Artificial Intelligence in Business Communication: The Changing Landscape of Research and Teaching

Kristen M. Getchell[1] (iD)**, Stephen Carradini[2]** (iD)**,
Peter W. Cardon[3]** (iD)**, Carolin Fleischmann[4],
Haibing Ma[5], Jolanta Aritz[6], and James Stapp[7]**

Abstract
The rapid, widespread implementation of artificial intelligence technologies in workplaces has implications for business communication. In this article, the authors describe current capabilities, challenges, and concepts related to the adoption and use of artificial intelligence (AI) technologies in business communication. Understanding the abilities and inabilities of AI technologies is critical to using these technologies ethically. The authors offer a proposed research agenda for researchers in business communication concerning topics of implementation, lexicography and grammar, collaboration, design, trust, bias, managerial concerns, tool assessment, and demographics. The authors conclude with some ideas regarding how to teach about AI in the business communication classroom.

Keywords
virtual teams, business communication, collaboration, artificial intelligence, teaching, new communication media

[1]Babson College, USA
[2]Arizona State University, USA
[3]University of Southern California, USA
[4]Rosenheim Technical University of Applied Sciences, Germany
[5]LeapIn Technology (Shanghai) Co., Ltd., China
[6]University of Southern California, USA
[7]Cornell University, USA

Corresponding Author:
Kristen M. Getchell, Babson College, 231 Forest Street, Babson Park, MA 02457, USA.
Email: kgetchell@babson.edu

Artificial intelligence (AI) is changing the business landscape, including business communication: newly developed AI technologies offer to support, mediate, and facilitate business communication (Hancock et al., 2020). Some tools profess to help teams be more effective. Other tools purport to make difficult communication processes easier for a variety of stakeholders. For example, one of the most common current uses of AI in communication is to screen applicants who submit job applications. More than 380 services can be found offering this service to employers (Capterra, n.d.). Other tools, such as automated note-takers, create text as a service for business communicators and audiences. A range of functions will continue to develop as AI emerges, with the promise of changing the way humans communicate and collaborate in the workplace.

As business communication instructors, we need to consider how these new technologies can change the nature of team collaboration and communication. Mancha et al. (2020) argue that business schools in particular hold a certain responsibility for educating students about personal responsibility and ethics in digital transformation because of their ability to affect entrepreneurial ventures and organizational change. Like Mancha et al. (2020), we believe that business communication instructors share responsibility with business school peers for educating students about the uses and functions of AI in the workplace. In anticipation of greater proliferation of AI communication and collaboration tools in workplace contexts, we examined the current theoretical frameworks and practical business communication applications of AI technologies to support an ongoing strategy for integration of and teaching about AI in the business communication classroom.

Other business disciplines have already begun devoting significant attention to the potential AI has to influence their field. In the past 3 years alone, research in business disciplines such as marketing (Huang & Rust, 2021; Ma & Sun, 2020; Overgoor et al., 2019), management and organizational studies (Baldegger et al., 2020; Shrestha et al., 2021; van Esch et al., 2019), and information systems (Abbass, 2019; Bawack et al., 2021) has focused not just on examining current uses and functions of AI, but on developing strategic theoretical frameworks to aid decisions made about AI. As business communication researchers and instructors, we need to continuously consider how digital transformation can change the nature of communication and collaboration in the workplace. We hope this article helps develop a sustained conversation focused on understanding AI in business communication—what it is, what it is capable of, what it could be—with the goal of fostering further research and teaching inquiry related to the implementation of these technologies in the workplace.

What Is Artificial Intelligence?

Artificial intelligence is a broad term that typically serves as an umbrella term for technologies such as machine learning, deep learning, natural language processing, and computer vision. In this article, we primarily use the unifying term *AI technologies* to describe technologies that implement these many forms of AI.

One prominent current AI technology is known as a *machine learning algorithm* (Shane, 2019, pp. 8-9). Algorithms are the mathematical procedures on which AI relies

to solve the problems. Machine learning uses experience to learn and improve (Jordan & Mitchell, 2015). Instead of a programmer creating rules for the machine to operate, machine learning is a process by which the machine learns how to complete a task by trying to identify patterns or rules in training data (Goodfellow et al., 2016). The rules can be very small in number or very large in number. The data set being analyzed can be relatively small (such as a small business's internal communication) or enormous. The particular type of outcome can be simple or incredibly complex (Kumar et al., 2019).

Another prominent type of artificial intelligence technology is called *natural language processing* (NLP). NLP "explores how computers can be used to understand and manipulate natural language text or speech to do useful things" (Chowdhury, 2003, p. 51). While computers have manipulated text for years, the goals of NLP are to develop ways that computers understand the context and meaning behind words and sentences. Many methods are used for this task (see Chowdhury, 2003, pp. 56-59, for a detailed list of approaches; see also Qiu et al., 2020), but many rely on the computer seeing a wide array of uses of language and learning what words are often related to each other in certain contexts. Technologies that can formulate contextually appropriate text offer a wide array of uses in professional contexts, from customer service applications to brainstorming tools.

Despite their wide range of possible uses, AI tools using machine learning, NLP, and other models are currently best suited to achieving specific, narrow goals. The current level of effectiveness of machine learning algorithms and other types of AI technologies ensures that what we know today as artificial intelligence is artificial narrow intelligence instead of artificial general intelligence (Shane, 2019, p. 41). *Artificial narrow intelligence* means that AI technologies cannot deviate from a narrow, preassigned task. Current AI technologies are not *artificial general intelligence*, which would mean possessing an intelligence similar to a human's that can move from task to task on its own.

