Expositions

Language Education in the Era of Digital Technology

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As the use of digital technology continues to increase, the types of communicative competencies that are needed are also evolving. In this paper I focus on people born after 2000 (referred to as the "digital generation") and propose that the purpose of language education is to assist learners to develop communicative competence for this new era of digital technology. I argue that language educators should use digital technology itself as a pedagogical tool while adapting it to learners' own linguistic behaviors and cognitive styles. Furthermore, I argue that communicative competencies must be conceptualized broadly so that they can cover both verbal and nonverbal elements. Given the advantages and disadvantages of digital technology, the role that teachers and parents play is critical in helping students develop the communicative competencies needed by this new generation.

デジタル・テクノロジーの使用が高まるにつれ、デジタル時代に必要なコミュニケーション能力も変わりつつある。本論文では、2000年以降に生まれた子供たち（デジタル世代と呼ぶ）に焦点を当て、彼らがデジタル時代に必要なコミュニケーション能力を習得するための手助けすることに言語教育の目的があると提案する。そのためには、学習者の言語行動や認知スタイルを考慮しつつ、デジタル・テクノロジーを指導の手段にとして取り入れていくことが大切である。コミュニケーション能力も、言語要素と非言語要素の両方を加味した広義で柔軟なものとしてとらえる必要がある。デジタル・テクノロジーには利点も課題点もあることから、デジタル世代が必要なコミュニケーション能力を習得するために、教師や保護者が果たす役割は非常に重要である。

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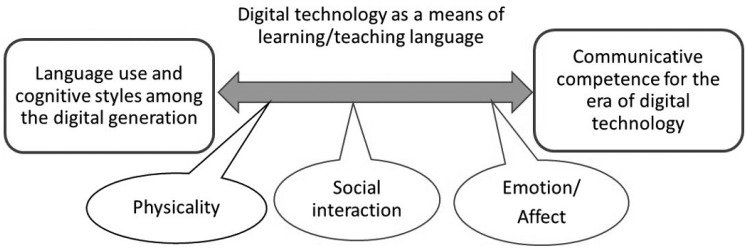
Advances in digital technology have drastically changed how language is used and, in turn, what counts as communicative competence in language learning. For example, reading used to be considered as an act of processing linguistic information from written texts. Nowadays, however, reading often requires processing multimodal texts that include nonlinguistic, audio, and visual information. Digital technology has also changed the way that people learn languages. In Japan, for example, thanks to a recent government policy—Global and Innovative Gateway for All (GIGA)—tablets are provided to all Grade 1 to 9 students (MEXT, 2021). As such, students and teachers are expected to use such digital technology, or Information Communication Technology (ICT)[1], for learning and teaching. Many rapid changes in language use through digital technology demand new approaches to language education and communication.

The aim of this paper is to discuss how language educators should envision language education in the era of digital technology; that is, *how can digital technology serve as a bridge between the ways that people learn and use languages, and how does digital technology affect people's view of communicative competence,* as illustrated in Figure 1. In this paper, therefore, I first illustrate how students currently use digital technology and discuss potential differences in preferred cognitive styles between the digital generations and previous generations. Next, I address three core elements of human language use—physicality (the roles of bodies), social interaction, and emotion/affect—that language educators should keep in mind when using digital technology for teaching and learning. Following my discussion of these core elements, I propose the concept of *communicative competence in the digital era,* and I offer some pedagogical suggestions to foster such competence.

Adolescents who grew up with digital technology have been referred to in various ways, including *digital natives, homo digitals, digital youth, generation Z, cyber citizens,* and *netizens* (Hockly, 2011). I use the term *digital generation* in this paper to refer to children and youth born after 2000. This generation (and particularly members of this generation in developed countries including Japan) are presumably familiar with digital technology.

Figure 1
Language Education in the Era of Digital Technology (adapted from Butler, 2021, p. 281)



Language Use and Cognitive Styles Among the Digital Generation

Because the digital generation mostly grew up with digital technology, these children and youth likely have unique linguistic behaviors and cognitive styles, including their preferred ways of information processing, and their use of cognitive strategies (Butler, 2021). Thus, to maximize the effect of language education for this population, we must understand their digital use and cognitive styles.

