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Contextually Based Professional Development

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In this article, the authors detail a study of a three-year professional development project designed to increase in-service teachers' classroom technology integration. Participants engaged in learning activities that modeled technology integration from a contextually based perspective that included technology, and pedagogical and content knowledge. Although participants reported having very limited technology skills before professional development began, after two years they reported a significant increase in using technology skills. In addition, participants reported increased comfort and confidence in using technology to the level where they changed their teaching practice to integrate technology. Indeed, between years two and three, participants reported a significant increase in technology use for learning by their students.

KEYWORDS technology integration, professional development, digital immigrants, integration barriers, community, technology skills, teacher in-service, contextually based instruction

Integrating computer technology into pre-K–12 education has been described as one way to promote a learner-centered environment where the computer acts as a tool that possesses a cache' of knowledge and the teacher introduces and moderates ill-structured problems and encourages methods for learner engagement (Jonassen & Land, 2000). Hew and Brush (2007) described six barriers that make it difficult for teachers to effectively integrate technology in their classrooms. The top three barriers—resources (40%), knowledge and skills (23%), attitude and beliefs (13%)—made up for 76% of those mentioned in the current literature. While resources (40%) was the barrier

most mentioned, resources are generally an issue of economy and may not be substantially alleviated by pre-service instruction or in-service professional development. The remaining top two barriers, knowledge and skills (23%) and attitude and beliefs (13%), make up for a bit over one-third of the barriers which could well be improved by good instruction within pre-service teacher preparation programs and in-service teacher professional development. However, overcoming the barrier of teachers lacking skills and knowledge is more than simply providing technology skill instruction. For example, providing instruction for pre-service teachers or professional development for in-service teachers on how to use a computer or specific software does not assure that it will necessarily increase their understanding of how to integrate technology into their teaching practice. Providing instruction that enhances one's knowledge and skills about technology doesn't necessarily change one's attitude or beliefs. Furthermore, many teachers who have been in the classroom for a number of years most likely did not grow up with technology. These more veteran teachers, who might be described as *digital immigrants*, may not feel as comfortable with technology (Prensky, 2001). Conversely, most traditional students currently in teacher preparation programs grew up with technology. Described as *digital natives*, these students are often comfortable with many aspects of technology. Even if they don't possess a specific technology skill, they have basic understandings of technology concepts and skills that often transfer. Therefore, they may be more apt to try new technologies or may learn software applications more quickly. Consequently, designing, developing, and implementing technology integration instruction for pre-service or professional development for in-service teachers is quite complex.

Koehler and Mishra (2009) helped unbundle this complexity by identifying three types of knowledge that classroom teachers need to possess in order to successfully integrate technology into their teaching practice: (a) technology knowledge, (b) pedagogical knowledge, and (c) content knowledge (TPACK). While separating these three discreet types helps us identify the requisite essential knowledge, it is precisely the intersection of all three that provides the context for technology integration. In other words, teachers who can successfully integrate technology do so when they possess content knowledge, content-specific pedagogy, and the technical skills that will support their use of technologies to help enhance the learning environment. Additionally, Gess–Newsome, Blocher, Clark, Meansco, and Willis, (2003) suggested that successful professional development embeds technology skills within a focus of technology integration strategies as they relate to the content and various grade levels. Hixon and Buckenmeyer (2009) outlined stages that teachers move through as they become more proficient in technology integration. They also similarly recommended that "it is crucial for technology-related training to be situated in the individual teacher's context" (p 143).

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This suggests that, when designing professional development for technology integration, one must consider more than simply providing explicit technology skills instruction. However, it might seem logical to focus on basic technology skills training and provide explicit technology skills instruction to build a technical foundation for *digital immigrants*, especially if they are in-service teachers who already possess pedagogical and content knowledge. In other words, to provide a solid technology skill foundation, should *digital immigrants* be given explicit instruction in basic technology skills prior to instruction on technology integration methods? The purpose of the authors in this article is to detail a study conducted to determine the impact of technology professional development for primarily *digital immigrants* where technology skill instruction was embedded within the context of pedagogy and content, rather than first providing explicit technology skills instruction and then later providing pedagogical instruction.

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METHODS

Setting: The Community of Leaders

The setting for this professional development was a consortium of seven very rural districts (which quickly grew to 13) in a southwestern state of the United States. Supported by grant funds, long-term professional development was designed and implemented to enhance the teachers' technology skills and their ability to integrate technology into their teaching practices. Furthermore, the professional development was specifically designed to move participants from entry-level technical knowledge to an advanced level where they might provide technology leadership. Indeed, the group took on the title of Community of Leaders (CoL), based upon the concept of the participants becoming the technology leaders within their respective school districts.

