017). Pertinently, Artificial intelligence and machine learning (ML) are among the newest innovative technologies that have changed business processes and replaced large portions of the decision-making process traditionally performed by humans (Haneya et al., 2021).

1.2. Deep Learning (DL)

Deep Learning appeared in 2010 as a new technique for connecting Machine Learning via neural networks to achieve complex thinking tasks. It is a subset of machine learning (ML) and AI, originated from artificial neural networks (ANNs), and it has remarkable capacity to learn from large datasets. The term 'deep' means multiple stages or levels where the chosen data is working to build a model. Deep learning is a particular kind of machine learning that achieves great power and flexibility by learning to represent the world as a nested hierarchy of concepts, with each concept defined in relation to simpler concepts, and more abstract representations computed in terms of less abstract ones (Shaikh, 2017). Nowadays, deep learning is widely used in various domains like text analytics, healthcare, education, negotiation training and many more. Many corporations including Google, Microsoft, Nokia, etc., study it actively as it can provide significant results in different classification and regression problems and datasets (Karhunen et al., 2015).This popularity has spread beyond expectations thanks to deep neural networks' capacity to mimic the human brain's processing of data, differing from standard machine learning, by using multiple layers of data to build computational models and train them effectively (Xin et al., 2018).
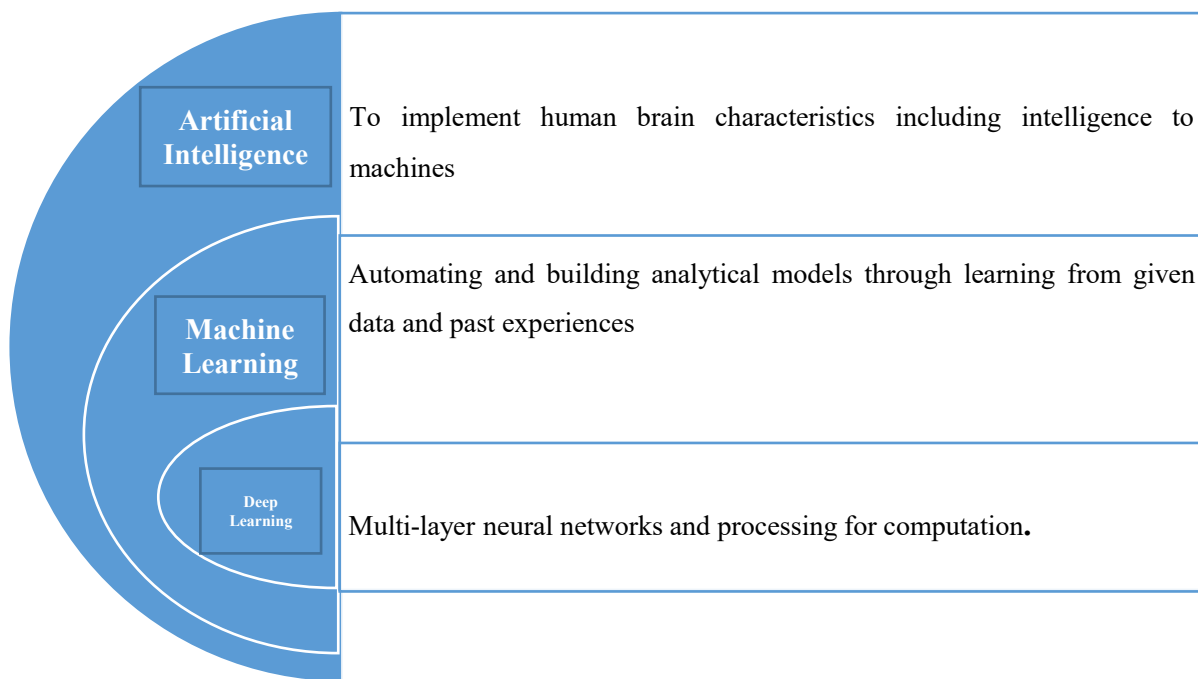
1.3. Neural Networks (NNs)

In the late 1980s, neural networks became a well-known concept in the area of Machine Learning (ML) and Artificial Intelligence (AI) because of the successful network structures with various effective learning methods (Karhunen et al., 2015). In subsequent years, the number of neural networks' enthusiasts decreased, especially after researchers failed to develop stronger models. This situation has changed quickly with the advent of deep learning (DL)

(Hinton et al. 2006) and new generation neural networks which were based on the concept of artificial neural networks (ANNs). Perhaps, the simplest and most flexible definition was presented by Baker and colleagues (2019) where they described Neural networks (NNs) as "a form of AI inspired by the structure of the human brain; they are made up of processing nodes (artificial neurons) which are connected in layers. For further explanation, each node receives data from nodes above it, and passes this down to nodes below it" (p. 10).

The following figure describes the position and interconnection between Machine Learning and Deep Learning within AI.

Figure 1

The position of ML and DL in AI

Artificial Intelligence	To implement human brain characteristics including intelligence to machines
Machine Learning	Automating and building analytical models through learning from given data and past experiences
Deep Learning	Multi-layer neural networks and processing for computation.

1.4. Big Data (BD)

Big Data is considered as a global concept that can be used commonly in academia and industrial ventures. Data is not just numbers anymore; it consists of texts, images, videos, ranks, frequencies, gene sequences, sensor arrays, click logs, and lists of recommendations. (Alpaydın, 2016). As a standard definition, it designates data sets that are too large and complicated to be analyzed using simple algorithms and require more complex data analytics or machine learning to understand (Baker, T., & Smith, L., 2019). They can be effective in various fields like

education. In this sense, Big Data can help predict the future trends such as education technology trends (Yaseen et al., 2020).

1.5. Algorithms (As)

In recent years, artificial intelligence algorithms and systems have gained popularity and become one of the most prominent technology applications, especially in education (Makhlouf, 2021). AI algorithms are categorized into various types such as evolutionary algorithms, Bayesian inference and networks, search and optimization, fuzzy set theory, case-based reasoning, and traditional machine learning approaches (Hwang and Tu., 2021). Each type works according to its functionality but most AI studies in higher education have adopted mixed AI algorithms for fruitful outcomes (e.g., Latham et al., 2012; Lykourentzou et al., 2009; Tomasevic et al., 2020). Nowadays, there is a shift to Smart algorithms (SAs) that can assist negotiators in various ways when planning and conducting negotiations **(**Eidenmueller, 2024).

1.6. Natural Language Processing (NLP)

Natural Language Processing (NLP) is considered as a process to design and implement computer systems to produce linguistic operations for effective natural language analysis. From some researchers' point of view, it is, for example, a theory-motivated range of computational techniques for the automatic analysis and representation of human language via virtual entities (Cambria & White, 2014). Another enhanced definition is presented by Hirschberg & Manning (2015) where they describe that "Natural Language Processing (NLP), also known as computational linguistics, as a subfield of computer science that is concerned with using computational techniques to learn, understand, and produce human language content" (p. 261). Large Language Models (LLMs) can help to fulfil the demands; they are deep learning algorithms that can recognize, summarize, translate, predict, and generate content using very large datasets (Eidenmueller, 2024).

The principal objective of NLP is clearly to understand user's verbal and written commands to provide automatic responses (machine reasoning). For example, let DL with simple reasoning trains a model with different levels by using LLMs and transformer-based architecture (to process sequential data and comprehend context and semantic features) for ESP written communication to check the correctness of negotiation language and, then, the model can learn instant representations that are useful for the given task. Integrating AI into non-STEM

classrooms– especially ESP within the context of negotiation skills–can broaden the cultivation of these soft skills and reduce inequalities among trainees.

2. Changing Conceptions of Literacy

The AI has made remarkable changes in all aspects of life using all its integrated softwares to act like humans. Hundreds if not thousands of researchers and educators have conducted studies on the field of AI, and more than million hits in Google indicate the prevalence of this topic (Google 2025). Hence, it is essential for users to be well-fortified with the skills or competencies needed to utilize AI effectively. These competencies are referred as AI Literacy (AIL). The term 'literacy', in fact, has changed overtime in relation to each era; it was first defined as the ability to read and write in order to express oneself using written language. Then, the term shifted to the ability to communicate and share ideas (Freire, 1972). In the 21st century, researchers have utilized new literacy definitions collocating the term with words in various disciplines especially with the advent of technology. It has been collocated as 'computational literacy' (diSessa, 2000), 'scientific literacy' (Hurd, 1958), 'digital literacy' (Gilster, 1997), 'data literacy' (Wolff et al., 2016), "media literacy" (Livingstone, 2004) and nowadays AI literacy (Kong, 2008).

