

X-RAY OF ARTIFICIAL INTELLIGENCE APPLICATION IN GUIDANCE AND COUNSELLING FOR EDUCATIONAL DEVELOPMENT

AKPO, JUSTINE AGIABEKONG

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY
FEDERAL COLLEGE OF EDUCATION, OBUDU

PHONE NUMBER: 08067381885, 08112325074

AYENI, MONICA AGOR

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY
FEDERAL COLLEGE OF EDUCATION, OBUDU

PHONE NUMBER: 09066697622

Monicaayeni10@gmail.com

&

IZAMA JANET KONGKIB

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY
FEDERAL COLLEGE OF EDUCATION, OBUDU

PHONE NUMBER: 07066158476

Janetizama2018@gmail.com

Abstract

Artificial intelligence is increasingly prominent in public, academic and clinical provinces. A widening research base is expanding AI's reach, including to that of guidance and counseling and educational development. This article defined AI and its relevant subfields, provides a brief history Psychological AI and suggest four levels of implementing AI in counseling, correspondence to time orientation and influence. The implications of Artificial Intelligence are highlighted to be applicable to counseling ethics, existentialism, clinical practice and public policy. The paper further highlighted various ways AI impacts in educational development and the challenges associated with AI in educational development. The application of AI in Guidance and Counseling, The differences between Role of AI and application of AI, impact on counselor Roles(the shift), The medium to distant future, i.e the dawn of Artificial general intelligence, The age of super intelligence, AI in Radiograph and medical imaging, Artificial intelligence (AI) and Educational development, impact of AI in Education, Core benefits of AI, Key Consideration for implementation, Suggestion on AI application in Educational development and Recommendations were all discussed. The article concluded by stressing that Artificial Intelligence is increasingly prominent in public, academic and clinical provinces, each implementation level sees AI growing more into the counselling field, but the present has seems an AI resurgence.

KEYWORDS: *Artificial Intelligence, Application, Guidance and Counseling, Educational Development.*

Introduction

The Term Artificial Intelligence was devised by Mathematics Professor John Mc Carthy, who helped to organize a Summer Conference at Dartmouth College in 1956 about whether Machines Could be Made to think. His proposal laid a basis for AI research. The concept Artificial Intelligence (AI) is the Simulation of human intelligence in Machines to enable them to learn, reason, and solve problems, often performing Tasks that typically require human Cognitive abilities. It powers everyday Technologies like recommendation systems to and chatbots, and encompasses subfield

such as machine learning and deep learning that allow systems to learn from data. While AI drives innovation in areas like healthcare, finance, and transportation, it also raise significant ethical, privacy, and employment questions.

Artificial Intelligence Techniques, though diverse, all fundamentally rely on data algorithms and Computational power. AI Systems learn and improve through exposure to vast amounts of data, identifying patterns and relationships that human might miss. AI application in guidance and Counselling is focus on Creating a “hybrid Support Model”

The Role of AI

AI Systems are designed to mimic Cognitive functions:

The role of AI defines the relationship between the human and the machine. AI originates from Computer Science research into Simulating human intellect Specifically learning, reasoning, and perception, with roots in mid-20th Century studies and the 1956 Dartmouth Conference and the ability to "see" and understand, such as through optical character recognition (OCR) for data extraction from images.

It acts as a tool for automating tasks, enhancing decision making, and solving Complex problems using data driven algorithms. The field was formally established in the 1950s, evolving from Symbolic logic to modern machine learning neural network, and massive dataset analysis. It's role is to augment human intelligence automating routine tasks (eg data entry) and accelerate Complex processes (eg medical imaging).

Learning: Adjusting to new data and improving performance over time through experience.

Language Understanding: Comprehending and translating spoken and written language.

Reasoning and Problem-Solving: Analyzing information to make Logical decisions and find solutions

Decision-Making: Using insights from data to make Choices.

Artificial Intelligence

AI application in Guidance and Counselling (G&C)

AI application in guidance and Counselling (G&C) is focus on Creating a "hybrid support model", where AI handles data analysis and routine check-ins, allowing human Counselors to focus on deep emotional work and Mentorship.

AI chatbots for mental health (eg woebot), predictive analytics for identifying at-risk Students, and personalized Career path mapping. These tools enhance accessibility, streamline administrative task for Counselors, and aid in personalized academic planning.