On average, the digital generation spends substantial time on screens. In Japan, the Information and Communication Policy Research Institute (ICPRI), a governmental agency, releases statistics on citizens' media use every year. According to the most recent report (ICPRI, 2021), Japanese teens preferred the Internet to TV (i.e., real-time TV watching). The most popular Internet activity in 2020 was watching videos, followed by using social media; Japanese teens spent an average of 90.2 and 72.3 minutes, respectively, on these activities each weekday—and these times increased during the COVID-19 pandemic. They regularly engaged in multitasking such as doing homework while listening to music and checking social media. Similar tendencies have been found in nearly all other developed countries (OECD, 2019a).

Twenty years ago, Prensky (2001) proposed that the generation of people who grew up with digital games—or what he called the *game generation*—may have different cognitive styles and preferred strategies compared to earlier generations. According to Prensky, the game generation is much faster at processing information and is skillful at processing multiple information inputs simultaneously. Graphics are not subordinate to text for this

generation, unlike for previous generations. The game generation prefers to be connected to others, such as their peers. Prensky also suggested that members of the game generation are much quicker to master new technology and that they do not make a clear distinction between *play* and *work*. One can argue that Prensky's proposal oversimplified and perhaps even sensationalized children's attitudes and behaviors, but the idea of potential differences in cognitive style between the game generation and previous generations is worth considering.

Today, social media is a major communication tool for the digital generation. Compared with earlier generations, the digital generation is increasingly fond of using certain types of social networking services (SNS), such as YouTube, TikTok, and Instagram, that rely more heavily on videos and photos than on text (ICPRI, 2021). Their preference for graphics over texts may have become more prominent. They are also accustomed to always being connected to other people through SNS. For teens, social media remains a major source of news and other information. They prefer to use SNS because they can access information that *they want to know* (Watanabe, 2019), suggesting a possible danger of accessing information in a biased fashion. In doing so, they may miss the opportunity to access diverse views and counter perspectives. It is also concerning that students who spend greater time on SNS tend to pay less attention to the credibility of the information source and accept information less critically (Tsuzuki et al., 2019).

The language that is often used in SNS is called *text-speak* in English and *uchikotoba* in Japanese. Both text-speak and *uchikotoba* are creative (to make texting efficient) and playful languages, full of initialisms, blending, shortening, and substitutions. Although English text-speak tends to play with sounds, Japanese *uchikotoba* tends to play with letters and orthographies, reflecting their respective orthographic systems. Messages are shorter and simple in structure and often exchanged at the word and phrasal levels. Emoticons are also frequently used in SNS, along with text or in place of textual information. Language in SNS can be considered a visualization, with unique characteristics, of spoken language (Butler, 2021).

Concerns have been raised about the excessive use of SNS and the potentially negative influence such usage might have on children's physical and mental health (e.g., Hansen, 2020) as well as academic achievement (e.g., Arai, 2018). However, the impact of SNS use on the digital generation's text-based, traditional literacy development is inconclusive at this point. Empirical studies, mostly conducted on English text-speak in the context of first language (L1) development, have generally shown mixed results; it

remains a matter of "Gr8 Db8" (Great Debate). When it comes to children, although long-term use of SNS tends to be correlated with lower literacy skills, the use of text-speak itself can lead to higher phonemic awareness, which in turn can contribute positively to literacy skills. Children with higher literacy skills tend to create and/or process text-speak more efficiently. It looks like there is a positive, spiral relationship between the use of text-speak and literacy development among English-speaking children (e.g., Coe & Oakhill, 2011). Potential positive effects on children's phonemic awareness may be largely due to the characteristics of English text-speak; one needs to have a sophisticated phonemic awareness to get the most out of text-speak. Little is known, however, about the impact of Japanese *uchikotoba* on the Japanese digital generation's literacy development. Considering the characteristics of *uchikotoba*, it might not be reasonable to expect it to have the same merits for literacy development that English text-speak has. In contrast to research on children's literacy, studies of college students tend to show either no or negative effects of SNS use on literacy, even in English (e.g., Rosen et al., 2010). This might be because one may need sufficient exposure to academic texts to develop high levels of literacy skills in academic contexts, but the relationship between the use of SNS and access to academic texts is unclear. Moreover, given that we are in the era of abundant digital technology, it is reasonable to question the validity of the traditional literacy measures that were used in these studies.