In the digital era, literacy encompasses a variety of new topics, such as media, computers, digital information and AI (Kong et al., 2021). These "multiliteracies" are interconnected each and have made the field gain popularity in various areas, denoting knowledge, skills, and competencies.

To conceptualize the meaning of AI Literacy, most researchers and authors note that research on AI literacy is still in its infancy and literature's work is rare on this topic. Some others see that it is difficult to define AI literacy as it is not static; the term has evolved over the course for many years with different established definitions. Some of them have even utilized the term 'technological literacy' as an umbrella concept covering the previous multiliteracies including AI literacy to avoid confusion (Kahn & Kellner, 2006). The last decade gained many endless definitions about AI literacy trying to provide a clear-cut definition. For example, it is the ability to understand the basic techniques and concepts behind AI in different products and services (Kandlhofer et al., 2016). Basic techniques are described for many researchers as skill sets and competencies needed for better use, communication, and evaluation.

Within this context, Long and Magerko (2020) state that AI literacy "as a set of competencies that enables individuals to critically evaluate AI technologies; communicate and collaborate effectively with AI; and use AI as a tool online, at home, and in the workplace" (p. 2). This

definition includes all facets; it combines AI competencies with critical evaluation, effective communication and collaboration, and the usage in different contexts. Consequently, individuals are asked to be AI citizens in order not to stay further behind including educators and students, who should have a prior knowledge and competencies about how AI tools work. To do so, Kong and Zhang (2021) make a valuable conceptual framework for AI literacy which contains three dimensions as shown in Figure 2.

Figure 2

AI Literacy Dimensions (AILD)
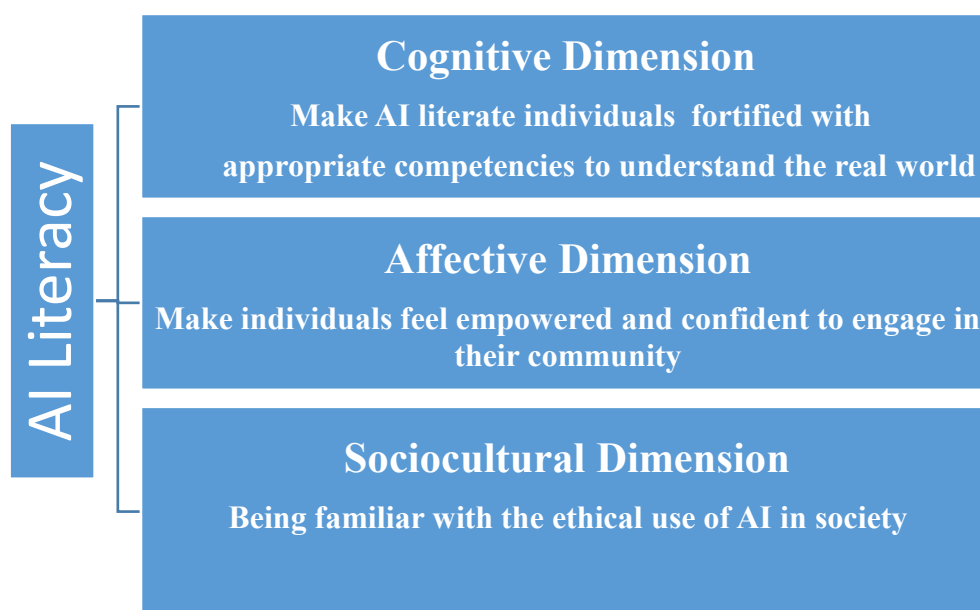
It is important to note that educators should not confuse AI pedagogy with AI literacy. AI pedagogy is described nowadays as strategies to teach concepts and technical aspects of artificial intelligence (AI) to learners using experiential learning.

3. Artificial Intelligence Education (AIED)

The use of AI in education has achieved important progress in theory and practice in this era. AI Education (AIED) has begun to disseminate steadily in the early 1970s especially with the advent of computers. Tech-lords (business tech-companies) started to innovate new didactic tools-powered technology in higher education for more profits; they developed learning programs to fill the gap. Such initiatives motivated the international research scholars to shift their interest to how to design and implement tech properly in higher education aligning with

pedagogical approaches. They established new concepts in their research such as computer-based training (CBT) and multimedia learning; therefore, they set up for the first-time the educational technology field. The latter, it is often referred to as EdTech which includes the use of digital resources or tools to enhance teaching-learning process with interactive experiences; it is about the implementation of technology to support instructional pedagogies, collaboration, assessment, and communication.

The first main stages of technological developments in the education field over the past 20 years were the inception of Wikis as the first digital learning in the late 1990s and the birth of online learning through learning management system (LMS) platforms as Massive Open Online Courses (MOOCs) and edX in 2012 (Weller, 2018). Today the educational technology with new innovative teaching and learning methods/or modes has made a significant impact on the education sector. Digital tools are recently sophisticated with new features like AI which includes, Algorithms, Machine Learning (ML), Deep Learning (DL), Natural Language Processing (NLP), Learning Analytics (LA), among others. All these AI characteristics have grabbed the attention of researchers and scholars to focus more on AI Education (AIED) as a subfield beneath the educational technology umbrella. To achieve this, they held numerous conferences and educational events to enrich the spectrum of AIED themes, starting with a particular stress on defining AI Education as a concept which is considered as a slippery term that can embrace many conceptual terms (Nfida & Houat, 2025). Popenici and Kerr (2017), for instance, define Artificial intelligence Education (AIED) as computing systems that are able to engage in human-like processes such as learning, adapting, synthesizing, self-correction and use of data for complex processing tasks (p. 2). Chiu et al. (2022) add that "AI in education (AIEd) refers to the application of AI technologies, such as intelligent tutoring systems, chatbots, robots, and the automated assessment of all modes of digitized artifacts that support and enhance education" (p. 01). AIEd has become an important emerging research area for setting out the future of learning (Holmes et al., 2021). In other words, AIED aims to develop integrative, adaptive, personal, flexible, and effective learning environments that complement and optimize traditional education and training (Renz & Hilbig, 2020). To meet this goal, higher education needs to integrate theories and applications of AI across the curriculum and disciplines and not consider it as an 'add on' requirement that becomes a check box instead of an essential element to the curriculum (Southworth et al., 2023). In the United States, resources and grants are being provided to designated institutions and organizations for researching and developing AI-driven personalized learning platforms that have great potential to boost

academic performance by deepening students' cognitive engagement and to reduce educational inequalities by assisting underprivileged students (Boninger et al., 2020; Williamson & Eynon, 2020).

4. AI revolution within the context of Negotiation Training

In this section, the paper provides a comprehensive overview of the most recognized definitions of soft skills, with emphasis on the concept of negotiation and AI negotiation tools from the perspectives of various scholars, educators, and practitioners. It also explains how AI negotiation tools work and how they negotiate effectively in both human–agent and agent–agent negotiations.

4.1. Soft Skills (SKs) as the Umbrella of Negotiation

The net of soft skills in higher education has become wider than just being limited for the organizational contexts. This dissemination is apparent in literature where the definition of soft skills and pedagogical training tools are currently under debate although they are represented as a big challenge for researchers, educators, practitioners, and managers. Historically, soft skills first emerged in a US Army training handbook in 1972 to identify the difference between hard skills and soft skills (Whitemore & Fry, 1974). They are defined in various studies under different names as transversal skills (they can be used in different contexts), employability skills/generic skills (needed for jobs), life skills/core skills (for formal and informal activities), and 21st century skills (a set of abilities for the present century). Soft skills are considered in general as interpersonal and intrapersonal competencies in formal and informal contexts spreading everywhere in people's lives to organize social and professional relationships. Soft skills are also personal behavioural competencies that guide the process of performing a task and affect the job performance rather than the final outcome (Boyatzis et al., 2002). To support this definition, soft skills as abilities that are involved in personal development and career, such as the ability to manage stress, intrapersonal and interpersonal communication, and thinking skills (Chia, 2005). Explicitly, these abilities are evident in jobs like management, customer service and other jobs that require to work in teams or groups (Jackson, 2010) for creating strong relations between co-workers and partners in the workplace, in that they enhance communication and team management (Pratt et al., 2009). In fact, trying to delve too deeply into every soft skill theory can lead to varying definitions; that's why, the focus here is only on the key aspects common to major definitions. Some authors, for instance, defined soft skills by showing their main features in comparison with hard skills' aspects in the workplace (e.g.:

Hendarman, 2012; Klaus et al. 2007; Pant & Baroudi 2008; Weber et al. 2009;). Specifically, these authors agreed that hard skills involve technical abilities based on structured operations with a limited scope of application, whereas soft skills involve social abilities based on flexible processes with multiple solutions and unlimited application. Furthermore, literature goes more behind the previous definitions by scrutinizing in details each type of soft skills as ESP which is considered a key negotiation soft skill in this globalized world. With the advent of AI, researchers also study how to shift from traditional training methods to integrate innovative ones like AI tools. Among all the types of soft skills that have been identified in relation to AI, one that can be integrated in all daily situations, as work or family relationships, is negotiation.