- 1) **Accessibility:** AI Can bridge the gap between Students and Counseling Services by providing accessible support anytime anywhere.
- 2) **Smart Study Organizer:** Applications like Notebook help Counselors and Students organize research and academic note into interactive Study
- 3) **Meeting Summarization:** Tools automatically summarize Counseling session and flag key Concern for follow-up.
- 4) **Wayhaven:** Offers adaptive guidance for Students managing everyday emotional challenges
- 5) **Liven:** Combines AI Conversational guidance with mood tracking and structured journaling to build long-term resilience.
- 6) **AI guides Students Career choice in via Schooligio:** AI is stepping up as a key guide for students making Career choices with traditional Counselors stretched thin (sometimes one for every 372 Students). Platforms like Schooligio use AI to give personalized advice matching your interest and grades to possible Career paths.
- 7) **Mental Health Care and Counseling Chatbot:** Tools like woebot and Slomia offer immediate support for anxiety, stress and behavioral health, reducing the stigma of seeking help.
- 8) **Administrative Support for Counselors:** AI automates routine tasks such as scheduling sessions, sending progress reminders and summarizing reports, freeing up time for direct student/counselor interaction.

The differences between Role of AI and application of AI

Role of AI, refers to the functional part AI plays especially when it can do on its own without the presence of a human, e.g. the difference in AI can see, the functional difference: AI does not have emotions & logic, while practical uses would implement algorithms. AI actually solve equations. This is with step-by-step solutions to while AI performs better. Algorithms based on logic, adaptation, and needs rules based on data. For businesses and individuals keen on exploring the power of AI understanding these differences is essential.

The fundamental difference between the role of AI and the application of AI lies in distinction between what AI does (function/behaviour) and where or how it is used (use case/Implementation).

Impact on counsellor roles (the shift)

- **-Techno-Counseling Capabilities:** Counselor must gain proficiency in using AI tools for data analysis and personalized student support.
- **From clerk to clinician:** As AI automates administration and data management, counselors can transition to higher-level empathetic and complex Counseling work.
- **-Partnership:** The future is Collaborative, with AI as an assistant to human Counselors, rather than a replacement.

An X-ray of Artificial Intelligence guidance and Counseling is not a literal X-ray image, but rather a Metaphorical examination of how AI is being integrated into the fields of guidance and Counseling. This integration involves using AI for tasks for personalized learning platforms, and virtual training simulations, and for assisting with ethical considerations, client support, and workflow management in Counseling. The 'X-ray' metaphor Suggests a deep look into the principles, applications, benefits and challenges of AI in these areas to understand its current state and future potential.

Artificial Intelligence (AI) plays an influential role in the mental health care of the future (Luxton, 2016). Many theorists and researchers predict AI to shape the existential future of life on earth (Muller, 2016) with special implications for jobs and Careers (Ross, 2017). Late physicist Stephen Hawking discussed AI potentially bringing about the end of humanity, stressing the importance of enacting safety measures including raising awareness and a deepened understand of the risks, challenges, and short- and long-term impact of AI development. Its believed that Artificial Intelligence relies on vast amount of data to be trained and to identify patterns. Machine learning and deep learning these are key technologies within AI that allow systems to learn and adapt without explicit programming.

Mimicking the Brain, AI systems study how the human brain processes information to develop smarter and more efficient ways of performing tasks.

Key application Areas:

The Key application areas of Artificial Intelligence in guidance and counselling include:

- **Virtual Counseling and Chatbots:** AI powered Chatbots (eg. Using GPT-based architecture) provide immediate, 24/7, and judgment-free support for student questions, mental health resources and emotional check-ins.
- **Ethical Concerns:** Rapid AI advancements bring challeges related to ethics, privacy, and potential impact on employment.
- **Automated Administrative Tasks:** AI reduces the bureaucratic burden on Counselors, handling scheduling, data entry, and report generation, enabling more focus on direct student interaction.
- **Regulatory Frameworks:** Policies like The E.U's AI Act aim to establish rules for governing and implementing AI responsibly.
- **Predictive Analytics for early intervention:** Systems analyze behavioral patterns (attendance, grade, engagement) to flag students at risk of distress, dropout, or failure, allowing counselors to intervene proactively.

- **Innovation:** AI is a driving force behind innovation, unlocking new value and shaping the future of technology and society.

Theory and Psychology of AI (Cozzioli, 2017).

