

# EDUCATIONAL TECHNOLOGIES FOR K-12 LEARNERS: WHAT DIGITAL NATIVES AND DIGITAL IMMIGRANTS CAN TEACH ONE ANOTHER

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## ABSTRACT

*As technology continues to evolve, the gap between those who have grown up with technology (digital natives) and those who have not (digital immigrants) continues to widen. This gap is very present in the K-12 classroom, where both digital natives (students) and digital immigrants (teachers) work together. This gap highlights a stigma associated with each group; digital natives are comfortable with technology and digital immigrants are not. However, just as digital natives can teach digital immigrants a lot in terms of using, navigating, and harnessing the efficiency of technology, digital immigrants can offer digital natives a lot in terms of learning to use, troubleshooting, and operating without technology.*

## INTRODUCTION

Technology has not only become a powerful tool in daily life, but has had a large impact on education (Metz, Riegel, Kozen, & Polka, 2017). With technologies allowing for increased learning efficiency, faster and more reliable information, professional presentations of student work, and diverse approaches to learning, the use of technology in K-12 has become “central to teaching and learning” (D’Angelo & Woosley, 2007, p. 462; Li, 2007; Nickerson & Zodhiates, 2013). It follows that K-12 educators would harness educational technology as a teaching tool in the classroom, so students can “harness technology to be effective problem solvers, collaborators, communicators, and creators” (National Education Association [NEA], 2014, p. 31). However, a fundamental problem concerning the way teachers and students view and use technology has limited technology’s effectiveness in the classroom; “instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population that speaks an entirely new language” (Prensky, 2001, p. 2).

Although the increased use of technology has supported, assisted and even enhanced the act of learning (Selwyn, 2010), it has also widened the gap between those who have grown up with technology (digital natives) and those who have not (digital immigrants) (Prensky, 2001). The information discussed with in the article generally assumes that the majority of digital immigrants work as teachers in K-12 classrooms, while students make up the majority of digital natives in the same settings. However, the authors acknowledge that these two groups are not distinct and may overlap.

In 21st century classrooms, where teachers often have not grown up with the technology being used, it follows that teachers often assume the role of digital immigrants and students often assume the role of digital natives. Since both digital natives (students) and digital immigrants (teachers) work together in the K-12 classroom, it is vital that both groups use their strengths to enhance each other’s knowledge pertaining to technology. However, the stigma associated with each group (i.e. digital natives are comfortable with technology and digital immigrants are not) may keep reciprocal learning from occurring.

To harness the strengths of both digital natives and digital immigrants in the K-12 classroom, the characteristics that make both digital natives and digital immigrants unique are outlined below. Given these distinctive qualities, the learnings that digital natives can teach digital immigrants in terms of using, navigating, and harnessing the efficiency of technology, and the learnings that digital immigrants can offer digital natives in terms of learning to use, troubleshooting, and operating without technology are discussed. Additionally, various examples of technology tools that appeal to digital natives and digital immigrants are identified in an effort to demonstrate the importance of informed technology selection. Finally, to overcome the stigma associated with digital immigrants and digital natives, the mindset of each group is discussed, with an emphasis on how to overcome the stigma and allow for reciprocal learning to occur.

## **CHARACTERISTICS**

Prensky (2001) first characterized two different groups of individuals as digital immigrants and digital natives. He emphasized that the main discrepancies between the two groups were differences in technology usage plus language and communication. Prensky theorized that the integration of a technology-rich environment led to “hypothesized changes in the brain structure which meant young people think and process information in fundamentally different ways compared to older generations” (as cited in Helsper & Eynon, 2009, p.1). The main characteristics of both groups will be outlined below in further detail.

### **Digital Immigrants**

Digital immigrants are considered individuals who were born prior to the influx of technology, specifically computer use, the Internet, and smartphones. The term immigrants corresponds to their adoption of web technologies or “immigrating” to the technological environment. A summary of their characteristics may be found in Figure 1. Their preference is to speak face-to-face as opposed to texting or using an instant messenger service. Similarly, they would rather interact with one individual or a few people rather than a large group. These patterns focus on the importance of human connection in person as opposed to connecting to an individually electronically.