For instance, programmers can ask an AI to identify a cat because identifying a cat is class-specific identification (Le, 2013, p. 8595). AI can become very good at finding rules for identifying cats: two pointy shapes (ears) plus four long shapes (legs) plus a cluster of roughly radial lines (whiskers) could be a cat. An AI tool told to identify cats may decide that the Jacksonville Jaguars' logo is a cat, which is artificial narrow intelligence. The AI will not look up who the Jacksonville Jaguars' current starting quarterback is and remember that piece of information for future reference in football-related conversations. This sort of task-switching would be more akin to artificial general intelligence. Instead, AI technologies can only produce outputs based on the task programmers have put in front of it (Shane, 2019, pp. 41-43). Yet even artificial narrow intelligence can have powerful functions, for good and ill.

What Are the Current Functions of AI in Business Communication?

AI technologies are increasingly used to facilitate higher productivity and improved business communication. In this section, we provide a basic overview of the use and

function of some AI tools used for business communication and collaboration, including team communication and meeting tools, text-summarization tools, augmented writing tools, oral communication evaluation, and conversational agents.

Team Communication and Meeting Tools

Increasingly, AI technologies are used to improve team processes and collaborative performance (Fleischmann et al., 2020, 2021; Webber et al., 2019). Developers continue to explore how to use AI to listen to meetings, find information for meeting participants, and automatically create action items. These tools are far from perfect, but continue to develop in accuracy and usefulness (McGregor & Tang, 2017).

Currently, researchers are exploring how to use technology to account for elements of meetings such as side-talk, side-tracking, multitasking, meeting pretalk, and meeting posttalk (Niemantsverdriet & Erickson, 2017, p. 1). Furthermore, developers and researchers are exploring the many ways in which AI-assisted software can assist in team communication and collaboration (Porcheron et al., 2017). AI-assisted tools are emerging that can use recordings and transcriptions of team conversations to automatically predict the level of collaborative problem solving, diagnose problems with collaborative problem solving, and give team members advice about how to improve (Stewart et al., 2019). Developers and researchers are using platforms to capture many forms of team member behavior, including intensity of physical activity, proximity to colleagues and patients, speech activity and interaction, sentiment/social listening, and electrodermal activity peaks to evaluate team performance. For example, meeting platforms BlueJeans and Cisco's Webex recently launched gesture recognition features that provide a way for meeting participants to express themselves using physical gestures more effectively. WebEx Gestures allows participants to gesture—including thumbs up, clap, thumbs down, among others—to show sentiment while another person is talking.

Some researchers refer to this multimodal data as *collaboration translucence* (Echeverria et al., 2019). Many of these team communication and meeting tools are being integrated into other major collaboration platforms, including Microsoft Teams and Zoom.

Augmented Writing and Text-Summarization Tools

Most people are familiar with autofill features in email platforms, as well as grammar and tone checker tools such as Grammarly. Machine learning and NLP technologies support Grammarly (Markovsky et al., 2021), as well as other simple forms of these tools. More advanced forms of augmented writing continue to emerge, often providing recommendations and even composing various forms of business communication. For example, Textio composes job position announcements based on analysis of how tens of millions of job candidates have responded to job position announcements. It claims to use language that is more inclusive and less biased (including in areas of sexism, ageism, and ableism). This mainstream tool is used by over a quarter of *Fortune* 100

companies (Textio, 2020). Another remarkable example is GPT-3 (Generative Pretrained Transformer 3). GPT-3 is an "autoregressive language model"—a feed-forward model, which predicts the future word from a set of words given a context—with 175 billion parameters. Among its broad spectrum of capabilities, the most compelling is that in the few-shot setting (providing as many demonstrations as 10 to 100 to establish the model's context), GPT-3 can generate synthetic news articles which human evaluators have difficulty distinguishing from human-generated articles (Brown et al., 2020). However, even at that scale, GPT-3 still struggles with some tasks like natural language inference and reading comprehension. Similar technologies will continue to augment writing in other business communication contexts.

Communication Evaluation and Training Tools

A variety of software vendors have created tools to evaluate and help improve oral communication (Lee, 2020). These tools promise highly individualized feedback and learning that caters to the learner's level, pace, and needs (Schweyer, 2018). Business communication instructors may be familiar with platforms such as PitchVantage and Bongo that use AI technologies to give scores and feedback about pitch, tone, pace, verbal distractors, eye contact, and other elements of verbal presentation delivery. Similar tools are used in hiring environments. For example, HireVue provides automated assessments of video interviews. It automatically assesses job candidates in areas such as communication, personal stability, conscientiousness, and problem solving. This mainstream tool is used by over 700 companies as part of their hiring efforts (HireVue, n.d.). Similar tools that evaluate oral communication will continue to emerge in other business situations.

In addition to these services, a variety of products mine and analyze recorded voice and visual data. Text-summarization AI can assist with distilling information such as complex business reports (Naidoo & Dulek, 2022). Companies like Cision and Affectiva offer sentiment analysis tools with potential for internal and external organizational use. Affectiva's analysis goes beyond identifying tone to a more complex assessment of *human states* as a way of understanding human behavior. So far, these types of sentiment analysis AI technologies are being used internally in organizational collaboration, and externally in consumer and market research (Kleber, 2018; Somers, 2019).

Conversational Agents

Dialogue systems that respond to human language are called conversational agents and are often referred to as chat bots. A variety of these conversational agents allow people to work in many new ways. In basic conversations, AI-assisted tools can act as proactive search agents by listening to conversations and providing missing or useful information to meeting participants. These tools primarily help in simple conversations, but will increasingly support more complex conversations (Andolina, Klouche, et al., 2018; Andolina, Orso, et al., 2018). Researchers and developers recently tested

a conversational agent called Robota that successfully allowed employees to speak to it about their workdays. The conversational agent helped employees engage in reflection and self-tracking (Kocielnik et al., 2018). A variety of studies have explored the use of voice user interfaces for completing work tasks. For example, one recent study showed that financial analysts increased overall productivity and significantly reduced time to completion in six tasks when they used voice commands with an AI analyst assistant (Nematzadeh et al., 2019).