This partnership aim to bring together activists and experts in other fields including psychology to discuss AI's current and future role and impact on society. Efforts are thus being made to approach AI as a societal shift with multidisciplinary implications. Specifically, the developers of AI are selected prudently seeking input from mental health professionals, as the psychological sciences have played a central role in AI development since its formal inception (Frankish and Ramsey, 2014). Counselors have forecasted AI to infiltrate their profession for some time. But only within the past decade have improvements in computer processing power and natural language processing ability, along with advancements in artificial neural network brought about a new wave of AI ability (Hirschberg & Manning, 2015). These advancements have positioned AI in the spotlight. The Artificial Intelligence Index (2017) Annual Report states, “Artificial Intelligence has leapt to the forefront of global discourse, garnering increased attention from practitioners, industry leaders, policymakers, and the general public” (p.5). AI research is advancing extremely fast.

Four levels of AI implementation in Guidance and Counseling.

The American Counseling Association (ACA) defines counseling as “a professional relationship that empowers diverse individuals, families and groups to accomplish mental health, wellness, education, and career goals” (Kaplan, Tarvydas and Gladding, 2014, p. 366). The definition can be broken down into three pillars of counseling: (a) forming a professional relationship, (b) empowering and (c) accomplishing goals. The act of Counseling requires the fulfillment of all three pillars. However, we might say that if one or two of the requirements are met by an AI, then That AI is getting closer to functioning as, if not, if not being a counselor. For example an AI capable of empowering an individual towards accomplishing a wellness goal is partially functioning as a counselor because two of the three requirements are met. If AI takes on a more prominent role in counseling, we should expect to see the functions of a counselor met – or potentially exceeded by artificial Intelligence. Based on the premise that AI has been and will continue to be applicable to counseling, I describe four levels of implementation:

Historical

Historical AI implementation in counseling establish a professional relationship and empowered people accomplish their goals to significant degree. Traditionally counselors have made little use of artificial Intelligence, Connections drawn between the two fields are indistinct and indirect. First level interaction involved chatbots showcasing rudimentary application of natural language processing (NLP), a field of AI Concerned with understanding and modeling human language (Tanans, Hallgren, Imel, Atkins, & Srikumar, 2016). The field of NLP has advanced from its 1960s inception such that complex models can now be applied via powerful computer-generated statistical processors to assess Statistical probabilities of sequences of words, inflection, and semantics in large Samples of natural language (Ignara et al., 2016). These progressions have led to A.I.-assisted programs designed for therapeutic use, (Dalfonso 2017).

Contemporary

Modern AI implementations in counseling establish a professional relationship and empower to an unknown degree, and likely help clients accomplish their goals to a some degree. Level two is marked by AI-assisted implementations in counseling backed by research. Contemporary implementation take two major forms, while the first is through text-based bots like Woebot, a text-based agent that employs Cognitive Behavioral Therapy (CBT) by conveying CBT self-help Techniques in conversation-like interactions with users.

Woebot has been shown to alleviate symptoms of depression and anxiety in young adults (Fitzpatrick, Darcy, and Vierhile, 2017). Another example is Tess, a psychological AI using an integrative theoretical orientation which included conversational, informational and CBT-like approaches. Research suggests that Tess can reduce depression and anxiety in college ctudents by

providing interventions applicable to real life through AI-generated conversations (Fulmer, Jevon, Gentile, Lakerink, & Rawns, 2018). The second form is through virtual reality, Ellie, termed a Virtual human interviewer, combines virtual reality with effective computing (Gaggioli, 2017b). Appearing on a screen as a virtual (human, Ellie is capable of analyzing a client's verbal responses, facial expressions, and vocal intonations (Darcy, Louie, and Roberts, 2016). In many respects, Ellie represents the highest level of today's therapeutic AI applications. Noteworthy are Ellie's abilities in assessing, as her capacity to identify distress indicators may prove beneficial in the diagnosis and treatment of post-traumatic Stress Disorder (PTSD), in addition to depression and anxiety (De Vault et al., 2014). Today's AI implementations show the utility of a wide range of counseling theories, with CBT being most prominent. There is movement beyond strictly text-based communication into visual and auditory domains as well as AI- based assessments that may lead to greater reliability in diagnosis (De Vault et al., 2014; Hahn, Nierenberg, & Whitfield-Gabrieli, 2016). Research is leading to improvement in data sensors, NLP, and general Machine learning by applying more complex models when computing communicative and behavioral systems as well as learning paradigms so that they may be implemented in computers. Coupled with research attesting to therapeutic-AI efficacy, AI may play a greater role in the counseling of the future. Levels three and four represent how that future may come to fruition.