The digital generation's reading habits are also changing as more digital texts become available; they increasingly prefer to read on screen (Butler, 2021). Based on recent meta-analyses (e.g., Clinton, 2019; Singer & Alexander, 2017), the mode of reading makes a difference in comprehension, depending on conditions. For example, at least at this point, reading on paper has some advantages in terms of comprehension when reading long texts (longer than 500 words for English texts), when reading expository texts (no difference in narrative texts), and when the reading requires critical and inferential thinking. Print reading also helps the reader to encode specific details and to self-evaluate their comprehension. As the digital generation gets more accustomed to reading on screen, however, these tendencies may change.

Furthermore, digital reading is often accompanied by unique attributes such as hyperlinks and visual and audio information. Hyperlinks can be useful and potentially promote autonomous learning, but depending on how they are structured, how readers use them (e.g., how often they click them), and how many cognitive resources readers have, hyperlinks can be a distractor for comprehension (DeStefano & LeFerve, 2007). With respect to

reading speed, print reading takes longer when reading texts only, whereas digital reading takes longer when the texts are accompanied by visual representations (Clinton, 2019). These findings suggest that the meaning-making process when print and visual representations are combined may be different between reading-on-paper and reading-on-screen.

To maximize digital technology for language education, understanding technology's pros and cons is as important as using it properly and strategically for a given purpose. If students are immersed in information-heavy digital environments without effective strategies, they may find it difficult to construct the accurate meanings that they need from the information. Critically, there seem to be substantial individual differences in multimodal processing among members of the digital generation, although the details are still not well known (Butler, 2021).

Important Elements of Language Use When Using Digital Technology for Language Education

As noted above, the digital generation is heavily involved in activities using digital devices and, therefore, they may have distinct cognitive styles and strategies. However, in Japan, the digital generation does not use digital technology for academic purposes as much as their counterparts in other developed nations (OECD, 2019b). Greater use of digital technology for academic studies is urgent and indispensable, but it needs to be carried out while attending to the roles of physicality (the role of human bodies), social interaction, and affect, given that these three elements are the very basis of human language communication.

First is the importance of physicality, or more precisely the role of human bodies, in language use. When people converse, gestures, back-channel behaviors such as nodding, and eye contact are all critical components of communicating a message. In fact, one theory claims that language evolved from gestures (Corballis, 2009). Although substantial individual and cultural differences in the use of gestures and back-channel behaviors exist, it is known that if people are restricted from using physicality, they feel uncomfortable, and their work productivity decreases (Bailenson, 2020). For example, consider what happened during the COVID-19 pandemic, when millions of people moved their meetings and classes online. Many of them reported feeling easily tired or uneasy during these virtual gatherings, perhaps because people in online interactions often have insufficient access to gestures or back-channel behaviors, especially when they mute their audio and/or turn off their video functions (Bailenson, 2020).

Human bodies play an important role not only in oral communication but also in reading and writing. People can enhance their memory by writing things down by hand, for example. When reading on paper, people often manually prepare pages to turn efficiently (e.g., sticking a finger between pages), and the position of the hands often plays a role in guiding our eyesight. In other words, hands can play an important role in the effective use of cognitive resources (Shibata & Omura, 2018). Because people read texts not only with their eyes but also with their hands, digital technology for reading and writing should not interfere with people's use of their bodies.

Second, social interaction is central to the implementation of language activities. Babies and young children do not pick up much language (either first or second language) by merely watching videos or interacting with digital books. Verbal and nonverbal interactions with parents and other adults using and engaging with the videos and digital books are critical for young children's language development (Butler, 2021). In other words, human interaction is essential in order to help children develop language using digital technology. Therefore, when using digital technology for language learning and instruction, it is important to ensure a sufficient number of high-quality, two-way interactions.