Within the K-12 classroom, digital immigrants are often the teachers or instructors. They may prioritize face-to-face interactions among students over implementing technological educational aids. For example, utilizing in-person group work as opposed to allowing students to collaborate within the classroom via Google drive. The latter is a file-sharing program which allows users to virtually edit and share documents.

Digital immigrants’ learning patterns focus on logical rationale. An example would be if a digital immigrant was speaking to technical support via the telephone. If the call was regarding an email app on their phone to send an email, they may not understand that an arrow represents “send” as opposed to being specifically labeled as such.



- Adopters of the web technologies
- Prefer to talk in person
- Logical learners
- Focusing on one task at a time
- Prefer to have interaction with one or few people rather than many
- Get info from traditional news sites

*Figure 1: Digital Immigrant Characteristics (Unicheck, 2015)*

## **Digital Natives**

Digital natives are individuals who were born during or after the integration of technology within the classroom, or the “digital age.” A list of their characteristics is outlined in Figure 2. Prensky originally defined a digital native as being born on or after 1980, however, some scholars define individuals born between 1980 and 1990 as the “first generation of digital natives” (Helsper & Eynon, 2009, p.7). For these researchers, a second-generation digital native is born after 1990. Therefore, one may argue that teachers may include digital natives and digital immigrants.

Digital natives are “fluent in acquiring and learning all sorts of new technology” (Mete et al., 2017, p.69). They are categorized as intuitive learners as they grew up with technological jargon and can quickly adapt to technological advances. An example would be the use of iPads within the classroom. iPads are becoming more common within the K-12 classroom to help promote learning and often younger students can surpass the teacher’s knowledge within a few weeks (Grant & Barbour, 2013; Reid & Ostashevski, 2011). Digital natives’ intuition also stems from their consistent use of electronic devices – it is estimated that in America, nearly 60% of 12-year-olds own a personal cell phone.

Due to their multi-use of many of the tools, digital natives are comfortable with the quick transfer of information and multi-task with ease, in comparison to their digital immigrant counterparts. Within the K-12 classroom, the digital natives, who are most likely the students, are more comfortable with the integration of multimedia such as audio, video, and images to promote learning.

The increased usage of social media among digital natives, specifically Facebook, Twitter, and Instagram, as well as Snapchat provide them with quick and easy methods for communication (Williams, Crittenden, Keo, & McCarty, 2012). This also highlights their preference for electronic interactions as opposed to face-to-face interactions. Digital natives enjoy social interactions, however, would prefer to use social media and other apps to facilitate communication. This is also evidenced in their usage of emoticons or emojis (small graphics in text) and slang in text (Williams et al., 2012).



- Born during or after the digital age
- Always on, attached to a phone or other device
- Intuitive learners
- Multitask and rapidly task-switch
- Extremely social
- Multimedia oriented

*Figure 2: Digital Native Characteristics (Unicheck, 2015)*

### **RECIPROCAL LEARNING**

Throughout the past few decades, education has evolved into a two-way street where teachers and students teach and learn together (Branscombe, Goswami, Schwartz, & Bowen, 1992). Just as teachers have a wealth of information to offer students, students have a great deal of knowledge to offer teachers. This reciprocal learning fosters an environment where all participants in education can benefit from the knowledge of everyone in the classroom. When it comes to technology, this notion of reciprocal learning holds true; both digital natives and digital immigrants have a lot to teach one another. Given the unique characteristics of both digital natives and digital immigrants outlined above, it follows that the strengths of each group can be leveraged to enhance technology in the K-12 classroom.

#### **What Digital Immigrants Can Teach Digital Natives**

Since digital immigrants did not grow up using technology to teach and learn in the classroom, they are able to offer digital natives insight into learning to use, troubleshooting, and operating without technology. Specifically, digital immigrants can teach digital natives how to carry on when technology fails. As individuals who were born during the digital age, digital natives rely on the availability of digital resources such as wi-fi, apps, websites, etc. (International Society for Technology in Education [ISTE], 2017). With their teaching preparation focused on pedagogy not involving technology, digital immigrants are able to navigate teaching and learning in the case that technology fails.