These conversational agents combine with other features to provide integrated services to individuals and teams. Many employees want digital reminders based on data from conversations from smart speaker systems (e.g., Amazon Echo). Similarly, people want digital assistants (e.g., Microsoft's Cortana) to plan meetings and make decisions (Brewer et al., 2017). Voice assistants in the workplace are increasingly useful and may be integrated effectively into workflows, according to emerging research.

A relevant example is Project Debater, the first AI system that can debate humans on complex topics. The system absorbs massive and diverse sets of information from multiple perspectives to build persuasive arguments and make well-informed decisions. It is worth noting that a screened list of topics was selected to ensure a meaningful debate at the initial demonstrations (Krishna, 2018). Developing technologies of this kind involves advanced research fields in AI technologies—especially in NLP—such as argument mining, argument detection, interaction with surroundings in a human-like manner, and sentiment analysis (Toledo-Ronen et al., 2020). For example, sentiment analysis should deal with idiomatic expressions, like "on cloud nine," and concern phrases, like "reduced bureaucracy," which often carry strong emotional content despite their literal meanings not bearing strong emotional content (Toledo-Ronen et al., 2018).

These are just some of the AI technologies currently entering the workplace. They could be deeply impactful, not impactful at all, or somewhere in between. They could be deeply unethical or highly virtuous in their use. Teaching people to understand the potential concerns regarding the tool should be considered alongside teaching the functionality of the tools.

Ongoing Challenges and Risks of AI in Business Communication

Despite their functionality, AI tools, and their large-scale implementation, are not without problems. AI technology has many possible uses in business communication and collaboration, but these capabilities need to be considered alongside the known, emerging, and potential challenges. Different researchers highlight the needs to adopt AI technology in the workplace safely by looking beyond performance metrics to risks of data privacy, security, and possible bias (Manyika & Sneader, 2018; Veale & Binns, 2017). Google massively uses AI technologies, but even their CEO Sundar Pichai called for regulation: "Now there is no question in my mind that artificial intelligence needs to be regulated. It is too important not to. The only question is how to approach it" (Pichai, 2020).

Bias

One major concern with these technologies relates to bias in decision-making processes. Algorithms mirror human biases and even reinforce them when trained with older data that contains semantic evidence of historic biases (Caliskan et al., 2017). Counter to the idea that AI is objective because it relies on math instead of emotions, AI can reproduce the bias of humans when making decisions (O'Neil, 2016). Because AI technologies learn from large amounts of data in an attempt to complete a task, the output of the AI is only as unbiased as the training data on which it learned. If the machine receives biased data, then the machine could produce results more biased than the original data, as it exaggeratedly tries to replicate patterns it found in its training. O'Neil offers the design concerns of transparency, simplicity, and stress-testing (testing the effectiveness of these technologies under a variety of conditions) to counter bias in AI design.

These are *design* concerns. How should people implementing AI think about bias in the machine? Can the user trust that the creator developed the AI with best practices, resulting in an unbiased tool? Questions around bias are particularly difficult because often the only choice for users when presented with a biased AI is to use it, not use it, or appeal to its designer to make it less biased. How should users know when to do each of the three?

AI bias is particularly damaging because AI technologies lack empathy, mercy, or emotions of any kind. AI cannot feel, use emotional intelligence, or deploy situational awareness. Some people want to use AI for exactly this reason: to offload hard decisions onto *the math* and justify actions. This desire is misguided, because many situations where people would like to avoid hard choices are particularly where humans are best suited: decisions regarding hiring, firing, and promoting are all complex human choices that require emotional intelligence and intuition, situational awareness, and nuance that current AI cannot approach. AI can sort massive amounts of data with impressive accuracy, but it cannot make decisions with emotional intelligence and intuition. While people in these situations can and perhaps should use AI to provide multiple scenarios and options (Gray, 2017), human judgment can take into account human factors that AI cannot evaluate. Mathematical justification of unemotional decision making is a potentially dangerous pitfall of AI use, especially in business communication situations where emotional IQ is becoming ever more necessary. In this instance, AI may affect business communication negatively, if content decisions are offloaded to AI that can make unethically biased evaluations. Business communication practitioners, scholars, and teachers must keep the possibility of bias in mind as they work with AI.

Inaccuracy

AI's reliance on good data and lack of emotional awareness lead to a trenchant critique of AI: by not comprehending any emotional context or being able to understand heterogeneous data, AI can come to incomplete or inaccurate results (Shane, 2019). If the

limitations of the tool and the data set are not acknowledged in advance, the results of AI analysis may be no more than very expensively created fallacies (Tambe et al., 2019). Even with good information, AI is best at *predicting*; humans are better at *judging*. Humans and AI working together in combination can work toward eliminating the shortfalls of both AI and solely human decision making (Agrawal et al., 2017).

Yet there are limits even to the success of AI's predictive powers. Facial recognition technology has been a prominent area of error and mistaken prediction in AI development. Despite rapid uptake by many organizations, prominent facial recognition software tools recognize Black and female faces correctly less often than White and male faces (Simonite, 2019). These ongoing inaccuracies have led to some change: In January 2021, HireVue announced that it stopped using facial recognition after significant criticism over possible bias in its proprietary algorithms (Kahn, 2021). Using facial recognition tools comes with significant risk for business communicators due to the known possibility of creating incorrect and potentially damaging communication based on output from facial recognition software. All AI tools must be viewed carefully for their potential effects on communication and collaboration, but facial recognition technology is particularly controversial.