Another important basis of language use is that people use language not only for transmitting information but also for expressing the third element of communication, sharing emotion/affect. Infants exhibit their ability to empathize with others as early as 12 months of age if not earlier (Decety, 2010). It may be that digital games and SNS are attractive to the digital generation at least in part because such tools encourage them to express their emotions (e.g., joy, excitement, desire) and allow them to share their emotions through verbal and nonverbal exchanges. Currently, artificial intelligence (AI) researchers try to better understand human emotion and incorporate it in designing AI technology. For example, social robots that can respond to emotions have been shown to enhance children's language learning (van den Berghe et al., 2019), and in similar vein, other language researchers have identified that having positive emotions can facilitate learners' language development (Maclntyre & Gregersen, 2012).

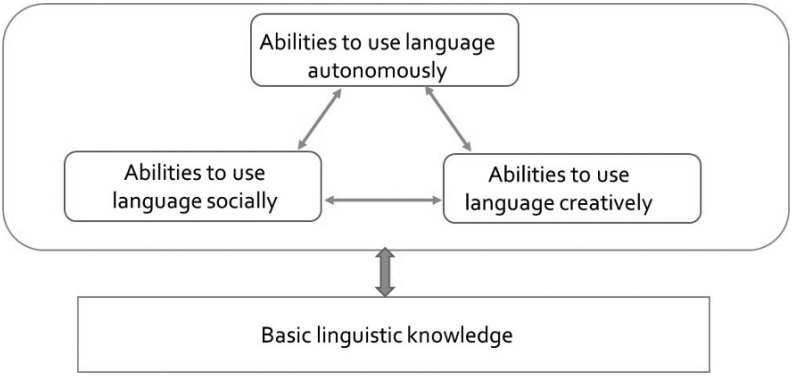
In summary, the essence of language use lies in physicality (the use of human bodies), social interaction, and emotions/affect, and it is important to use digital technology in ways that it does not restrict their roles in language learning and communication.

Communicative Competence for the Era of Digital Technology

What kind of communicative competence do children need to develop in the era of digital technology? As digital technology advances, communication is increasingly carried out in a multimodal fashion. For example, when people read online articles or e-books, they often process the text along with audio and visual information; reading has become largely multimodal processing. The boundaries between verbal and nonverbal activities are increasingly blurry. In light of this situation, I propose that communicative competence for the era of digital technology is a competence that is necessary for multimodal communication, primarily through language but not limited to language. Moreover, it should be a competency that resides in social relations as opposed to individuals in isolation. Therefore, it is a much broader concept than the traditional conceptualization of communicative competence in applied linguistics. As shown in Figure 2, my conceptualization of communicative competence in the digital era consists of a knowledge-based component—what I call *basic linguistic knowledge*—and the abilities to use such knowledge *autonomously*, *socially*, and *creatively*. Importantly, these abilities are not compositional; they are not independent and separate abilities. They focus on different aspects of our communicative competence, and they are all interconnected.

Figure 2

Communicative Competence in the era of Digital Technology (Adapted from Butler, 2021, p. 291)



Basic linguistic knowledge refers to foundational knowledge about how language works, including knowledge of phonology, morphology, lexicon, syntax, semantics, pragmatics, and sociolinguistic knowledge of how the language should be used in given contexts. Readers may recall Canale and Swain's (1980) conceptualization of communicative competence as composed of grammatical competence, sociolinguistic competence, and strategic competence. My conceptualization of basic linguistic knowledge has some overlaps with Canale and Swain's grammatical competence and sociolinguistic competence, but not strategic competence, because, as McNamara (1996) pointed out, strategic competence—"coping strategies" (Canale & Swain, 1980, p. 31)—should not be considered knowledge. Traditionally, language education in schools in Japan has primarily focused on developing basic linguistic knowledge. Granted, the value of developing linguistic knowledge is unquestionable, but knowing how a language works does not make a learner a sufficient user of that language. Thus, learners need to develop the abilities to use language autonomously, socially, and creatively.

Using language autonomously refers to being able to manage and control one's language use by efficiently processing vast amounts of information, purposely selecting necessary information while understanding the intention of the authors and comprehending and analyzing it from a critical perspective. These abilities include not only language processing but also cognitive and metacognitive processing and strategies. The internet has a massive amount of information. Some information is fake, and other information is useless if not harmful. Blindly relying on digital technology can have potentially negative impacts on language development and cognitive functions. This is why the autonomous use of language is important.