Digital immigrants can also teach digital natives about the importance of human contact in the educational process. As individuals who are always on or attached to a phone or other device, digital natives may miss social cues or nonverbal communication that occurs during human interactions (Drago, 2015). With the majority if not all of their teaching experience in face-to-face settings, digital immigrants can demonstrate the impact and importance of nonverbal communication (e.g., body language, tone of voice, facial expression, etc.) in educational interactions.

Additionally, digital immigrants can teach digital natives about the limitations of technology. As individuals who are intuitive learners who focus on learning underlying principles or general ideas, digital natives may not recognize the difficulties that digital immigrants face when it comes to working with technology (English & Gordon, 2004). Using themselves as examples, digital immigrants can explain how logical learners focus on learning facts in a linear manner, highlighting some restrictions and shortcomings of specific technologies.

Digital immigrants can also teach digital natives how to navigate and use traditional sources (e.g. books, journals, newspapers, etc.) to gather information. As individuals who are multimedia oriented, digital natives may not be aware of the surplus of information contained in traditional sources and how to critically analyze the credibility of media sources (Johnson & Kaye, 1998). Since the sources available to digital immigrants during their own education did not include multimedia sources, their innate familiarity with traditional sources can provide digital natives with additional reliable sources for information.

Finally, digital immigrants can teach digital natives how to simplify activities that rely too much on technology. As individuals who multitask and often switch tasks, digital natives may get caught up in distracting tasks like E-mailing, web browsing, and/or instant messaging and lose sight of their purpose (Ellis, Daniels, & Jauregui, 2010; Hembrooke & Gay, 2003). With an outside perspective from an individual who grew up focusing on one task at a time, digital immigrants can suggest simpler approaches to activities such as communication or studying.

### **What Digital Natives Can Teach Digital Immigrants**

Since digital natives grew up with technology, they are able to offer digital immigrants insight into using, navigating, and harnessing the efficiency of technology. Specifically, digital natives can teach digital immigrants how to streamline classroom processes. As individuals who must adopt technologies, digital immigrants may not have had the exposure to various technologies that can significantly influence the efficiency of the classroom (ISTE, 2017). With a constant exposure to and new technologies, digital natives can introduce and teach digital immigrants to technologies that can help with classroom processes like attendance, classroom management, data analysis, etc.

Digital natives can teach digital immigrants how to engage and motivate younger generations by using familiar technology in educational ways. As individuals focus on one task at a time, digital immigrants may miss judge 21<sup>st</sup> century students as distracted or unmotivated rather than unengaged due to the method of teaching (Borsheim, Merritt, & Reed, 2008). Since they were board in the digital age, digital natives can offer suggestions for technology (i.e., video games, interactive presentations, communication boards, etc.) that they would prefer and enjoy using in the classroom.

Additionally, digital natives can teach digital immigrants how to easily collect classroom data for student evaluation and data-based decision making. As individuals who get information from traditional sources, digital immigrants may rely heavily on time consuming summative assessments (Garrison & Ehringhaus, 2009). Using their familiarity with digital resources, digital natives can help introduce immediate formative assessment in the form of online polling and instant response techniques into the classroom.

Digital natives can also teach digital immigrants how to educate students in a manner that is comfortable to them. As individuals who prefer to talk in person, digital immigrants may not consider initiatives like the flipped classroom, that can increase students' accountability and achievement (Amresh, Carberry, & Femiani, 2013). Since digital natives are intuitive learners, they can identify the multimedia sources where they get most of their information from and promote the use of those sources within the classroom.

Finally, digital natives can teach digital immigrants how to make the classroom more accessible using technology for students with exceptional learning needs. As logical learners who may focus on technology in a linear manner, digital immigrants may not be able to see the potential of a technology to assist students and help differentiate material (Netherton & Deal, 2006). With an

innate ability to think creatively about technology, digital natives can suggest alternative approaches to technology use in an effort to make the classroom and material more accessible.

### TECH TOOLS

Prensky (2005) states that instructors need to know the technology students can use. As mentioned before, education is a two-way street, meaning that students also need to know the technology instructors can use. When both digital natives and digital immigrants know the technologies that appeal to the characteristics of each group, they can make informed technology selections. These informed technology selections cut down on the likelihood that technology is rejected, misused, or underused (Bai & Ertmer, 2008).