Acting on inaccurate results from AI can produce legal and ethical problems. The legal responsibilities borne by creators of machine learning algorithms are currently unclear, leading to a higher amount of risk in using AI than a known tool. From an ethical standpoint, humans should be just as responsible for AI's outputs as they are for the outcomes of the tools they use in construction settings. Humans—not AI—should be blamed when the AI breaks something, just as humans are blamed when bridge bolts break—not the bolts themselves (Vorderbrueggen, 2013). However, not everyone sees AI as tools, as we will explain below in the *Machines as Teammates* section, and this view of AI complicates the legal and ethical norms surrounding responsibility for inaccuracy. Regardless, business communicators using AI tools need to be aware that inaccurate results regarding the outputs of the machine are possible.

Privacy

Another concern is data privacy. Data privacy is receiving considerable attention internationally, particularly in the European Union. Because AI technologies require large amounts of data to complete tasks, these large data sets can include information about user demographics, behavior, and communication. In response, there is growing concern with how these data are stored, used, and potentially shared. Recently products such as Amazon's Alexa are facing questions about privacy and security (Estes, 2019). Rules such as the EU's General Data Protection Regulation, the California Consumer Privacy Act, Data Security Law of the People's Republic of China (adopted June 10, 2021, effective September 1, 2021), South Africa's Protection of Personal Information Act, South Korea's Personal Information Protection Act, Australia's Privacy Act, and Argentina's Personal Data Protection Act offer varying levels of consumer protection and penalty for companies that use personal data improperly around the world (Mazzoli, 2021; Robichaud, 2020; Wall, 2018). Those using AI tools should be aware

of the potential dangers of misusing or potentially exposing data in whatever country or region the data comes from.

Proficiency and Use

A lack of knowledge about how to interact with AI and how to use recommendations provided by AI poses another issue. Employees often are not properly trained in how AI functions and what it actually does. This is sometimes known as the *black box problem*.[1] At its core, AI provides us with predictions. Yet, many people confuse these predictions with decisions. AI's predictions need to be evaluated by humans and only then serve as behavioral guidance (Agrawal et al., 2017). The most sophisticated models, such as GPT-3, even pose the challenge that humans can hardly recognize that they are dealing with AI, because GPT-3 generated texts are difficult to distinguish from human written texts. GPT-3 is not yet released for public use because of the danger of malicious use of the model (e.g., disinformation, fraud in academic essays; Brown et al., 2020).

But not only human knowledge about AI is lacking. Many AI tools still lack the necessary sophistication to provide reliable and valid results. This is due to algorithms and data availability. Simple, frequently occurring tasks may be completed successfully, but more complex, specific tasks often lack the necessary training data. One example are chatbots, which still fail to address anything but the most basic inquiries. While they are constantly improving, currently they still lack context-sensitivity, tone-sensitivity, and human intuition. Human communication is nuanced and ambiguous, which is even more difficult to decode for a machine than in human-human interaction. While many researchers want to train AI to respond to human emotions effectively (and ideally more uniformly than humans deal with human emotions), this effort raises complex ethical questions (Merriam, 2021). The ability of AI to accurately and uniformly respond to emotions is still not practical at a large scale but may someday be. Even more distant is AI using emotions, but business communication should be ready with ethical and practical responses (e.g., how to collaborate on a team with a note-taking AI that has emotions?) to this emerging concern.

Professional Standards

Professional organizations have published little regarding the social and ethical concerns of AI implementation. Scholars and authors have developed insights and ethical directives regarding the ethical implementation of AI in businesses, but relevant professional organizations are still working on adopting and encouraging such directives. Currently, professional organizations granting an increased focus on ethics and AI, such as The IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems, are focused on the *design* level. There is comparably little literature regarding the ethics and social responsibility of implementation and use of AI technologies from similar professional organizations. This lack of consistent guidelines around the ethical use of AI technologies in business is concerning, especially as organizations push to

integrate these technologies ahead of competitors. While McKinsey & Company includes an "Executive's Guide to AI" on their website that provides a foundational overview of key AI concepts in this AI "race," the authors fail to mention how to ethically implement these technologies (Chui et al., 2020). This is a severe oversight, as users must understand the social implications that come with implementing and using these technologies.

To address these and other problems related to the ethical implementation and maintenance of AI technologies, standards are needed. Smith and Green (2018) propose communication standards for leaders and all team members of teams that include AI. These standards build on some of the dilemmas that arise as a result of working with AI, such as lack of trust and emotional intelligence. These proposed communication standards are valuable because they refer to the implementation in teams, not just in design. The continued development of communication standards will only become more valuable as AI technologies enter the workplace in greater numbers. Research and education surrounding the social and ethical implications for AI use is necessary. This current study contributes to this need by helping instructors know where to begin the conversation with our students, but much more work is needed.

Frameworks for Understanding the Role of AI

One place to begin with social and ethical concerns surrounding AI regards frameworks for how to think about AI. These frameworks are ways of thinking about, contextualizing, and understanding what an AI is, what it does, and how it should be responded to. This section focuses on two frameworks: *AI as a Tool* and *AI Roles.*

AI as a Tool

The *AI as a Tool* (Houston & Walsh, 1996; Siddike et al., 2018) framework focuses on the technical nature of the operations which the machine is carrying out, and the powerful nature of the tool as something other and separate from humans. In this view, the lack of general intelligence makes AI technologies nothing more than a tool to produce an outcome. Even superhuman results do not affect how people using the AI as a Tool model think about AI. Le et al.'s (2013) model that identified cat faces (among other classes of object) contained 10 million images. The algorithm created 1 billion connections in response to those images in just 3 days (p. 1). As impressive as this number and speed of output is, thinking about AI as a Tool means this massive output is nothing more than a collection of patterns identified by a machine to do a task.