4.2. Negotiation Skills (NSs)

The concept of negotiation has been largely debated, since the earliest publications in 1716s, and it is still discussed heavily in literature. The difficulty of providing a comprehensive definition of the concept of negotiation lies behind its interconnection with various disciplines and theories. So, the formal definitions of negotiation vary and scholars have approved some basic tenets. Foremost among them is the assumption that negotiation is a process of combining conflicting positions into a common position, under a decision rule of unanimity (Kissinger, 1969). In other words, it is a process in which two or more parties seek agreement on what each shall give to, and take from, the other(s) (Rubin and Brown 1975; Thompson 1990). Above all, the scholars maintain that negotiation is a process where two or more parties try to settle agreement with fruitful results. From another contribution, Cohen (2002) states that "negotiation is one name for a variety of joint decision-making processes, although people also use terms as making a deal, trading, bargaining, dickering, or (in the case of price negotiation) haggling" (p. 3). Harvard Business School has also tried to settle a clear explanation for negotiation by describing it as the means by which people deal with their differences (Harvard Business School, 2003). These differences are, indeed, diverse like negotiating for a price, sales' procedures, legal dispute, or complex negotiations between companies and countries. It is claimed that these definitions have a serious flaw because they make the assumption that negotiation is only a process and means between parties. Anastakis (2003), for instance, describes it as "a strategy to resolve a divergence of interests, real or perceived, where common interests also exist" (p. 74). (A strategy is "a careful plan or method, especially for achieving an end" (Merriam-Webster's Dictionary, 1994). It is a give-and-take process or a well-planned strategy; it is between two or more parties to affect each other for achieving their own and common goals (Agndal et al., 2017). Accordingly, negotiation is a fact of our daily activities

where everyone is a negotiator for something to maintain their sakes. In summary, based on these examples (and many others in the literature), negotiation is a process, a means, or a strategy that uses communication to bridge differences and achieve common goals or interests among negotiators. However, being a good and global negotiator requires certain skills such as mastering ESP (negotiation language) that every negotiation student should acquire during training.

When we hear the word negotiation, the word skills pledges automatically into our minds. It is so crucial to define what this collocation - negotiation skills - precisely stands for. The US Academy of Sciences and the World Economic Forum identify negotiation as a foundational social skill essential for the future of work through its impact on organizational creativity and productivity (National Academies of Sciences Engineering and Medicine, 2016). Negotiation skills are considered as soft skills that must be cultivated in a negotiator's personality to achieve the intended outcomes for two or more parties. Some negotiation theorists have sought to categorize soft skills; they have been categorized as either strategic or diagnostic. To be explicit, Strategic skills are fundamental skills needed to plan a negotiation, whereas diagnostic skills are "at-the-table" skills needed when negotiating (Anastakis, 2003). All in all, the conceptual framework of negotiation skills is full and pregnant of interesting concepts especially with the advent of AIED and its integration in pedagogical instructions to boost trainees' skills. However, negotiation, like most social skills, is described as an ill-defined domain which presents a challenge for intelligent tutors (Aleven et al. 2008) and other types of AI as will be discussed in subsequent sections.

4.3. Computer-Based Simulation (CBS)

Simulation is an archaic method where people in ancient times started to use real simulations by making swords and horses from wood for training. After many centuries, the idea of simulation has become a priority for any vocational training and, thus, many educational schools adopted experiential simulations by using role-plays, case studies, and exercises for cultivating the intended skills. It is used to train professionals such as workers, pilots, soldiers, managers, doctors, students, and professional negotiators. A simulation is a representation of some phenomenon or activity that users learn about through interaction with the simulation (Alessi & Trollip, 2001). For example, in an ESP classroom for teaching negotiation skills, students are able to benefit from either simple simulations or mega ones to learn both language and negotiation theory through various activities. Recently, the advent of computer technology, in fact, has enhanced simulations which have shifted from paper-based learning to computer-

based learning (computerized simulations). Saunders & Lewicki (1995) state that Computer simulations are often quite engaging, providing a compelling world within which the participants can interact (p. 157). Computer simulations are computer programs that model a real-life scenario or product and test many possible outcomes against it (Thomas, 2025).

4.4. Intelligent/Expert Tutoring Systems (ITSs)

Despite limited intelligent tutoring systems (ITSs) designed for teaching, literature has shown that they are promising tools at teaching soft skills such as negotiation (Gratch et al. 2016; Monahan et al. 2018). The simplest definition shows that intelligent tutoring systems are "adaptive systems which use intelligent technologies to personalize learning according to individual characteristics such as knowledge of the subject, mood and emotion" (Sleeman & Brown, 1982). These Expert Systems have the ability to be real tutors specialized in negotiation training like IAGO online platform and many others. Another fact, intelligent tutoring systems (ITSs) are a type of computer-based educational tools that use advanced algorithms to provide adaptive and personalised instruction and feedback to learners (Ma et al., 2014). They can negotiate with humans by adapting instructional strategies of negotiation theory in real-time and providing instant feedback. In fact, the integration of ITSs have provided transformative pedagogical tools for negotiation students to enhance and cultivate their experiential contexts, negotiation skills, and personalized learning.

4.5. AI Agents (AIA): virtual/intelligent agents/avatars/humans

An agent is a software programmed to act according to the intended outcomes without human intervention. It has scored the best outstanding results than the conventional computer programs. Due to its success, the field of virtual agents has created an interesting debate about its conceptual definition, which varies widely. The first concept of an agent was presented by McCarthy and Selfridge in the mid- 1950s and research in agents started in 1970s with flourishment in 1990s. McCarthy and his colleague suggested a "soft robot," computer software that has an objective doing tasks and receiving feedback from humans (Ehlert, 2001). There is, in fact, a variety of definitions about the "agent" concept. The following lines are devoted for pioneering definitions:

1) It is a software entity dedicated to a specific purpose (Smith, Cypher, & Spohrer, 1994).
2) It is a software that engages in dialogs, negotiate, and coordinate transferability of information" (Coen, 1994).

3) It is a simulation of a computer program regards on human relationship by doing something that another person could do on behalf of you (Selker, 1994).

4) It is described as a component of software or hardware that is capable of acting rigorously so as to accomplish tasks on behalf of its user (Nwana & Ndumu, 1998).

It is worth noting from these definitions that an agent is a software simulation fortified with characteristics which are able to do tasks on behalf of humans. An agent's characteristics should include autonomy, cooperation, and learning as stated by Nwana. The Sprinklr Dictionary similarly expands the concept by considering it "as an advanced conversational bot using AI and NLP to interact with users, understand their intent and provide quick resolutions. Unlike simple chatbots, virtual agents learn from conversations to become smarter over time, offering contextual answers in real time or smoothly transferring calls to human agents when needed. They gather user information, qualify leads, disseminate product information, create support tickets and gather sign-ups for events. Virtual agents enhance customer service by efficiently handling diverse tasks and improving overall user experience" (The Sprinklr Dictionary, 2025).

For over three decades, research on agents was already dormant due to the demands of dynamic and open environments and the complexity of tasks (Mostafa et al., 2017). However, interest has recently revived in the AI community, and the terms intelligent agents and virtual avatars/humans are now used interchangeably with virtual agents.

4.6. AI-Driven Negotiation Training Platforms (AIDNTPs)

AI-driven (or AI-powered) negotiation training platforms are specialized software platforms or agents designed exclusively for negotiation training. These platforms emerged because the capabilities of basic chatbots were too limited for complex conversational training. Trainees can learn about negotiation by actually negotiating or by observing how computers/apps negotiate with them or with other computers. Furthermore, automated negotiation aims at reaching a mutually acceptable agreement through an iterative process of making offers and counteroffers (Faratin et al., 2002). In this context, Yinping & Singhal (2009) distinguish three basic types of automated negotiation tools: the first type is human-to-human negotiation with computer mediation through Negotiation Support Systems (NSSs), the second is agent– agent negotiation, and the last is human–agent negotiation (Yinping & Singhal, 2009). For instance, IAGO is a well-known virtual agent platform that provides students with the opportunity to practice negotiation strategies and receive feedback on the outcomes (see MyIAGO.com).

Other platforms include ENACT (see the ENACT game website), Nibble (NibbleTechnology.com), an AI Negotiation Agent (offered by statworx), the AI Negotiation Challenge (Frontline Associates), among others. Some platforms like IAGO, ENACT, NegoChat-A, and Negotiation 360 have been assessed for their effectiveness in negotiating with humans, showing positive outcomes. Recently, there is unprecedented demand for human–agent negotiation, especially with the emergence of general or generative agents (like ChatGPT, Copilot, Google's Gemini, DeepMind's DeepSeek, Anthropic's Claude, etc.), which are able to respond to nearly all daily interactive tasks.