As outlined in Figure 3, there are technology tools that appeal to digital immigrants over digital natives, and vice versa. Aspects such as the user-friendliness, features, and navigation contribute to the placement of each technology tool in the figure. Depending on the circumstances and needs in the classroom (i.e., file sharing, video, presentation, writing, evaluation, classroom management, brainstorming, student products, and assessment) making an informed selection of technology may directly impact the effectiveness of the teachings. Below, several technology tools in the areas of video, presentation, and classroom management that appeal to digital immigrants or digital natives are outlined.



Figure 3: Tech Tools that Appeal to Digital Immigrants and Digital Natives

#### Tech Tools that Appeal to Digital Immigrants

Videos are often used in the K-12 classroom as a means of engagement. Digital immigrants can use YouTube ([www.youtube.com](http://www.youtube.com)) for videos in and out of the classroom. Working much like Google, a search engine many digital immigrants are comfortable using, YouTube allows educators to access video material posted by others. The familiarity of the platform to a search engine allows for digital immigrants to use YouTube without much assistance or guidance.

The presentation of material is a distinctive aspect of the K-12 classroom. Microsoft Office provides software that is commonplace in the classroom, including Microsoft Word for word processing and Microsoft Excel for data collection and/or analysis. Microsoft PowerPoint is also commonplace in the classroom for creating and giving presentations. The mass use and acceptance

of the software as a presentation tool and common features between all Microsoft products allows for digital immigrants to use Microsoft PowerPoint without much scaffolding.

Classroom management plays a huge role in the K-12 classroom. Digital immigrants can use Bouncy Balls ([www.bouncyballs.org](http://www.bouncyballs.org)) for classroom management, specifically volume control. Using the microphone on any device, Bouncy Balls works to measure the volume in the classroom. Displayed on the screen of the device (or projector) is a set of bouncy balls that move faster with more noise and slower as the noise lessens. The simplicity of the platform allows for digital immigrants to use Bouncy Balls without much training.

### **Tech Tools that Appeal to Digital Natives**

When it comes to using videos in the classroom, digital natives can use EDpuzzle ([www.edpuzzle.com](http://www.edpuzzle.com)). Similar to YouTube, EDpuzzle works as a search engine for digital video content, but searches multiple platforms (e.g., YouTube, TED Talks, Kahn Academy, National Geographic, etc.). In addition to accessing video content, individuals can embed comprehension questions right into a video. The ability to embed questions into EDpuzzle videos allows for videos to be assigned, allowing for digital natives to be assessed in a manner that may be more comfortable to them.

When it comes to presenting material to 21<sup>st</sup> century learners, Pear Deck ([www.peardeck.com](http://www.peardeck.com)) provides an alternative to Microsoft PowerPoint. Rather than a one-way presentation of information, Pear Deck allows for digital natives to interact with the material, instructor, and peers. The ability for interaction through multiple choice slides, drawing slides, draggable slides, text and number response slides, and web slides allows for digital natives to stay engaged in a lesson.

When it comes to classroom management, digital natives may respond well to Class Dojo ([www.classdojo.com](http://www.classdojo.com)). After students create avatars, Class Dojo allows an educator to assign points to positively reinforce good behavior and take away points to keep students focused and on task. Displayed on a classroom projector or students' individual devices (if available), digital natives can receive feedback on their participation in real time allowing them to modify their behavior if necessary. Although far more involved than Bouncy Balls, Class Dojo allows digital natives to respond to the real-time feedback they are accustomed to receiving in other aspects of life.

## **MINDSET**

To further understand the perspectives of digital immigrants and digital natives, each of their respective mindsets will be discussed in detail. Mindset is defined as “the established set of attitudes held by someone” (Oxford Living Dictionaries, 2017). It is safe to assume that individuals who grew up prior to the digital age would have a different mindset towards technology than those who grew up during the digital age. Understanding the mindset of each group will allow both digital immigrants and digital natives to collaborate effectively within the K-12 classroom.