Although empirical research remains limited, a substantial gap in the autonomous use of language among the digital generation has emerged. For example, Paracha et al. (2018), an eye-tracking study conducted among Japanese college students, found that the students with high proficiency in English tend to be good at skimming the entire text and fixating on important parts, such as keywords, while quickly going through unimportant parts. When nonverbal visual information is available in the texts, they glance through it and fixate on relevant parts but ignore irrelevant and unimportant parts. In contrast, the study found that students with lower proficiency are not good at skimming through the texts. They obtain only the limited information *that they happen to access* and cannot selectively use relevant nonlinguistic information. The focus of Paracha et al. (2018) was foreign-language processing, but one may expect that similar differences would be found in L1 processing.

Social use of language among the digital generation refers to abilities to enhance knowledge and skills in time-free (e.g., asynchronous email exchanges) and distance-free (e.g., Zoom meetings) interpersonal spaces through language, while at the same time building useful networks. Existing communicative competence models used in language education, including Canale and Swain's, predominately perceive competence as being inherent in the individual. In the increasingly digitalized world, however, people are expected to share their linguistic and nonlinguistic knowledge (e.g., knowledge about the world) with others and to build new knowledge through interaction. In digital space, you may need unique skills that are different from the skills in the analog, or physical, world. For example, you need skills to efficiently communicate with AI agents who may not be very cooperative or to communicate with other people while using and differentiating among multiple avatars.

The importance of developing abilities to work efficiently and collaboratively in interpersonal spaces can be seen in companies' job advertisements. Rios et al. (2020), for example, analyzed 140,000 job advertisements in the United States and found that the 21st century's most desired skills in the labor market included oral communication skills, written communication skills, and collaborative skills. In essence, companies are looking for people who can be productive in communicating and collaborating with others. These skills are different from the desired qualifications from previous generations, such as self-management skills, professionalism, and leadership, which are mostly individual-based qualifications.

Finally, being able to use language creatively refers to abilities to rebuild or reorganize existing knowledge (primarily based on basic linguistic knowledge) and/or to apply existing knowledge in a new communicative context. This process is mainly conducted through language, but the target information also includes nonverbal information such as video and audio. Importantly, for using language creatively, basic foundational knowledge is indispensable. As mentioned, school-based language education has traditionally focused on developing basic linguistic knowledge, but more direct supports are necessary for students to be able to apply this knowledge in a new context using multimodal tools.

In sum, communicative competence needed for the era of advanced digital technology, in my view, encompasses the abilities to use language autonomously, socially, and creatively, based on a foundation of basic linguistic knowledge. Importantly, such knowledge and abilities do not exist in isolation but are interconnected and, as such, influence each other. My proposed

model of communicative competence for the digital era is not a theoretical model because it cannot be tested in its current state of development. Instead, the model is a conceptual framework that is a work-in-progress meant to foster vital discussions about the development of communicative competence models that are suitable for our digital world.

Pedagogical Suggestions

How should teachers assist students in developing such communicative competence while taking their digital knowledge and experience into account? The fast pace at which technology advances makes it difficult to offer concrete examples that will still be relevant in the coming months and years; however, below I suggest a couple of examples from primary school English lessons.

Self-introduction is a popular activity in Japanese primary school English classes, but it does not seem to be a very exciting activity for children because they already know their classmates. But changing the format of self-introduction from face-to-face to video-based can make the task far more engaging for children. Intervention studies, such as Pinter (2019), found that children often creatively incorporate various visual and audio information in their video tasks. Knowing that they would receive feedback from their peers and parents on their uploaded video self-introduction, the children showed strong motivation to make a better video, and they repeatedly practiced their presentation. It is well known that task repetitions enhance students' language development (Bygate, 2018). Importantly, in the video self-introduction task described above, the children autonomously repeated the task instead of being told to do so by their teacher. To facilitate children's collaborative skills, teachers can make the self-introduction a paired task that incorporates peer feedback.