Participants

Participants were recruited from the consortium districts with the understanding that they would be (a) asked to engage in the CoL project for three years, (b) expected to become technology leaders for their respective districts, and (c) compensated for their time. The compensation included monetary stipends, graduate-level course credit, and occasionally technology-related hardware and/or software. Members included teachers from various grade levels, but also included a few staff and administrators, including even one district superintendent. Although a few of the members were in their late 20s, most members ranged between mid-30s to late 50s. A few participants dropped out of the CoL project after the first year for various personal reasons and were replaced with newly recruited members who continued on

for the remaining two years. In all, a core group of approximately 20 participants remained intact throughout the entire project, with an average of just over two years of individual engagement in the project.

Professional development was conducted over the three years with a frequency of four full Saturdays and a four-day, week-long intensive each year. During the professional development sessions participants engaged in technology activities where the members worked individually and collaboratively to complete meaningful products that would relate back to their specific teaching or professional practice. Participants were grouped in various ways to provide the opportunity for members to become working colleagues with members from other school districts.

To provide an academic and technology framework, the state's K–12 standards were used to articulate a scope and sequence that included clearly benchmarked student proficiency levels. By providing participants with an understanding of what their students should know and be able to do at the different grade levels and in the different content areas, a framework was developed that would help participants then focus on integration strategies.

Throughout the professional development project, participants engaged in activities that embedded many traditional technology tools, including but not limited to the following:

- Internet Skills: Web browsers, searching and communication (e-mail, discussion boards, etc.)
- Productivity tools: Microsoft Office, Word, Excel, and PowerPoint
- Cognitive mapping: Kidspiration and Inspiration
- Web development: Internet scavenger hunts and WebQuests
- Graphics: Digital still and video imagery, paint, and drawing

During the earlier part of the professional development participants engaged in activities that allowed them to learn technology skills embedded and contextualized within the learning activity that they could then later take into their classroom. However, it is important to remember that traditional *explicit direct instruction* for using any of these tools *was not* provided. For example, one of the activities grouped participants into teams where they "became" travel agents who gained knowledge of specific geographical locations. Working together they gathered information and media to help them produce several products. Specifically, they designed and developed a variety of artifacts (e.g., brochures, itineraries, and advertisements) for their hypothetical travel agency clients. The participants then chose a travel destination to investigate and promote. By letting them self-select the location and presentation material products they would construct, participants could begin to plan for their own classroom curriculum, making the products personally relevant and meaningful. When a participant did need specific technology skill help, he or she asked a peer or was given individual

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troubleshooting help by one of the professional development facilitators. In this way, participants were engaged in learning activities that modeled technology integration and learned methods of using technology to help enable their students to learn and present their acquired knowledge in different ways. In addition, however, they also learned technology skills as they were required to complete the activity.

Collaboration was an important aspect of the project, and once participants became comfortable with one another, they were grouped by grade level and given the opportunity to practice technology integration by designing a lesson for their classes. The lesson was to have their students use technology tools to produce an artifact that might demonstrate their achievement of the objectives of that lesson. Working together, participants planned, taught, evaluated, and then reported back to the CoL their experiences. In some cases, some participants co-taught lessons, even though they were from different districts.

One project goal was to help promote participants' leadership qualities. Participants were given the opportunity near the end of the three years to write mini grants and receive funds that might provide financial support to help them integrate technology within their individual teaching practice, within their school, or within their district. One example was a mini grant submitted by a participant who wished to purchase Kid Pix for the kindergarten classes within her district.

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Data Collection

There were several sources of data collected during this professional development. After the second year, a survey was administered to examine the self-reported level of technology skill self-efficacy and professional use. Items were developed to elicit feedback on specific technologies and applications.

Part A of the survey asked participants to rank their perceived level of competency on specific technology skills before they joined the CoL and their current perceived level of competency, based upon the following scale:

0 = *I have not used this technology.*
1 = *I need a lot of help using this technology.*
2 = *I can use this technology with minimal help.*
3 = *I can use this technology independently.*

Part B asked participants to rank their present use of technology in their instruction (teacher use), and the level of student use of technology in their classroom (student use) according to the following scale:

0 = *Not used yet*.
1 = *Thinking about it*.
2 = *At least once a month*.
3 = *At least once a week*.

Part C asked participants to respond to several open-ended questions.

1. *What was your most significant change due to your involvement with the CoL?*
2. *To what do you attribute that change?*
3. *What would you like to see for the next part of the professional development?*

All three parts of the survey were again administered after the third year. However, Part A was changed to only ask their current perceived level of competency on the previously identified technology skills. In addition, participants also submitted lesson plans and reported on their technology integration experiences. Participant teachers were observed integrating technology within their classrooms by professional development instructors.