4.7. Serious Games (SGs)

Serious games, gamification or game-based learning is one of the most important active strategies; it has been highlighted with the advent of web-based learning and training, namely in negotiation training. Recognizing the potential of gamified approaches, researchers have begun exploring their application in negotiation training (Schmid & Schoop, 2022). Serious games were first termed as PC-based games and console-based games but are now used interchangeably because of technology developments. A game is suited now either for computer-based simulation or apps on mobiles and tablets. According to Salen and Zimmerman (2004), "a game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome" (p. 80). For negotiation purposes, games play a paramount role because they are challenging, and their negotiation outcomes are unpredictable; uncertainty of the outcomes can make the experience enjoyable. For instance, Win-Win Manager, SISINE and The Auction were investigated in literature with fruitful results. Importantly, gamified apps motivate trainees to continuously engage (Hamari et al., 2014). IDecisionGames, for example, is a platform that cultivates human performance during negotiation by simulating near-human images and voices during the preparation phase of a negotiation, allowing the assignment of roles and purposes, and simulating a real negotiation process (Taylor, 2021). Moreover, emotion recognition technology has recently been integrated into gamified learning platforms to detect emotions and respond appropriately via providing personalized feedback for negotiation skills. Game-based learning, in fact, has been launched by means of agents as virtual avatars, full-fledged games as Merchants, or by means of virtual reality (Ding et al., 2020). The latter–games-based VR– is characterized by uncertainty and challenging tasks that include multiple avatars competing in immersive contexts.

4.8. Virtual Reality (VR)

Virtual Reality has brought new services by implementing AI features. Steuer (1992) defines virtual reality (VR) as "a real or simulated environment in which a perceiver experiences telepresence" (p. 7). It can be also defined as ''the sum of the hardware and software systems that seek to perfect an all-inclusive, sensory illusion of being present in another environment'' (Biocca & Delaney, 1995). Put differently, VR immerses users by engaging their senses – mainly visual and auditory (and possibly haptic) – in an illusion of reality (Sanchez-Vives & Slater, 2005). Makransky and Lilleholt (2018) further illustrate VR's benefits: VR is a type of virtual technology that can help students understand abstract topics and increase student motivation. Various researchers have sought to deepen the explanation of VR's features. For example, Ruggeroni (2003) divides VR into three types: desktop or non-immersive VR, projected or semi immersive VR, and fully immersive VR. The second type projects images onto a large screen for more immersion and interaction. The last type – fully immersive VR – is considered expensive since it requires special devices and gadgets such as a data glove and a head-coupled visual display unit (Ruggeroni, 2003). From another perspective, virtual technology gives students a deep learning experience because there are three basic features of virtual technology: immersion, imagination, and interaction (Ralhan, 2016; Zhang et al. 2017). It is remarkable that AI makes the experience of VR more real and effective in all types of VR (AR/EXR). So, immersion, presence, and interactivity are considered as the main characteristics of VR technologies (Ryan, 2015) and the integration of AI features surely will enhance traditional classroom settings.

4.9. Generative AI (GenAI) Systems

While traditional AI such as computer-based simulation (CBS), intelligent tutoring systems (ITSs), or other traditional negotiation support systems (NSSs) have already made important contributions to literature and negotiation training, the emergence of GenAI brings about deeper changes and provides new opportunities by enabling strategic, creative, and cooperative thinking particularly in late 2022. Still, before talking about/or integrate this type of AI to assess its effectiveness in cultivating negotiation skills and achieving complex scenarios, it is significant to understand the precise meaning of the concept. Taking a closer look at the terminology, the word "generative" is defined as "(being) able to produce or create something" (García-Peñalvo & Vázquez-Ingelmo, 2023). It is clear from this definition that Generative AI

refers to a type of AI with smart algorithms that can generate new content like text, images, audio, video or other types of data. It is trained using data collected from webpages, social media conversations and other online media (UNESCO, 2023). The concept, itself, is used interchangeably with various terminologies like Generative Adversarial Networks (GANs), Variational Autoencoders (VAE), and among several others (Gm et al., 2020). However, the mentioned above definitions cannot be applied to all AI tools on the grounds that simple decision tree models with simple content generations, for example, are not considered as generative AI (weak AI). In the same line, some researchers claim that categorizing AI agents as GeneAI depend on their characteristics and parameters and any ambiguity in definitions can also affect the acceptance and adoption of this technology and by making it hard for students and industry experts to understand what Generative AI is and what it can do. Accordingly, without a clear definition, researchers and negotiation practitioners, in fact, should carefully examine and identify GenAI content scenarios and use appropriate curriculum techniques to meet negotiation students' needs. Table 1 presents some important definitions of GenAI with different visions and thoughts, but the concept, in general, remains inconsistent and unclear especially, in terms of technical features.

Table 1

Sample Definitions of GenAI

Authors	Definitions
(Houde et al., 2020)	GenAI is a class of machine learning technology that learns to generate new data from training data.
Chan (2023)	Generative AI is a subset of artificial intelligence (AI) that focuses on creating new data or content rather than analyzing and interpreting existing data.
(Rao et al., 2024)	GenAI is a branch within the broader field of AI which uses advanced deep learning models to produce novel content.
Ritala et al. (2024)	Generative AI represents a new paradigm in AI systems and means that AI can exhibit and mimic human creativity.
(Bianchini, 2025)	GenAI refers to a class of systems that share numerous features with earlier forms of AI, features which are now being perceived or reinterpreted in new ways, in what might be described as a kind of exaptation of the tool, emerging from the interaction between human users and the system.

Generally speaking, the concept 'GeneAI' can be applied to complex models which act as humans doing complex conversational tasks – as in negotiations – like ChatGPT, Gemini, DeepSeek, Copilot, Grok, etc.

The following figure shows how negotiation process happens between AI or human negotiator and AI negotiator. The latter is a concept that can be used interchangeably with all types of AI concepts to avoid confusion or any illusion. Human or AI negotiator starts the opening by addressing offers or messages to AI negotiator that tries to organize and analyze the messages through Nego Manager by employing AI features like NLP (LLMs through computational linguistics) with a vision to decode and understand human language, negotiation scenario(s), and tactics (the right type(s) of algorithm). After this process, the AI Negotiator, (DL), will choose, based on the previous process, an appropriate Computational Model to the negotiation scenario(s) which gives the green light for Response Provider to generate and execute messages for negotiation. Finally, the AI Negotiator Core's mission is to store negotiations and let the agent, (ML), learn from them for upcoming negotiations. What makes AI Negotiator to be different from non-AI Negotiators is its ability to learn from past experiences.

Figure 3

A General Architectural Model of AI Negotiator
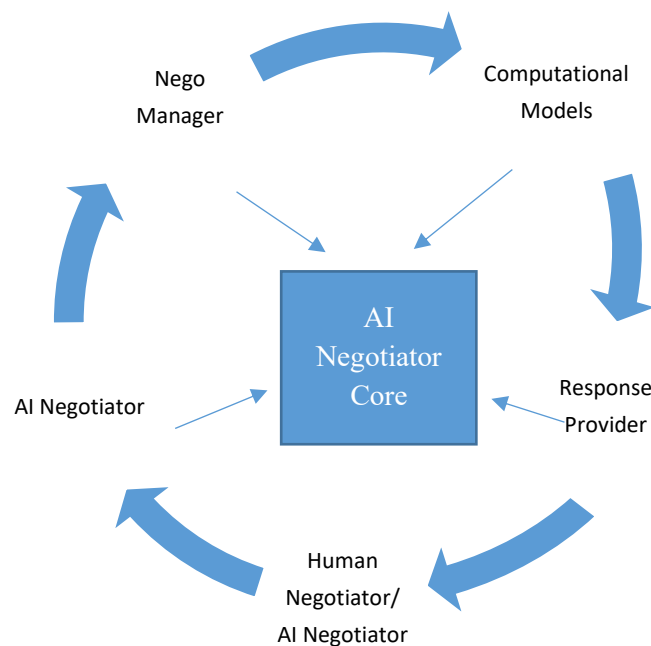
5. Situating AI and Soft Skills – Negotiation in The Arab World: Morocco as a Case Study

AI in soft skills training, throughout the world, has increasingly grabbed the attention of researchers and practitioners. AI is more and more seen to be one of the most effective tools for negotiating training. Still, while this sphere is vibrant and integrated in many developed countries' curricula, it is still unknown or young in other developing countries; AI integration in negotiation training is a field that has long been neglected in the Arab world. In fact, the literature reveals that there has been slow progress in incorporating AI in soft skills in ESP programs in the Middle East and North Africa region. However. this situation has not prevented some Arab researchers, educators and practitioners from seeking to make a difference by introducing new concepts and methodologies that allow Arab students to cultivate their negotiation soft skills.