The medium to distant future, i.e., the dawn of artificial general intelligence

Level three is characterized by the onset of Artificial General Intelligence (AGI). AIs at this level possess the expertise necessary to form professional relationships with clients. Additionally, an AGI would have the capacity of empowering and helping clients accomplish their goals. Modern AI is known as having narrow intelligence because it is designed to accomplish singular goals, like providing psycho-education.

In contrast, an AGI would be versatile, able to reach many goals and complete tasks in a way reminiscent of, or superior to, a human being (Yampolskiy & Fox, 2012). AGI has not been developed yet and experts differ on their predict a century or longer (Tegmark, 2017). Consequently the previous level, two, may encompass an extended period.

There is a stark difference between second and third level AI implementations to counseling.

The advent of an AGI built for the purpose of counseling would likely learn the art and science of the profession in its totality and swiftly. With a high-level skillset, and a capability of seeing a vast range of clientele "AGI counselors" would incite a host of ethical, legal, and philosophical questions. A prominent question will be if the AGI counselor is indeed establishing a professional relationship, with all the responsibilities and protections that implies; nevertheless, There is already copious discussion in the literature about the moral rights of conscious robots, including what constitutes consciousness and the moral responsibilities tied to it, and whether AIs can be developed to represent evaluative diversity (Tavani, 2018). There may be a Contrast between a body of research that suggests that AGI is effective a counseling (sometimes more so than human counselors) and those who fear a takeover and job loss from, the AGI. The fear of job loss from automation and eventually, AI is growing in many field but there (Ross, 2017). It is conceivable that the same fear would exist among counselors who may feel that their AGI counterparts have assumed that the same level of communicative and empathetic skills to completely replace them. Level three implementations of AI in counseling will constitute a fundamental change to the profession. For the first time, counselors may be more than human.

The Age of Super intelligence

Level four is characterized by 'super intelligence'. Such an AI would easily meet all three counseling criteria relationship, empowerment and goal accomplishment - along with other possibly more helpful and effective criteria not yet established by humans. The idea of a super intelligence was proposed by philosopher Nick Bostrom (2014) and refers to a high-level AI that far surpasses human-level intelligence. Superintelligence represents the time when AGI learns to the point of accomplishing goals of a Caliber impossible for human beings. The proficiency of such an AI is

unfathomable at this point. Some suggest the onset of high-level intelligence will usher in the next stage of human evolution (Reese, 2017), others fear its consequences for humanity (Bostrom, 2014), while others believe these fears to be unfounded (Agar, 2016). The age of Superintelligence remains conjecture. Nonetheless, Muller and Bostrom (2016) and the Future of Humanity Institute at Oxford University who Surveyed theorists and researchers doing technical work on AI found include:

AI in guidance and counseling have the following support

Ethical Support: AI Tools can provide access to guidelines and ethical frameworks, such as those from the national professionals navigate the complexities of using AI in practice.

Client Support & Workflow: AI is being explored for its ability to support client and streamline administrative tasks within the counseling field, allowing professionals to focus on client care.

Education Resource: AI-powered platforms can provide personalized learning experiences for professionals, adapting to their individual strengths and weaknesses.

AI in Radiography and Medical Imaging Image Analysis: AI, particularly deep learning, helps in detecting patterns, classifying conditions, and assisting in the diagnoses of medical conditions from X-ray images.

Clinical Support: AI Supports Clinical decisions-making by providing insights, such as identifying nodules and pneumothorax on chest X-rays.

Education Tools: AI-powered Simulations Create virtual learning environments for students to practice radiographic procedures, minimizing risk to real patients and enhancing understanding of complex anatomical structures.

Workflow Optimization: AI automates routine tasks and enhances efficiency in clinical imaging workflows, allowing radiologists to concentrate on more complex cases.

Regulatory Guidance: Professional bodies and regulatory agencies like the National Institute for Health and Care Excellence (NICE) are developing guidance for the safe and effective use of AI in medical imaging.

Challenges, the future and Ethical Concerns

Training and Education: There is an urgent need for formalized AI training for radiography and counselling professionals to ensure safe, effective, and responsible integration of these technologies into clinical practice.

Ethical and Practical Concerns: Challenges include the need for diverse and high-quality datasets for training AI, managing job security concerns among professionals and seamlessly integrating AI tools into existing workflows.

Technical Literacy and Training needs: Counselors often report a lack of knowledge on how to ethically and safely implement AI tools.

Data privacy and security: Handling sensitive students data requires strict adherence to privacy regulations, as data breaches pose significant risk.