Applying the *AI as a Tool* approach to business communication is not much different than applying other technologies to business communication, such as internal and external social media (Crews & Stitt-Gohdes, 2012). The tools are pitched to serve a purpose. A company, team, or business communicator can choose the tool to fit that purpose. If the tool is not useful, too expensive, too difficult to use, or perceived as too unethical to the person or group choosing, then the person or group will not use the tool.

Similarly, teachers using and choosing AI technologies may find that the choice of AI is similar to the questions surrounding what teaching tools to use—be they LMS, social media, or other tools that have emerged in the writing space over the past 50 years. The same considerations and qualifications (practical, pedagogical, and ethical) that teachers and business communicators used and use for other tools of writing can be applied to AI.

AI Roles

Another framework seeks to differentiate ways of thinking about AI based on their cognitive assistant function. Siddike et al. (2018) developed a continuum of roles for cognitive assistants that range from tools to assistant to collaborator to coach to mediator (see Table 1). Babic et al. (2020) conceptualized a continuum of roles for AI that range from assistant to monitor to coach to teammate. We combine the frameworks of Siddike et al. (2018) and Babic et al. (2020) to illustrate how AI roles can be applied to business communication (see Table 1). While this table shows an indicative range of categorizations, these roles and applications are far from comprehensive.

Table 1 demonstrates the relationship between a technology's capability and the way a technology is being implemented within a team. With the exception of the teammate role, all roles are currently in practice, with the tool and assistant roles most common. Most professionals have used meeting captioning and transcription *tools* in platforms such as Zoom, Microsoft Teams, and Hangouts. Mainstream companies, such as WebEx, include note taking tools as part of their virtual meeting *assistants*. Nearly everyone has benefited from assistant-style autofill features as they write emails and texts, and these abilities are becoming more sophisticated. The *monitor* role is less ubiquitous, yet many examples exist. Many presentation training platforms, such as PitchVantage and Bongo, provide users with personalized evaluations based on speech content, pitch, tone, pace, and even nonverbal communication. Fleischmann et al. (2020) recently described how 109 virtual teams used a team platform that evaluated team members' conversational patterns, conversational content, and nonverbal communication to provide team dynamics scores. The *coach* role is even less common, yet emerging in use. Many customer service centers already use AI tools that provide real-time coaching to customer service reps about how to interact with customers based on their emotional states and past consumer behavior. While abundant research has explored the possibility of AI as teammates (Seeber et al., 2020; Zhang et al., 2020), AI acting like a human teammate is beyond current technological capabilities.

As professionals adopt AI tools for business communication, evaluating these roles and gaining consensus among team members about boundaries for these roles will be critical. Each role has practical and ethical considerations. The roles operate on a continuum in which moving from one stage to the next generally comes with increased risk of loss of human agency and loss of human privacy. Important conversations among team members would help ameliorate these risks.

Table 1. Roles of AI in Business Communication.

AI role	Characteristics of role	Current or potential applications
Tool	AI is used primarily for data processing and retrieval.	• Meeting captioning and transcription • Translation • Note taking in meetings
Assistant	AI serves as a recommendation system.	• Content recommendations (e.g., autofill in email and texts) • Language mechanics and style suggestions • Meeting and calendaring recommendations • Productivity advice
Monitor	AI evaluates communication performance.	• Presentation evaluation • Team communication assessment • Audience sentiment analysis
Coach	AI gives advice about how to improve communication performance.	• Presentation advice • Team communication and team dynamics guidance • Tailored advice for communicating to particular people and audiences
Teammate	AI works with people to make team decisions.	• Deep conversations that include humans and AI (extending Project Debater; see Krishna, 2018) • Consensus building among all partners, including AI

Artificial Intelligence Concepts for Business Communication Research

We have discussed the current state of functions, risks, and frameworks for thinking about AI. In each of these, we suggest that more research is needed to develop the technology further. In this section, we turn that call for research from the tools themselves to business communication's use of AI tools. Business communication sits at the intersection of the workplace and communicative activity, which gives the field a unique viewpoint from which to assess the use of AI in workplaces. Business communication scholars should contribute their unique viewpoint to the study of AI, as research on the topic will benefit the field and its students, as well as fill in gaps in other fields' research. In what follows, we offer a research agenda for business communication scholars regarding AI.

Implementation

Research on how the implementation of AI tools changes the social conditions surrounding communication in the workplace is needed. Many companies are already adept at considering the implementation of AI from a strategy perspective, but we find that there is a currently little-met need to consider implementation and use from a

social perspective. How does the implementation of AI change who people communicate with, what they say, and why they say it? Does the implementation of AI in an organization produce changes in management/employee or employee/employee communication habits? Will employees and managers embrace, tentatively accept, or reject the technology, and what effects will those decisions have on communicative practices in the workplace? Research regarding how AI impacts social functions and in turn affects communication practices will allow a better understanding of what AI technology to use and when.

Lexicography and Grammar

Studies of the lexical and grammar habits of people using AI-assisted communicative technologies are necessary. The ability of AI tools to recognize and translate spoken words to text is highly variable in quality; users of these tools may change their word choice or sentence structure in response to the tool. Certain types of words may be more or less frequent when using AI as opposed to non-AI-assisted communication. People may be more or less formal in their communication than they previously were. These and many other lexical and grammar aspects of communication should be investigated to continue determining the effects of different types of AI communication tools on communication.