Notably, over the past a decade, MENA countries have launched AI regulations and national AI strategies, but unfortunately drafting AI-specific legislations of these regulations and strategies is still absent or low. Decades of neglect have led to a crisis in providing qualified students to be future leaders and real negotiators. Arab HE is still suffering in terms of quality and research output because of several obstacles– for example, a disconnect between what universities teach and the needs of workplace. To address these issues, some Arab universities, mostly in the Gulf, have started to prioritize research development in both STEM and non-STEM subjects (including soft skills) by developing strategic plans and integrating innovative pedagogical methods like AI technologies. A report by Economic and Social Commission for Western Asia, ESCWA, shows that soft skills have become important in the Arab market like negotiation skills (communication, problem solving, mastering English, etc.). For example, the report states that "command of English also seems to be one of the most needed soft skills in Arab countries" (ESCWA, 2022). ESP has become one of the most important soft skills needed for negotiation in this globalized world. Importantly, Mellor (2024) mentions that "in Bahrain, for instance, graduates need to possess both technical expertise and soft skills that are highly sought-after by employers, which is the Higher Education Council launched the National Strategy for Higher Education (2014–2024) to bridge the gap between higher education and the labour market. The strategy aims to promote problem-solving, critical thinking, communication, and networking skills—all essential attributes for success in today's workplace" (p. 251). For this endeavour, AI technology can play a role in improving the learning experience, increasing efficiency, and allowing easier access to academic and administrative tools (Badran et al., 2019). For better learning and training outcomes, Zayed

University has also recently eliminated exams completely on the ground that it is no longer an effective method to prepare graduates for the contemporary workforce. Instead, the university fosters continuous assessments before, during, and after class using interactive tools and providing continuous feedback (Hopkinson, 2023). AI is one of the best interactive tools with a power to provide trainees with instant feedback about their negotiation skills. From KSA' part, the kingdom targets to increase AI literacy in 40% of its workforce by integrating AI into educational universities (Pasquarelli, 2022). Qatar is also applying artificial intelligence in the education to improve both soft skills and hard skills in order to meet the requirements modern life, while Egypt has established a university for computer science with an AI stream to develop expertise across all fields.

As far as Morocco is concerned, the country has committed itself to developing AI education through a number of established programs. Negotiation as a soft skill in Morocco plays a paramount role in both formal and informal contexts. There's no doubt about it, Moroccans are adept negotiators and if you want to get good at this life skill then there is no better place to practice it than in Morocco, where almost every price can be haggled (Sanchez, 2024). This soft skill quality can be attributed to the mindset of Moroccan people as well as the integration of soft skills in general within higher education. Less than a decade, Moroccan universities introduced "Soft Skills" either in ESP or specialized classes as an independent module in the curriculum of many departments. Nonetheless, an important Study Day held in Oujda organized by CEDUC Laboratory (Communication, Education, Digital Usage, and Creativity) in collaboration with ENCG (a National School of Commerce and Management) at Mohammed First University in February 2025 on the issue of Artificial Intelligence in Higher Education: Exploring Competencies and Research Agenda. Researchers, educators, and practitioners at that Study Day confirm that there is still an enormous lack of theoretical as well as descriptive work regarding the implementation of AI in ESP negotiation classes– namely a lack of AI pedagogy. According to participant, factors such as the heavy workload under traditional paper-based learning, the absence of training and professional development for teachers in digital practices, immature curricula, data privacy concerns, and a shortage of funding for educational initiatives are all obstacles to implementing AI negotiation tools at the grassroots level in Morocco. Clearly, all attendees agreed that using outdated teaching methods (e.g., paper-based learning) in this digital era will cause teachers and students to fall further behind and yield unsatisfactory results. This problem has negatively impacted the teaching-learning process and the development of future leaders at large. The majority of negotiation students feel at least partially dissatisfied when they study and attend lessons without integrating AI materials in the

process of learning. Therefore, in education and training, the adoption of AI in Moroccan educational systems is expected to personalize teaching, boost educational performance and allow students to enhance their negotiation skills.

To promote AIED in the country and raise public and academics awareness of its importance in all fields (including negotiation skill development), Morocco has announced some remarkable initiatives, especially following royal directives emphasizing the importance of AI adoption in all sectors including education. For that reason, the Ministry of Digital Transition and Administration Reform has adopted a National Strategy called "Digital Morocco 2030" to implement the king's vision. Specifically, the country has launched the "Al Khawarizmi" call for projects in artificial intelligence and big data. Moroccan higher education has also created some AI centers of international scope, such as the "AI movement" Center at Mohammed VI Polytechnic University, which has begun adopting AI agents to help students access interactive career-preparation tools and to provide resources for building AI assistants for their learning needs. The AI movement, for example, works on the development of natural language processing (NLP), game theory and multi-agent systems that are as a foundation to negotiation systems. According to Imane Lechheb (2025), writing in *Hespress* (an online news outlet), Morocco ranks 42nd in the world for artificial intelligence adoption, with a projected adoption rate of 16% by the end of 2025, according to a new report by the platform *All About AI*.

To address the obstacles and encourage officials and researchers for more initiatives, in the Arab region, there is an acute need for expertise in AI to evaluate the capabilities of current AI systems in addition to assessing students' capabilities (Tuomi, 2018). Arab countries are cooperating by exchanging vision and expertise through The Arab Labor Conference, which includes a technical committee on AI and new work patterns. The group is trying to settle an Arab strategy following the countries' initiatives like Kingdom's Vision 2030 of KSA, The UAE's Vision 2031 and Digital Morocco 2030 strategy. Notably, several Arab countries are advancing AI research, whereas some others are still lagging further behind due to various factors. Some Arab researchers and educators have worked to stress the importance of AI education by organizing workshops, seminars, and conferences to encourage AI integration within negotiation training in the region. Ultimately, AI Negotiation has become one of the main priorities worldwide due to the need of soft skills in the workplace. The field indeed faces ongoing calls for more collaboration to narrow the information gap and to establish a collaborative platform for developing future leaders.

Conclusion

This paper has presented a contextual review of AI integration in negotiation as a soft skill. It has covered selected aspects of the field, which serve as motivations for this research. First, the paper outlined the background of AI in negotiation as one of the main outcomes of the "soft skills developments". Besides, it defined AI within its historical and conceptual framework and outlined some of its main features, such as Machine Learning, Deep Learning, Neural Networks, Big Data, Algorithms, and Natural Language Processing. It also addressed the changing conceptions of literacy – from the general notion of "literacy" to the specific idea of "AI literacy" – and its significance for 21st century life skills. To provide a clear picture, another conceptual framework was presented to understand and discuss soft skills/negotiation skills concepts and different types of AI negotiation tools, including computer-based simulations, AI agents as general/generative ones, intelligent tutoring systems, AI-driven negotiation training platforms, serious games, multiplayer online simulations, and virtual reality simulations. Finally, the paper closed with a description of AI and soft skills in the Arab world, particularly in Morocco, discussing the obstacles and initiatives for a better AI future in the region. Addressing this framework will surely provide a solid background to bridge the gap between theory and practice in this vibrant area. The paper recommends further future research in this field to include broader concepts, more historical facts and innovative experimental designs to fill the conceptual void. These insights might be as a driving power for enhancing negotiation training as well as higher educational reform objectives in Morocco.

References

Abuzakiyeh, K. (2018). Expert systems in artificial intelligence and their employment in education and education. *Journal of Faculties of Education, University of Al-Zawiya, 12.* http://www.dspace.zu.edu.ly/bitstream/handle/1/315/12.pdf?sequence=5&isAllowed=y

Agndal, H., Åge, L., & Eklinder-Frick, J. (2017). Two decades of business negotiation research: an overview and suggestions for future studies. *Journal of Business and Industrial Marketing, 32*(4), 487–504. https://doi.org/10.1108/jbim-11-2015-0233

Alessi, S.M., & Trollip, S.R. (2001). Multimedia for Learning, Boston, MA: Allyn and Bacon.

Aleven, V., Ashley, K., Lynch, C., Pinkwart, N. (2008).: Intelligent tutoring systems for ill-defined domains: assessment and feedback in ill-defined domains. In: The 9th International Conference on Intelligent Tutoring Systems.