Creating an e-poster can be another creative and enjoyable task for primary school children, and the product can be used as an assessment (i.e., e-portfolio). The e-posters shown in Figure 3 were created by students in the classroom of Ms. Sahashi, a primary school English teacher in Japan who kindly shared her practice with me.

Figure 3
Primary School Students' e-posters (Sahashi, 2020)[2]

In Ms. Sahashi's class, primary school students used Google Pages to create e-posters. They used Google Art and Cultures to identify a famous portrait that resembles them. Using this app, along with self-portraits that the students drew in their art class, they expressed themselves freely and creatively using English words and expressions that they had learned in class. The posters were shared among classmates and parents. Some students voluntarily investigated the portrait and the museum that owns it. According to Ms. Sahashi, this task increased the students' sense of affirmation as well.

For older children who already have a certain degree of autonomy in learning, teachers can ask them to develop English-learning tasks for themselves. I have asked Japanese sixth-grade students to design digital games for learning English vocabulary in groups (Butler, 2015, 2017). The children incorporated various game elements that were considered important for language learning in their designs, such as giving instant feedback, visualizing learners' improvement, incorporating graded challenges, creating "unexpected" events (e.g., accidents) to motivate learners, and so forth. This task was a wonderful opportunity for children to reflect on their language learning and to set their own goals, which enhances metacognition. It also helped teachers better understand the students' knowledge and experience with digital technology.

Although many possibilities for incorporating digital technology into language classrooms abound, educators also need to keep in mind some serious concerns endure. I will highlight three such concerns. The first concern is about

unequal access to digital technology. Fortunately, thanks to Japan's GIGA School Concept Policy (MEXT, 2021), gaps in access to digital technology will soon become less of a concern in Japan. However, gaining access to digital devices does not guarantee that students will efficiently and effectively use the information they access through these devices. Therefore, the second and more serious concern is the gap in the *quality of students' use of digital information—in other words, how efficiently and effectively they use digital technology for their academic work*. As noted above, substantial individual differences in how well the digital generation strategically identifies and uses relevant information through digital technology to develop knowledge and skills for academic settings. The third concern—and one that is as serious as the second one—is how students' personal data is used. The evolution of digital technology has made it easier to collect vast amounts of data about individual students' learning processes and outcomes. In some countries, such as the Netherlands and Malta, students' data are collected during their school years and later used to construct a life-long learning history database among citizens (QA Updates, 2017). Despite the fact that such educational data can improve the quality of teaching and advising students, many ethical questions persist: Who owns and/or can access the personal data? How should it be managed? Is it securely stored? Such ethical issues lag far behind the evolution of digital technology and require urgent action.

Conclusion

The purpose of language education in the era of digital technology is to assist learners to develop communicative competence by using digital technology as a pedagogical tool along with these learners' own language use and cognitive styles. Given that the essence of human language use lies in physicality (the use of human bodies), social interaction, and emotions, educators should introduce digital technology to learners in a way that does not restrict these three important elements. Language educators should also consider issues of equity and privacy. The era of digital technology demands a new and broader conceptualization of *communicative competence*—one that is flexible enough to incorporate both verbal and nonverbal elements. My proposed conceptual framework for communicative competence in the digital era is grounded in basic linguistic knowledge but also encompasses the abilities to use language autonomously, socially, and creatively; this framework is meant to serve as a starting point for future discussions.

Digital technology will play an increasingly important role in helping people enjoy their diversity and individual uniqueness. At the same time, using digital technology comes with the possible danger of moving towards standardiza-

tion and deindividuation. Furthermore, despite the possible benefits of using digital technology to expand human cognitive functions, if digital technology is misused, it can also negatively influence linguistic abilities and cognitive functions. If we, as a society, are to coexist peacefully and productively with digital technology, it is critical that we use it selectively and strategically. To assist students to develop necessary communicative competence, direct human intervention is essential. No matter how advanced the technology becomes, the vital role of teachers and parents in supporting students' language development will remain if not become even more crucial.

Notes

1. In this paper I consider *digital technology* and *ICT* as interchangeable terms that refer to technology involving the use of computers, mobile devices, video cameras, and other devices operating in a digital format.
2. Courtesy of Ms. Keiko Sahashi, from her class.

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