Collaboration

While AI is being used in many ways to facilitate better teamwork and encourage more collaboration across business departments and units (Latinovic & Chatterjee, 2019), collaboration may also be affected negatively by AI tools. Employees have expressed concerns about privacy when a third-party technology is collecting and analyzing content of communication between two or more people (Cambre et al., 2019). Things that could previously be said in confidence between group members may not be able to be confidential if a machine is recording, transcribing, and storing the conversation (Cardon et al., 2021). This could in turn lead to people choosing to not say things that they are worried about being recorded. Meetings with AI might become the equivalent of email—all conversations would be on the record and everyone could be held accountable for things they said in meetings. This potential situation results in AI altering communication in collaborative settings, as people cannot or do not want to communicate in ways that they previously communicated, due to the AI's involvement. Investigating employees' responses to the tool in collaboration and any changes they may make to their communication because of AI is an important area of research.

Design

How an AI tool is designed may affect human communication when the AI is present. Emerging research suggests that people are influenced by the humanness of machines. Shamekhi et al. (2018) contrasted how a voice-only conversational agent and a

conversational agent with a face influenced group work. Participants perceived an embodied (with a face) conversational agent as generating a more positive experience than the voice-only conversational agent generated. Participants rated the embodied conversational agent as demonstrating more rapport, engendering more trust, and demonstrating higher capabilities than its voice-only counterpart. Yet, the influence on actual group decision making was less clear (Shamekhi et al., 2018). Thus, one critical design decision regarding AI-assisted collaboration technologies is the form they take. Many people argue for more human-like forms, which raises diversity issues. For example, the gendered nature of the voice holds practical and ethical implications (Daugherty et al., 2019). Some researchers support exploring power relationships in the human-AI interactions, expanding on the long trend of exploring power relationships in human-human interactions (Fast & Schroeder, 2020). All of these issues affect the potential communication effectiveness of teams that are implementing AI, and should be investigated further.

Trust

Trust is another fundamental issue in human-AI interaction. People tend to be skeptical or suspicious of AI technologies, especially when AI can influence important decisions (Davenport, 2018; Wilson & Daugherty, 2018). If a person chooses to work with AI technologies, the person first needs to be able to trust the technology. Once the person trusts the AI, then the person must convince other people to trust the AI technology—or at least trust the work of the person trusting the AI. Many concerns about trust exist: Is the AI making decisions in a fair way? Is the AI aware of and aligned to human values when tackling problems? Does the AI have the capability to explain its reasoning and decision making, or is it a black box? How does the AI handle the data that many AI technologies rely on? Who is responsible and accountable if an AI algorithm does something unexpected (Rossi, 2019)? The answers to these questions affect whether humans can trust AI, which is a direct influence on whether they can or should implement AI for communicative purposes.

Bias

Bias is another problem for AI. How should people implementing AI think about bias in the machine? Can the user trust that the creator developed the AI with best practices, resulting in an unbiased tool? Questions around bias are particularly difficult because often the only choice for users when presented with a biased AI is to use it, not use it, or appeal to its maker to make it less biased. How should users know when to do each of the three? Research should investigate how employers and employees perceive the choice of using, not using, or appealing biased tools. How do managers and employees know or test that an AI tool is biased? How much bias is too much bias for people? More research investigating how people perceive and make decisions regarding the adoption of potentially biased AI tools for communicative purposes is necessary.

Managerial Concerns

Many popular views of AI suggest that AI will replace humans in the workplace. Research opinion is split on whether or to what extent this is true (Marks, 2021). The workforce that managers manage may look different in the years to come, and this will have effects on managerial communication. More research is needed that investigates the impacts on individual workplaces and sectors of business regarding the impact of AI on management communication efforts and habits. Research on how current managers are making decisions about implementation and how their communication changes after implementation will be necessary.[2] Understanding managers' potentially changed relationships to and communication with employees and AI is also a need. Understanding the ability or inability to be open and transparent about how AI will be used within organizations (Wilson & Daugherty, 2018) is important as well. Research on these issues can provide employers and employees with information needed to make ethical, informed decisions about AI technologies in their workplace communication.

Tool Assessment

Scholars should assess various AI tools. In this early stage of the AI technology ecosystem, tools easily proliferate but just as easily disappear; companies fold or get bought out at a rapid pace. Assessing individual tools, then, is not as important as developing an understanding of how different types of tools, such as collaboration tools or conversational agents, function in their roles. This type of analysis may require using multiple tools of the same type in studies to assess what impacts can be analyzed across tools. Assessing individual aspects of tools may be valuable to this endeavor as well: homing in on the automated transcription function of several different AI tools, even if they have otherwise substantially different features, may be a way forward for this research.

Demographics

Scholars should explore perceptions of AI communication tools in a wide range of demographic populations. Disposition toward AI could change based on contextual factors such as age, level of professional experience, comfort level with communication, comfort level with technology, geographical location, and others. Investigating how certain contexts or experiences change perceptions toward AI will allow us to better understand acceptance of or resistance to these communication applications.

Standards

In addition to and following research on all of these topics, professional organizations should develop standards and guidelines around the social and ethical concerns of AI implementation. Collecting, summarizing, and disseminating the research of business

communication on artificial intelligence's effects on communication should be a priority of organizations such as the Association for Business Communication, the Global Association of Business Communicators, the Korean Association of Business Communicators, the Japanese Association of Business Communicators, and more.

Table 2 provides a summary of potential research questions for business communication scholars, displaying a large number of questions in a wide variety of topics: implementation, lexicography and grammar, collaboration, design, trust, bias, managerial concerns, tool assessment, and demographics. Some of these questions may require a specific method to research, while some of them are very broad questions that can be researched via many different methods and approaches.