Alhashmi, M., Mubin, O., & Baroud, R. B. (2021). Examining the Use of robots as teacher assistants in UAE Classrooms: Teacher and student Perspectives. *Journal of Information Technology Education Research, 20,* 245–261. https://doi.org/10.28945/4749

Alpaydın, E. (2016). Machine learning: The new AI. MIT Press. https://international.scholarvox.com/book/88841730

Anastakis, D. J. (2003). Negotiation skills for physicians. The American Journal of Surgery, 185(1), 74–78. https://doi.org/10.1016/s0002-9610(02)01109-1

Badran, A., Baydoun, E., & Hillman, J. R. (2019). Major challenges facing higher education in the Arab world: quality assurance and relevance. In Springer eBooks. https://doi.org/10.1007/978-3-030-03774-1

Baker, T., & Smith, L. (2019). Educ-AI-tion rebooted? Exploring the future of artificial intelligence in schools and colleges. Nesta Foundation website: https:// media. nesta. org. uk/ documents/ Future_ of_ AI_ and_ education_ v5_ WEB. Pdf

Bianchini, F. (2025). Generative Artificial intelligence: a concept in progress. Philosophy & Technology, 38(2). https://doi.org/10.1007/s13347-025-00875-8

Biocca, F., & Delaney, B. (1995). Immersive virtual reality technology. In Communication in the age of virtual reality, (pp. 57–124). Hillsdale, NJ, US: Lawrence Erlbaum Associates, Inc.

Boninger, F., Molnar, A., & Saldaña, C. (2020). Big Claims, Little Evidence, Lots of Money: The Reality Behind the Summit Learning Program and the Push to Adopt Digital Personalized Learning Platforms. https://files.eric.ed.gov/fulltext/ED607124.pdf

Boyatzis, R. E., Stubbs, E. & Taylor, S. (2002), 'Learning Cognitive and Emotional Intelligence Competencies Through Graduate Management Education', Academy of Management Learning & Education 1(2), 150–162.

Brynjolfsson, E., & McAfee, A. (2014). The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies. W. W. Norton & Company.

Cambria, E., & White, B. (2014). Jumping NLP curves: A Review of Natural Language Processing research [Review article]. IEEE Computational Intelligence Magazine, 9(2), 48–57. https://doi.org/10.1109/mci.2014.2307227

Cantú-Ortiz, F. J., Sánchez, N. G., Garrido, L., Terashima-Marin, H., & Brena, R. F. (2020). An artificial intelligence educational strategy for the digital transformation. International Journal on Interactive Design and Manufacturing (IJIDeM), 14(4), 1195–1209. https://doi.org/10.1007/s12008-020-00702-8

Chan, C. K. Y. (2023). A comprehensive ai policy education framework for university teaching and learning. Int J Educ Technol High Educ, 20, 1–25. https://doi.org/10.1186/s41239-023- 00408-3

Chang, C., Hwang, G., (2021): Trends in artificial intelligence-supported e-learning: a systematic review and co-citation network analysis (1998–2019), Interactive Learning Environments, DOI: 10.1080/10494820.2021.1875001

Chiu, T. K., Xia, Q., Zhou, X., Chai, C. S., & Cheng, M. (2022). Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education. Computers and Education Artificial Intelligence, 4, 100118. https://doi.org/10.1016/j.caeai.2022.100118

Coen, M. H. (1994). SodaBot: a software agent environment and construction system. National Conference on Artificial Intelligence, 1433. https://dblp.uni-trier.de/db/conf/aaai/aaai94-2.html#Coen94

Cohen, S. P. (2002). A briefcase book: Negotiating skills for managers. London: McGraw-Hill. http://ci.nii.ac.jp/ncid/BA61296447

Cope, B.; Kalantzis, M.; Searsmith, D. (2020). Artificial intelligence for education: Knowledge and its assessment in AI-enabled learning ecologies. Educ. Philos. Theory, 1–17.

Ding D, Brinkman W-P, Neerincx MA (2020) Simulated thoughts in virtual reality for negotiation training enhance self-efcacy and knowledge. Int J Hum Comput Stud 139:102400. https://doi.org/10.1016/j.ijhcs.2020.102400

Dinnar, S. "Mooly," Dede, C., Johnson, E., Straub, C., & Korjus, K. (2021). Artificial Intelligence and Technology in Teaching Negotiation. Negotiation Journal, 37 (1), 65–82.

diSessa, A. (2000). Changing minds: Computers, learning and literacy. Cambridge, MA: MIT Press.

Ehlert, P. (2001). Intelligent driving agents: The agent approach to tactical driving in autonomous vehicles and traffic simulation. *Faculty of Information Technology and Systems*, 103.

Eidenmueller, H. (2024). The advent of the AI Negotiator: Negotiation Dynamics in the age of Smart Algorithms. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.4828339

Eidenmueller, H. (2025). Game Over: Facing the AI Negotiator. https://lawreview.uchicago.edu/online-archive/game-over-facing-ai-negotiator

ESCWA Report. (2022). The Arab region may be missing the Fourth Industrial Revolution: Arab skills are still stuck in the past. file:///C:/Users/Len/Downloads/arab-region-missing-fourth-industrial-revoloution-english.pdf

Faratin, P., Sierra, C., & Jennings, N. (2002). Using similarity criteria to make issue trade-offs in automated negotiations. Artificial Intelligence, 142(2), 205–237. https://doi.org/10.1016/s0004-3702(02)00290-4

Freire, P. (1972). Pedagogy of the oppressed. Herder and Herder, New York.

García-Peñalvo, F., & Vázquez-Ingelmo, A. (2023). What do we mean by GEnAI? a systematic mapping of the evolution, trends, and techniques involved in generative AI. International Journal of Interactive Multimedia and Artificial Intelligence, 8(4), 7. https://doi.org/10.9781/ijimai.2023.07.006

Gilster, P. (1997). Digital literacy. John Wiley & Sons, Inc

Gm, H., Gourisaria, M. K., Pandey, M., & Rautaray, S. S. (2020). A comprehensive survey and analysis of generative models in machine learning. Computer Science Review, 38, 100285. https://doi.org/10.1016/j.cosrev.2020.100285

Gori, M. (2017). Machine Learning: A Constraint-based Approach. Burlington, MA: Morgan Kaufmann.

Gratch, J., DeVault, D., & Lucas, G. (2016). "The Benefits of Virtual Humans for Teaching Negotiation," in Proceedings of the 16th International Conference on Intelligent Virtual Agents (IVA), 2016, Los. https://doi.org/10.1007/978-3-319-47665-0_25

Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does Gamification Work? -- A Literature Review of Empirical Studies on Gamification (pp. 3025–3034). https://doi.org/10.1109/hicss.2014.377

Haneya, H., AlKaf, D., Bajammal, F., & Brahimi, T. (2021). A Meta-Analysis of Artificial Intelligence Applications for Tracking COVID-19: The Case of the UAE. Procedia Computer Science, 194, 180-1

Hirschberg, J., & Manning, C. D. (2015). Advances in natural language processing. Science, 349(6245), 261–266. https://doi.org/10.1126/science.aaa8685

Holmes, W., Hui, Z., Miao, F., & Ronghuai, H. (2021). AI and education: A guidance for policymakers. UNESCO Publishing.

Houde, S., Liao, V., Martino, J., Muller, M., Piorkowski, D., Richards, J., . . . Zhang, Y. (2020). Business (mis)use cases of generative AI. In IUI 2020 Workshop on Human-AI Co-Creation with Generative Models, Cagliari, Italy. arXiv: 2003.07679

Hurd, P. DeH. (1958). Science literacy: Its meaning for American schools. Educational Leadership, 16, 13– 16, 52.

Jackson, D. (2010). An international profile of industry-relevant competencies and skill gaps in modern graduates. The International Journal of Management Education, 8(3), 29–58. https://doi.org/10.3794/ijme.83.288

Joost, N. K. (2009). Artificial intelligence. In Encyclopedia of life support systems. Eolss Publishers.

Jordan, M. I., & Mitchell, T. M. (2015). Machine learning: Trends, perspectives, and prospects. Science, 349(6245), 255–260. doi:10. 1126cience.aaa8415 PMID:26185243

Harvard Business School (2003). Harvard Business Essentials: Negotiation, Harvard Business School Publishing Corporation. Pages 1-11, 13-28.

Hendarman, A. F. (2012), 'Relationship among Soft Skills, Hard Skills, and Innovativeness of Knowledge Workers in the Knowledge Economy Era', Procedia - Social and Behavioral Sciences 52, 35–44.