Bias and fairness: AI models trained on skewed historical data may introduce biases into career or academic recommendations

Loss of Human Touch: Over reliance on AI may reduce the essential empathy and trust that characterize human counseling relationship.

Human-Machine Collaboration: The focus is shifting from AI overcoming human limitations to emphasizing the opportunities for collaborative work between human and Machines, with professionals playing a crucial role in validating and overseeing AI systems

Artificial intelligence (AI) and Educational Development

Artificial intelligence (AI) as applied to educational development entails transforming educational development by providing personalized learning experiences, automating administrative tasks for educators, offering intelligent tutoring systems, and enhancing teaching strategies through data analysis. While AI offers opportunities to improve learning access and effectiveness, particularly for diverse learners and in developing countries. It also presents challenges related to equity, potential bias, the need for new skills, and policy development. A human-Centered approach is

crucial to ensure AI serves as a tool for inclusion and equity, rather than widening existing educational divides.

Impacts of AI in Education

Personalized learning: AI algorithms analyze student data to adapt content, pace, and activities, providing tailored educational experiences that cater to individual learning needs.

Intelligent Tutoring Systems: AI-powered virtual tutors offer personalized guidance, instant feedback, and support, acting as collaborative partners for students.

Automated Tasks: AI automated tasks administrative burdens like grading and lesson planning, freeing up educators' time for more interactive and student-focus activities.

Early Identification of Struggling Students: By analyzing learning patterns, AI can identify students at risk of falling behind, behind enabling early intervention and targeted support.

Enhanced Teaching Strategies: AI tools can help teachers develop more effective and innovative teaching methods by providing insights into student performance and engagement.

Challenges and Inclusion

Equity and Inclusion:

Ensuring equitable access to AI technologies is vital to prevent widening the gap between well-resourced and under-resourced schools and Countries.

Bias and Ethics: AI system can embed existing biases, requiring careful development and ongoing oversight to avoid perpetuating inequalities.

Skill Development: The focus of education needs to shift towards problem-solving, Critical thinking, and Creative skills, rather than just rote memorization, to prepare students for an AI-driven world.

Human-Centered Approach: A fundamental principle is to ensure AI supports, rather than replaces, human interaction and Creativity in education.

Policy and Regulation: Rapid Technological advancements in AI for education have outpaced the development of necessary policy frameworks and regulatory guidelines.

Core Benefits of AI

Data Driven Decision Making: AI provides predictive accuracy for student outcome, allowing schools to allocate resources more effectively and personalize interventions.

Enhanced Accessibility and Scalability: AI bridges the Counselor-Students ratio gap, providing support to more students, particularly in remote areas without requiring Constant face-to-face Contact.

Proactive mental health support: Early identification of emotional distress or mental health issues through AI enables timely preventative Care.

Key Consideration for Implementation

- **Human-in-the-loop:** AI should Complement, not replace, human Counselors to ensure personalized Compassionate Care.
- **Infrastructural Readiness:** successful implementation requires addressing digital divides and providing necessary internet infrastructure.
- **Ethical Concern and Data privacy:** Ensuring data security and avoiding algorithmic bias is Critical in implementation of AI tools

Challenges

However, many challenges exist around development of AI tools in settings, and these are related to AI governance issues, regulations, accreditation validation and quality assurance of AI tools acceptance and trust in AI technologies by medical imaging professionals, AI education/training of professionals to name just a few. For these reasons, different professional societies in medical imaging have already issued guidance or position statements on practical considerations for AI implementation. There are concerns on AI reducing the person - centred skills of future professionals, and this can be mitigated by engaging in tailored, multi-disciplinary

educational initiatives, aimed at personalised care and optimal people management. This has been integrated in professional bodies' statements, requesting tailored AI training for radiographers with the focus being on patient care and treatment pathways. In this direction, the patients' voices should always be heard as key stakeholders in the adoption of AI.

For example radiography is arguably one of the most technologically advanced healthcare disciplines encompassing various technologies that continuously evolve with advancements in computing power and human knowledge.

Although the use of technology has always been extensive in the profession recent technological advances have focus on incorporating complex machine learning algorithms which have led to a change in clinical protocols that affect patient outcomes and radiograph practice.

Opinion statements and discussion pieces argue for the inclusion of AI education in undergraduate radiography curricula and appropriate education for current practitioners.