Incorporating AI Concepts in the Business Communication Classroom

A teaching agenda should follow the results of the research agenda. Certain angles of approach currently offer themselves as promising ideas for teaching, given current research in this and other fields.

- *Use frameworks to guide discussion*. Several different frameworks exist to guide discussion around concepts in artificial intelligence (Babic et al., 2020; Executive Order 13960, 2020[3]; O'Neil, 2016; Siddike et al., 2018). Frameworks are valuable because they allow decision makers to assess the situation from multiple angles. A framework provides structure for the process but often leaves open many possibilities for action. Asking students to respond to case studies using frameworks could build students' awareness of ethical concerns. We also suggest the work of Mancha et al. (2020), who recommend teaching digital transformation through building technical digital responsibility, as well as reflective self-awareness, personal responsibility, and an understanding of ethical frameworks.
- *Align research and instruction with practices from current business environments.* Business communication teachers and researchers should consider partnerships that can expose students to professional guidelines and workplace implementations of AI technologies. Student understanding of workplace practices and organizational culture surrounding implementation of AI technologies, particularly in teams, is an area ripe for partnership.
- *Develop teaching practices to improve students' ethical proficiency alongside technical proficiency.* Students must learn to evaluate implications for use of AI tools in the workplace through methods such as case studies, in-classroom discussion, and other reflective exposure.

Business communication pedagogy is in the very early stages of addressing how AI technology will affect business communication. As AI technologies become more entrenched in workplaces, more developed in their abilities, and more ubiquitous in professional lives, business communication pedagogy should attend to the ways it is

Table 2. Research Agenda: AI in Business Communication and Collaboration.

Concept	Questions
Implementation	• What types of arguments are effective and ineffective in the decision to implement or reject AI tools in a workplace? • Does the implementation of AI in an organization produce changes in management/employee or employee/employee communication habits outside the tool? • Will employees and managers embrace, tentatively accept, or reject the technology? What effects will these acceptance positions have on communicative practices inside and outside the tool? What conditions or arguments affect their acceptance positions? • How do employees and employers understand, accommodate, and work with people who resist communicating using AI tools? • How do communicative practices using the AI technology change over time, from first implementation to mature use or sunsetting of the tool?
Lexicography and grammar	• Do users of AI technologies change their communicative habits in response to the technologies' features or limitations? Do they add words, omit words, lengthen their sentences, shorten their sentences, change levels of formality, modify politeness, adjust sentence structure, or otherwise adapt their communication? • If they do change in any way, do users of AI technologies change their communication habits in nontool communication in similar ways? • Do AI technologies concerning oral communication and AI technologies concerning written communication produce different lexicographical or grammatical effects? • How do tools affect word and sentence use in multilingual, international, and/or intercultural workplaces? In primarily non-English monolingual workplaces?
Collaboration	• Do AI technologies facilitate better or worse teamwork? Which tools? Under what conditions? What types of teams? • Do AI technologies encourage more or less collaboration on communicative products across business departments and units? Why? What types of collaborations? What types of communicative products? • How do AI technologies affect or change remote collaboration? • How does the AI tool encourage or interrupt preexisting ways of communicating in collaboration? • Does the presence of an AI tool concern or bother users of the tool? How so? Why? How do team members with different opinions about the AI tool communicate in collaboration?

Table 2. (continued)

Concept	Questions
	• Does the presence of an AI tool change what types of discussions teams have? What topics rise in prominence? What topics decline? • How do collaborators interact with or talk about AI technologies? Does this disrupt or change the communication in the team?
Design	• What design elements influence how people communicate with an AI tool? Are certain design elements more or less interesting, valuable, or instructive? How do tools with the same goals but different design approaches differ in the end product of communication? • How does the humanness of machines (Shamekhi et al., 2018) affect how people communicate with and about AI tools? How do apparent gender (or lack thereof), voice tone, age, skin color, hair type, hair color, hair style, facial appearance, clothing, abled or disabled body type, and other apparent markers of a human-like avatar affect how people communicate with or about an AI technology? • How does the un-humanness of machines affect how people communicate with and about AI tools? How do animals, inanimate objects (e.g., Microsoft Word's Clippy), or other personifications of the AI affect how people communicate with or about an AI technology? • How does the presence of an AI technology in team or workplace communication affect preexisting power relationships or develop new power relationships (see Fast & Schroeder, 2020)?
Trust	• What types of communicative moves do AI technology marketers do to engender trust in employers and employees? What types of communicative moves do employers make to engender trust in an AI technology from employees? What types of communicative moves to peers make to engender trust of AI technologies in other peers? • What aspects of the communicative AI technologies are seen as most trustworthy and least trustworthy? What aspects (interpersonal equity, data management, privacy, legal responsibility, clarity, etc.) must be trustable for employers, employees, and customers to use the technologies?
Bias	• Do users consider potential bias when choosing, implementing, accepting, or rejecting AI technologies? How so? How does their understanding of potential bias change the communication about AI technologies in the workplace?