Hopkinson, P. J. (2023, July, 17). One UAE university scrapped exams—why? https://www.thenationalnews.com/opinion/comment/2023/07/17/uae-university-education-exams/

Hussin, A., Salman, R., & Abdullah, M. (2021). The extent to which artificial intelligence techniques contribute to the development and improvement of e-learning applications "Libyan universities as a model". The 1st International Conference of the Faculties of Sciences. [File PDF] https://dspace.zu.edu.ly/bitstream/handle/1/1751/a4p3.pdf?sequence=1&isAllowed=y

Hwang, G., & Tu, Y. (2021). Roles and Research Trends of Artificial Intelligence in Mathematics Education: A Bibliometric mapping analysis and Systematic review. Mathematics, 9(6), 584. https://doi.org/10.3390/math9060584

Kajtazi, M., Holmberg, N., & Sarker, S. (2023). The changing nature of teaching future IS professionals in the era of generative AI. Journal of Information Technology Case and Application Research, 25(4), 415–422. https://doi.org/10.1080/15228053.2023.2267330

Kandlhofer, M., Steinbauer, G., Hirschmugl-Gaisch, S., & Huber, P. (2016). Artificial intelligence and computer science in education: From kindergarten to university. 2021 IEEE Frontiers in Education Conference (FIE), 1–9. https://doi.org/10.1109/fie.2016.7757570

Karhunen J, Raiko T, Cho KH. (2015). Unsupervised deep learning: a short review. In: Advances in independent component analysis and learning machines. p. 125–42.

Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., . . . Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. Learning and Individual Differences, 103, 102274. https://doi.org/10.1016/j.lindif.2023.102274

Kerby, R. (2023, April 14). The Rise of Artificial Intelligence: How It's Changing the Way We Live and Work - The Data Company. The Data Company. https://thedatacompany.com/the-rise-of-artificial-intelligence-how-its-changing-the-way-we-live-and-work/

Kim, J. M., Hill, R. W., Durlach, P. J., Lane, H. C., Forbell, E., Core, M., Marsella, S., Pynadath, D., & Hart, J. (2009). BILAT: A Game-Based Environment for Practicing Negotiation in a Cultural context. International Journal of Artificial Intelligence in Education, 19(3), 289–308.Kahn R, Kellner D. Reconstructing technoliteracy: a multiple literacies approach. In: Dakers JR, editor. Defining Technological Literacy: Towards an Epistemological Framework. Palgrave MacMillan; 2006. p. 253–74.

Kissinger, H.A., 1969. Nuclear Weapons and Foreign Policy. W.W. Norton, New York, USA

Klaus, P., Rohman, J. & Hamaker, M. (2007), 'The hard truth about soft skills: workplace lessons smart people wish they'd learned sooner'.

Kong, S. C. (2008). A curriculum framework for implementing information technology in school education for fostering information literacy. Computers and education, 51(1), 129–141.

Kong, S. C. & Zhang, G. (2021). A Conceptual framework for designing artificial intelligence literacy programmes for educated citizens. In S. C. Kong, Q. Wang, R. Huang, Y. Li, & T. C. Hsu (Eds.), Conference Proceedings (English Track) of the 25th Global Chinese Conference on Computers in Education, GCCCE 2021 (pp. 11-15). The Education University of Hong Kong.

Kong, S. C., Cheung, W. M. Y., & Zhang, G. (2021). Evaluation of an artificial intelligence literacy course for university students with diverse study backgrounds. Computers & Education: Artificial Intelligence, 2, Article 100026. https://doi.org/10.1016/j. caeai.2021.100026

Korteling, J.E.; van de Boer-Visschedijk, G.C.; Blankendaal, R.A.M.; Boonekamp, R.C.; Eikelboom, A.R. (2021). Human-versus Artificial Intelligence. Front. Artif. Intell, 4.

Latham, A., Crockett, K., McLean, D., & Edmonds, B. (2012). A conversational intelligent tutoring system to automatically predict learning styles. Computers & Education, 59(1), 95–109. https://doi.org/10.1016/j.compedu.2011.11.001

Lechheb, I. (2025, April, 15). Morocco ranks 42nd globally in AI adoption, shows fastest growth rate. Retrieved from https://en.hespress.com/108089-morocco-ranks-42nd-globally-in-ai-adoption-shows-fastest-growth-rate.html

Long, D., & Magerko, B. (2020). What is AI Literacy? Competencies and Design Considerations. Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems.

Lykourentzou, I., Giannoukos, I., Nikolopoulos, V., Mpardis, G., & Loumos, V. (2009). Dropout prediction in e-learning courses through the combination of machine learning techniques. Computers & Education, 53(3), 950–965. https://doi.org/10.1016/j.compedu.2009.05.010

Li, H. (2024). AI-Powered Negotiations: opportunities, challenges, and the future of business strategy. Transactions on Economics Business and Management Research, 13, 148–154. https://doi.org/10.62051/dg1trh68

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). Intelligence unleashed. An argument for AI in education. London: Pearson.

Ma, W., Adesope, O. O., Nesbit, J. C., & Liu, Q. (2014). Intelligent tutoring systems and learning outcomes: A meta-analysis. Journal of educational psychology, 106 (4), 901.

Makhlouf, M. K. I. (2021). Effect of Artificial Intelligence-Based Application on Saudi Preparatory-Year Students' EFL Speaking Skills at Albaha University. International Journal of English Language Education, 9(2).

Makransky, G., Thisgaard, M. W., & Gadegaard, H. (2016). Virtual simulations as preparation for lab Exercises: Assessing learning of key laboratory skills in microbiology and improvement of essential non-cognitive skills. PLoS One, 1–11.

McCarthy, J., Minsky, M. L., Rochester, N., & Shannon, C. E. (2006). A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence, August 31, 1955. AI Magazine, 27(4), 12. https://doi.org/10.1609/aimag.v27i4.1904

Mellor, N. (2024). Using AI to develop capabilities in Arab universities. In Studies in big data (pp. 247–258). https://doi.org/10.1007/978-3-031-52280-2_16

Mihelj, M., Novak, D., & Begǔs, S. (2014). Virtual reality technology and applications. New York London: Springer Dordrecht Heidelberg.

Ming Chia, Y. (2005), 'Job offers of multi-national accounting firms: the effects of emotional intelligence, extra-curricular activities, and academic performance', Accounting Education 14(1), 75–93.

Monahan, S., E. Johnson, G. Lucas, J. Finch and J. Gratch, "Autonomous Agent that Provides Automated Feedback Improves Negotiation Skills," in International Conference on Artificial Intelligence in Education, 2018. Moss, P. & Tilly, C. (1996), '"Soft" skills and race: An investigation of black men's employment problems', Work and Occupations.

Mostafa, S. A., Ahmad, M. S., Mustapha, A., & Mohammed, M. A. (2017). A concise overview of software agent research, modeling, and development. Software Engineering, 5(1), 8-25.

National Academies of Sciences, Engineering, and Medicine. 2016. Promising Practices for Strengthening the Regional STEM Workforce Development Ecosystem. Washington, DC: The National Academies Press. https://doi.org/10.17226/21894.

Nfida, M., & Houat, N. (2025). Challenges for implementing artificial intelligence in business negotiation classes in Moroccan higher education. In Atlantis highlights in social sciences, education and humanities/Atlantis Highlights in Social Sciences, Education and Humanities (pp. 307–322). https://doi.org/10.2991/978-2-38476-408-2_23

Nwana, H. S., & Ndumu, D. T. (1998). A brief introduction to software agent technology. In Agent technology (pp. 29-47): Springer.

Owoyemi, A., Owoyemi, J., Osiyemi, A. and Boyd, A. 2020. Artificial Intelligence for Healthcare in Africa. Frontiers in Digital Health. 2:1.

Pant, I. & Baroudi, B. (2008), 'Project management education: The human skills imperative', International Journal of Project Management 26(2), 124–128.

Pasquarelli, W. (2022, June, 14). 'Pushing forward: the future of AI in the Middle East and North Africa'. Economist Impact. https://impact.economist.com/perspectives/technology-innovation/pushing-forward-future-ai-middle-east-and-north-africa

Popenici, S. A. D., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. Research and Practice in Technology Enhanced Learning, 12(22), 1–13.

Pratt, J. a., Claire, E., Hauser, K. & Ross, S. C. (2009), 'IS Staffing During a Recession: Comparing Student and IS Recruiter Perceptions', Journal of Information Systems Education 21(1), 69–85.

Ralhan. (2016). India can learn from Finland phenomenon based learning system. Retrieved from https://www.hindustantimes.com/education/india-can-learn-fromfinland-s-phenomenon-based-learning-system/story-PMu4sT7KrUyYE6c7yI3RZO.html.

Rao, S. J., Iqbal, S. B., Isath, A., Virk, H. U. H., Wang, Z., S, B., Glicksberg & Krittanawong, C. (2024). An update on the use of artificial intelligence in cardiovascular medicine. MDPI, 5 (1), 91–104. https://doi.org/10.3390/hearts5010007

Renz, André & Hilbig, Romy. (2020). Prerequisites for artificial intelligence in further education: identification of drivers, barriers, and business models of educational technology companies. International Journal of Educational Technology in Higher Education. 17. 10.1186/s41239-020-00193-3.