### **Mindset of Digital Immigrants**

Within the K-12 classroom, digital immigrants may see technology as an “add-on” to their daily lesson plan. They may not view an app as being integrated into their curriculum and rather view it as something to use at the end of class, such as a short video clip. Additionally, as stated earlier, many digital immigrants prefer in-person interactions and may prioritize those over digital interactions. With the advancement of technology, such as the Internet, it may be possible for teachers to have their students complete a homework “check-in” online. However, some teachers may prefer to discuss the daily homework face-to-face as opposed to posting it on a website and having students confirm electronically when it is completed.

Two main mindsets that often occur with digital immigrants are that it is too difficult to learn new technology as well as it is too late for them to learn about new electronic devices, electronic educational programs, and apps. This was evidenced in Reid & Ostashewski (2011)'s study where a teacher who was unfamiliar with the iPad stated the following, "I don't have to be the guru of technology, my students will be" (p.1692). This mindset may pose a barrier for collaboration between digital immigrants and digital natives, where digital immigrants may feel hesitant to ask for assistance, and digital natives may be using the technology in a different manner than anticipated. For example, utilizing the iPads in school for social media as opposed to an educational app.

### **Mindset of Digital Natives**

In contrast to digital immigrants, digital natives often view technology as being accessible to all and integrative into daily life. However, the definition of accessibility is often skewed among digital immigrants. Electronic device usage and technology may be ubiquitous among society; however, digital natives may not realize it is not accessible to all. Barriers to technology use may include lack of access and financial concerns. Furthermore, accessibility is a term often utilized among individuals who may require further supports, such as individuals with a physical or mental disability (Rust, 2015). Modifications to technology are available and examples for tablets and laptops include "adaptive hardware, touch screens, alternative keyboards and mice, and magnification and screen-reading software" are available to provide individuals with the ability to access the same technology with ease (Rust, 2015, para. 4). Within the K-12 classroom, there are teachers who may be considered digital natives and who may be unfamiliar with the types of modifications listed.

Digital natives will rely more on technology as a means to communicate which may pose an issue within the K-12 classroom. A digital immigrant teacher may find it difficult to discuss an issue with a digital native student, who is more comfortable speaking via text. The interpersonal skills that digital immigrants prefer, such as vocal tone, eye contact, and body language, are often not prioritized by digital natives. Consequently, there may be a communication gap between the two groups within a K-12 classroom.

### **CONCLUSION**

The education and awareness provided within the article promote the conversation among technology use and communication between digital immigrants (often teachers) and digital natives (sometimes teachers, most often students) within the K-12 classroom. However, the question remains: how can we overcome the stigma and stereotypes associated with each group when it comes to using technology in the classroom? Within this conclusion, the authors will provide helpful strategies for both digital immigrants and digital natives.

The first suggestion is to choose your words carefully when interacting with digital immigrants or digital natives. Try to reduce stereotypes by making blatant assumptions. While the article highlights two different groups of individuals, the authors would like to acknowledge that it may be possible that there are outliers within each group, namely: there may be digital immigrants who are more comfortable with technology, and there may be digital natives who do not feel comfortable with the integration of technology.

The authors also encourage individuals to utilize a strengths-based lens and focus on the positive characteristics and abilities of both digital immigrants and natives. One example is if there are technical difficulties within the classroom. A digital immigrant is familiar with a time when SmartBoards, iPads, and computers were not readily available or used in the classroom. This individual could continue to teach a lesson even without wireless Internet – a feat which may be unheard of to a digital native.



On a similar note, supporting one another, whether you are a digital immigrant or digital native, is another recommendation. Provide assistance, answer questions, and above all listen to each other. This will help reduce barriers to communication and also foster collaboration and goodwill amongst staff and students.

The last suggestion is to utilize an inclusive perspective regarding the chosen technology in the K-12 classroom. As outlined in the Digital Natives Mindset section, technology is widespread; however, it may not fully meet the definition of accessible. Review the type of technology to be implemented to ensure that all students will be able to access it.

In conclusion, the integration of technology into everyday life has impacted the delivery of curriculum as well as educational expectations. The K-12 classroom may include both digital immigrants (mainly teachers) and digital natives (may encompass teachers and students). The article provides a comprehensive view of the characteristics and mindset of digital immigrants and digital natives. It also identifies commonly used technology by both groups as well as how each group can learn from one another. The article also provides suggestions for both digital immigrants and digital natives to foster awareness and promote collaboration and inclusivity within the K-12 classroom.

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