(continued)

Table 2. (continued)

Concept	Questions
	• Do users trust AI tools? Do they expect unbiased results, biased ones, or a mix? Are users highly aware or bias while using the AI technologies or not very aware? How do managers and employees know or test that an AI tool is biased? How much bias is too much bias for people? • When presented with a biased AI technology for communicative purposes, will employees use it, not use it, or appeal to its maker to make it less biased? How should users know when to do each of the three? Do employers and employees perceive the choice of using, not using, or appealing biased tools differently?
Managerial concerns	• What impacts on individual workplaces and sectors of business do AI technologies as a whole and AI technologies individually have on managerial communication? • How does the day-to-day role and daily communication efforts of a manager change in the presence of AI tools? How is it changed? How much? Why? • How much ability do managers have to influence, critique, or add to decisions about implementation of AI technologies? • How do current managers make decisions about implementation of AI tools? How does managerial communication with employees and upper administration change after implementation? • How comfortable are managers in teaching and training employees to use AI technologies in formal and informal roles? How comfortable are managers in teaching about ethical considerations of AI technologies? How do managers navigate the tensions of implementing communicative AI technologies about which they may have mismatched feelings with the administration, employees, or both?
Tool assessment	• How do specific tools work? Which ones are effective or ineffective at their task? Are particular classes of tools more or less effective? What tools are too difficult or time-consuming to be useful? How do tools compare with each other? • Are particular tools more or less ethical in their function? What aspects of the Terms of Service, User Agreements, or other materials are prominent? What types of ideas/concepts/language should cause users to seek out or reject AI technologies? Does the function that the materials suggest match the actual use and outcome of the AI technology?
Demographics	• How do perceptions of AI communication tools differ in populations that differ in age, gender, cultural background, first language, level of professional experience, comfort level with communication, comfort level with technology, geographical location, length of time with the company, and amount of time in management? How do students and professionals view technology differently? How do clients/customers view use of AI technologies?

becoming entrenched, developed, and ubiquitous. Business communication students' awareness can and should extend farther than the technical know-how needed for using AI tools. We encourage business communication teachers to continue to develop students' awareness of practical, ethical, and social implications for AI tools in business communication.

Conclusion

AI technologies will contribute to business communication in the future, and business communication should prepare for this. One reason we are certain that this prediction will come true is that AI technologies already contribute to business communication in a variety of ways. While ethically minded business communication teacher-scholars should not uncritically welcome all developments in AI for business communication, staying aware of the developments in this area of the field would serve our students and the field well. Teaching students to understand the social effects of integrating an AI note-taker into a meeting and researching how jobseekers write in response to AI screening systems are equally important ways that the field can push forward in understanding AI.

The future directions for the study of AI in business communication are as wide and varied as the ends to which developers and researchers are using AI technologies. The potential methods for these studies are as diverse as the topics: workplace studies, surveys, classroom research, corpus analysis, qualitative close reading, and interviews are but a few of the ways forward to investigate these new technologies. Because AI is rapidly integrating into business communication in a variety of ways, business communication researchers with an interest in AI already have a vast array of options available to study. These studies can build on work from other fields and from open questions suggested in Table 2. We look forward to a breadth of studies that develop knowledge about AI technologies for business communication and general audiences.

Similarly, teachers with an interest in teaching technology in the business communication classroom already have a wide array of AI technologies available to teach about and with. As teachers develop methods and approaches to teaching the practical, ethical, and social aspects of AI in business communication to students, we look forward to reports of innovative ways to address these issues with students.

Business communication is the study of oral and written communication in workplaces. AI technologies contribute to, mediate, and even create oral and written communication, and thus the work of AI technologies falls under our purview. While some business communication teacher-scholars may become experts/researchers of AI technologies, we look forward to the future where many teacher-scholars add AI technologies to the list of topics that they know and teach to students as part of their courses.

ORCID iDs

Kristen M. Getchell https://orcid.org/0000-0002-4064-2636
Stephen Carradini https://orcid.org/0000-0001-6805-6279
Peter W. Cardon https://orcid.org/0000-0002-4574-4439

Notes

1. A "black box" refers to a computer process that cannot be investigated, due to proprietary or complexity reasons. Some technologies are black boxes because their creators will not let researchers look at the code that produced the software. Some technologies are black boxes because even their creators are unsure how the AI's answers were produced (Knight, 2017).
2. Regardless of the long-term societal impacts, forward-thinking business leaders should challenge the assumption that AI is always smarter than employees, even if advocating for use of AI technology; see above about narrow AI.
3. The large set of principles in U.S. Executive Order 13960 (2020) states that AI being used or designed for federal use should be "lawful and respectful of our [n]ation's values; purposeful and performance-driven; accurate, reliable, and effective; safe, secure, and resilient; understandable; responsible and traceable; regularly monitored; transparent; and accountable." Other frameworks look at slightly-to-greatly different aspects of AI technologies' implementation.

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Author Biographies

Kristen M. Getchell is an associate professor of business communication in the Division of Marketing at Babson College. She teaches courses in business writing, communicating in global virtual teams, persuasion, and behavior change. Her current research focus is on the history of business communication education in American colleges.

Stephen Carradini is an assistant professor of technical communication at Arizona State University. He teaches courses on social media, history of technology, and digital ethics. His current research is on the writing of Kickstarter campaigns and the historical development of smart home technology.

Peter W. Cardon is a professor of business communication and academic director of the MBA. PM program at the University of Southern California. He researches virtual team communication, leadership communication on digital platforms, the intersection of emerging technologies and workplace communication, and cross-cultural communication, with a focus on China.

Carolin Fleischmann is a professor of international business at Rosenheim Technical University of Applied Sciences in Germany. She specializes in research topics at the intersection of technology, international management, and business communication. She is particularly interested in how multicultural virtual teams communicate using advanced digital communication platforms.

Haibing Ma is the chief algorithm officer at LeapIn Technology (Shanghai). His research focus is on algorithms in deep learning, and technologies used in business communication.

Jolanta Aritz is a professor of business communication at the Marshall School of Business at the University of Southern California. She teaches business communication courses and researches virtual team communication, small group communication, and cross-cultural leadership.

James Stapp teaches management communication in the Dyson School of Applied Economics and Management in the SC Johnson College of Business at Cornell University. He focuses on research in the areas of persuasive communication, management communication, and cross-cultural/computer-mediated communication and engages with industry through executive and professional development outreach.