Ritala, P., Ruokonen, M., & Ramaul, L. (2024). Transforming boundaries: How does ChatGPT change knowledge work? Journal of Business Strategy, 45 (3), 1–7. https://doi.org/10. 1108/JBS-05-2023-0094

Rubin, J. and B. Brown. (1975). The social psychology of bargaining and negotiation. New York: Academic Press.

Ruggeroni, C. (2003). Ethical education with virtual Reality: Immersiveness and the knowledge transfer process. Education, 119–133.

Ryan, M.-L. (2015). 2, Narrative as virtual reality 2: Revisiting immersion and interactivity in literature and electronic media (Vol. 2). JHU Press.

Saunders, D. M., & Lewicki, R. J. (1995). Teaching negotiation with computer simulations: Pedagogical and practical considerations. Negotiation Journal, 11(2), 157–167. https://doi.org/10.1007/bf02187234

Salen, K., & Zimmerman, E. (2004). Rules of Play. Cambridge, MA: MIT Press.

Sleeman, D. H. & Brown, J. S. (1982), 'Intelligent tutoring systems', Science (NewYork, N.Y.) 228(4698), 456–462.

Sanchez-Vives, M. V., & Slater, M. (2005). From presence to consciousness through virtual reality. Nature Reviews Neuroscience, 6(4), 332–339.

Sanchez, R. (2024, May, 18). Master the Art of Haggling and Negotiation in Morocco. https://blog.tajinequiparle.com/en/master-haggling-negotiation-morocco/

Schmid, A & M. Schoop, "Gamification of electronic negotiation training: effects on motivation, behaviour and learning," Group Decision and Negotiation, vol. 31(3), pp. 649-681, 2022.

Schulze-Horn, I., Hueren, S., Scheffler, P., & Schiele, H. (2020). Artificial Intelligence in Purchasing: Facilitating Mechanism Design-based Negotiations. Applied Artificial Intelligence, 34 (8), 618–642.

Selker, T. (1994). COACH: a teaching agent that learns. Communications of the ACM, 37(7), 92-99.

Shaikh, F. (2024, March 21). Deep Learning vs. Machine Learning – the essential differences you need to know! https://www.analyticsvidhya.com/blog/2017/04/comparison-between-deep-learning-machine-learning/

Shapiro, S. C. (1992). Encyclopedia of Artificial Intelligence. 2nd edn., Vols. 1 and 2. New York, Wiley.

Sheikh, H., Prins, C., Schrijvers, E. (2023). Artificial Intelligence: Definition and Background. In: Mission AI. Research for Policy. Springer, Cham. https://doi.org/10.1007/978-3-031-21448-6_2

Simmons, A., & Chappell, S. (1988). Artificial intelligence-definition and practice. IEEE Journal of Oceanic Engineering, 13(2), 14–42. https://doi.org/10.1109/48.551

Smith, D. C., Cypher, A., & Spohrer, J. (1994). KidSim: programming agents without a programming language. Communications of the ACM, 37(7), 54-67.

Smith, E. E., Kahlke, R., & Judd, T. (2020). Not Just Digital Natives: Integrating Technologies in Professional Education Contexts. Australasian Journal of Educational Technology, 36, 1-14. https://doi.org/10.14742/ajet.5689

Southworth, J., Migliaccio, K., Glover, J., Glover, J., Reed, D., McCarty, C., Brendemuhl, J., & Thomas, A. (2023). Developing a model for AI Across the curriculum: Transforming the higher education landscape via innovation in AI literacy. Computers and Education Artificial Intelligence, 4, 100127. https://doi.org/10.1016/j.caeai.2023.100127

Steuer, J. (1992). Defining virtual reality: Dimensions determining telepresence. Journal of Communication, 42(4), 73-93. doi: 10.1111/j.1460-2466.1992.tb00812.x

Taylor, G. (2021). Why Walmart is Turning to AI Tech for Supplier Negotiation. Sourcing Journal.

The Digital Morocco 2030. (2024) Strategy https://www.mmsp.gov.ma/sites/default/files/202409/PlaquetteInstitutionnel_18092024_Ang.pdf The Glossay of Education Reform. (2016, August 25). 21ST CENTURY SKILLS. https://www.edglossary.org/21st-century-skills/

The Merriam-Webster Dictionary, (1994). Merriam-Webster, Incorporated.

The Sprinklr Dictionary. (2025). https://www.sprinklr.com/customer-service-glossary/virtual-agent/

Thomas, M. (2025). Computer Simulations: Definitions, Examples, Uses. https://builtin.com/hardware/computer-simulation

Thompson, L. (1990). Negotiation behavior and performance: Empirical evidence and theoretical issues. Psychological Bulletin 108: 515–532.

Tomasevic, N., Gvozdenovic, N., & Vranes, S. (2020). An overview and comparison of supervised data mining techniques for student exam performance prediction. Computers & Education, 143, Article 103676. https://doi.org/10.1016/j.compedu.2019.103676

Tuomi, I. (2018). The impact of artificial intelligence on learning, teaching, and education. In Policies for the future, Luxembourg: EUR 29442, Publications Office of the European Union.

Torregrosa, B., & Sánchez-Reyes, S. (2011).: Use of authentic materials in the ESP classroom. Encuentro: Revista de Investigación e Innovación en la Clase de Idiomas, 20, 89-94. http://dspace.uah.es/dspace/bitstream/handle/10017/10109/use_torregrosa_ENCUENTRO_2011.pdf?sequence=1.

UNESCO. (2022). K-12 AI curricula: a mapping of government-endorsed AI curricula. United Nations Educational, Scientific and Cultural Organization.

UNESCO. (2023). Guidance for generative AI in education and research. https://wp.table.media/wp-content/uploads/2023/09/386693eng.pdf

Weller, M. (2018). Twenty years of EdTech. Educause Review Online, 53(4), 34–48

Whitmore, Paul.G., & Fry, J .P. (1974). Soft Skills: Definition, Behavioral Model Analysis, Training Procedures. Professional Paper 3-74.

Williamson, B., & Eynon, R. (2020). Historical threads, missing links, and future directions in AI in education. Learning, Media and Technology, 45(3), 223–235. https://doi.org/10.1080/17439884.2020.1798995

Wolff, A., Gooch, D., Cavero Montaner, J. J., Rashid, U., & Kortuem, G. (2016). Special issue on data literacy: Articles creating an understanding of data literacy for a datadriven society. Journal of Community Informatics, 12(3), 9–26. www.ci-journal.net/ index.php/ciej/article/view/1286.

Xin Y, Kong L, Liu Z, Chen Y, Li Y, Zhu H, Gao M, Hou H, Wang C. (2018). Machine learning and deep learning methods for cybersecurity. Ieee access.6:35365–81.

Yanes, N., Mostafa, A., Ezz, M., & Almuayqil, S. (2020). A machine learningbased recommender system for improving students learning experiences. IEEE Access, 8.

Yaseen, H. K., & Obaid, A. M. (2020). Big Data: Definition, Architecture & Applications. JOIV International Journal on Informatics Visualization, 4(1), 45–51. https://doi.org/10.30630/joiv.4.1.292.

Yinping, Y., & Singhal, S. (2009). Designing an intelligent agent that negotiates tactfully with human counterparts: a conceptual analysis and modeling framework. Paper presented at the System Sciences, 2009. HICSS'09. 42nd Hawaii International Conference on.

Zhang, X., Jiang, S., Ord´o˜nez, P., Pablos, D., Lytras, M. D., & Sun, Y. (2017). How virtual reality affects perceived learning effectiveness: A task – technology fit perspective. Behaviour & Information Technology, 36(5), 548–556.

AUTHOR BIODATA

Mohamed Nfida is a visiting teacher of English at the Polydisciplinary Faculty of Taza, Sidi Mohamed Ben Abdellah University, and the Sciences Faculty of Ibn Tofail of Kenitra, Morocco. Also, he is a PhD researcher in CEDUC Laboratory at the Faculty of Letters and Human Sciences in Oujda. His research interests include E-Learning and Communication, AIED, ESP, Soft Skills, and Negotiation Training. NFIDA has published extensively in peer-reviewed journals, collective books and conference proceedings.

Nassira Houat is a professor at ENCGO, National School for Commerce and Management. She is also an international Business English Trainer, and Certified International Neuro-language

Coach. Her research interests are online Course design, AI in education, Techno pedagogical innovation, Communication, and English for specific Purposes. Dr. HOUAT has published extensively in peer-reviewed journals, conference proceedings and collective books.