In addition, recommendations were made that higher education institutions must ensure that radiography curricula provide educational opportunities for patient-centred care in relation to AI integration to ensure competent and safe practice. With increasing automation in clinical tasks, patient-centred care will gain more importance, highlighting the need for academic curricula to prioritise patient-centred care. The evolving landscape of radiograph marked by the increasing integration of AI, raises important questions about how to best prepare future radiographers.

Suggestions on AI applications in education development

- **AI in educational development focuses on:** Shifting from one-size-fits to all, teaching to highly efficient personalized learning models
- Current trends prioritize empowering teachers with automated tools so they can focus on high-impact mentorship
- AI can act as a tireless assistant handling clerical burdens to free up instructional Time
- Automated Administrative work; use AI to handle grading objective assignments like quizzes, track attendance and manage scheduling,
- Predictive analytics; systems analyze student data to identify those at risk of falling behind, allowing for early intervention through guidance and counseling services.
- **Content Curation:** AI can condense textbooks into exam prep guides, including flashcards and practice
- AI is designed to augment not replace, the human element in teaching and counseling by handling routine tasks so educators can focus on social-emotional support.
- **Gamification:** AI driven games and simulations make complex subjects, guidance and counseling services like Stem more engaging through interactive storytelling
- **Intelligent tutoring System (ITS):** virtual tutors provide instant feedback and guidance outside of school hours
- **Special Education Support:** Tools like Speech-to-Text and real-time translation help students with dyslexia or language barriers participate fully.
- **Curriculum and lesson planning:** AI tools like Khanmigo can generate detailed lesson plans, rubrics, and discussion prompt in minutes.

Recommendation

Invest in Training: Provide ongoing professional development to counselors on interpreting AI insights, and managing AI driven, data-sensitive workflows

Establish Ethical Guidelines: schools must create clear, transparent protocols for data, handling and AI usage, ensuring human oversight.

Conclusion

An X-ray of Artificial Intelligence (AI) application in Guidance and Counseling reveals a transformative shift from reactive resource-intensive methods to proactive, data-driven, and personalized support systems. By 2026, AI is expected to handle routine administrative tasks, offer 24/7 students support via Chatbots, and enable early intervention for mental health, while creating a

need for new ethical frameworks and technical training.

By leveraging AI, educational development can move towards more inclusive, efficient and proactive guidance and Counseling services, significantly enhancing student well-being and academic success.

Each implementation level sees AI growing more into the fabric of Counseling. The past saw nominal AI implementation to the Counseling field, but the present has seen an AI resurgence. There are strong indications of more AI research in the European Commission, U.S., and China devote billions of dollars to funding such endeavors (Cath, Wachter, 2018).

References

- Bantam Dell.Green, B. P. (2018). Ethical reflections on artificial intelligence. *Scientia et Fides*, 6(2), 9–31
- Darcy, A., & Vierhile, M. (2017). Delivering cognitive behavior therapy to young adults with symptoms of depression and anxiety using a fully automated conversational agent (Woebot): A randomized controlled trial. *JMIR Mental Health*, 4(2), e19. doi: 10.2196/men-tal.7785Frankish
- Fulmer, R., Joerin, A., Gentile, B., Lakerink, L., & Rauws, M. (2018). Using psychological artificial intelligence (Tess) to relieve symptoms of depression and anxiety: Randomized con-trolled trial. *JMIR Mental Health*, 5(4). doi: 10.2196/mental.9782
- Gaggioli, A. (2017). Bringing more transparency to artificial intelligence. *Cyberpsychology, Behavior, and Social Networking*, 20(1), 68 June 2019Theory & Psychology 29(7):0959354319853045 DOI:10.1177/0959354319853045. Kansas State University.
- Lomuscio, P. Scerri, A. Bazzan, & M. Huhns (Eds.), *Proceedings of the 13th international conference on autonomous agents and multiagent systems (AAMAS 2014)* (pp. 1061–1068). Richland, SC: International Foundation for Autonomous Agents and Multiagent
- Lucas, G. (2014, May). *Simsensei kiosk: A virtual human interviewer for healthcare decision support*.
- Rose, D. C., & Kamowski, T. P. (2010). Deep machine learning. A new frontier in artificial intelligence research *Computational Intelligence Magazine*, 5(4), 13–18. doi: 10.1109/mci.2010.938364Artificial
- Russell Fulmer, (2019). *Artificial intelligence and counseling: Four levels of implementation Systems*. Domingos, P. (2015). *The master algorithm: How the quest for the ultimate learning machine will remake our world*. New York, NY: Basic Books