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RESULTS

To begin with, a paired samples *t*-test was conducted to compare participants' self-reported mean scores of all technology competencies before they entered the training with their self-reported mean scores after two years of training. The results indicate a significant increase in their technology competencies ($M = 1.41$, $SD = 0.69$) after two years of participating in the CoL ($M = 2.22$, $SD = 0.70$), conditions; $n = 17$, $t(16) = 4.07$, $p < 0.001$, $d = 0.99$.

Between years two and three, however, a few participants left the professional development and were replaced. In addition, one participant did not complete Part B of the year two survey, where participants self-reported on their instructional use and student use of technology. Therefore, participants' self-reported means after the third year were compared using an independent *t*-test with the participants' previous self-reported technology competencies and instructional and student uses. As Table 1 indicates, there was no significant difference in participants' self-reported technology competencies between year two and year three.

Figure 1 presents the specific technology skill increases in participants' perceived level of technology self-efficacy after the professional development project.

To compare participants' self-reported instructional use of technology between years two and three, an independent *t*-test was conducted. However, results were mixed. As you can see in Table 2, there was no significant

TABLE 1 Paired Samples *t*-Test Results of Mean Ratings of Participants' Self-Reported Technology Competencies Before Training, Year Two, and Year Three

		n	*t*	*df*	*d*
Before training	1.41 (0.69)	17			
Year two	2.22 (0.70)	17	4.07 **	16	0.99
Year three	2.43 (0.29)	18	1.15 *	33	0.39

Note: * = $p > .05$, ** = $p < .001$ Standard deviations appear in parentheses below means.

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difference reported by the teachers for *instruction use* between year two and three. On the other hand, they reported that their *students' use* had significantly increased between year two ($M = 0.87$, $SD = 0.62$, $n = 15$) and year three ($M = 1.50$, $SD = 0.66$, $n = 16$) conditions; $t(29) = 2.72$, $p < 0.05$, $d = 0.98$. It is important to remember that the scale provided for participants defined both teacher use and student use as: 0 = *Not used yet*, 1 = *Thinking about it*, 2 = *At least once a month*, and 3 = *At least once a week*.

Figures 2 and 3 below indicate the specific technologies and applications on which participants self-reported. It is of interest to note that video editing and imaging technology had the largest increase of means of participant

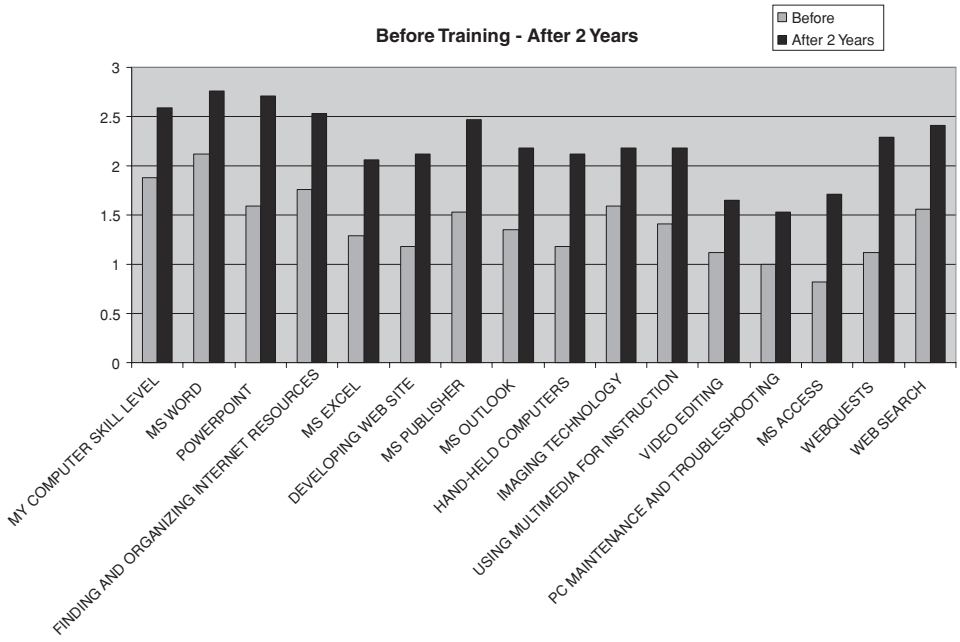

FIGURE 1 Participant self-report of specific technology skill ($n = 16$).

TABLE 2 Mean Ratings of Technology Use for Instruction and Student Use for Learning Between Year Two and Year Three

	After Year 2	After Year 3	*t*	*df*	*d*
Participants' rating of their instructional use	1.84 (0.55)	2.09 (0.34)	1.54*	29	0.55
Participants' rating of their students' use	0.87 (0.62) $n = 15$	1.50 (0.66) $n = 16$	2.72**	29	0.98

Note: * $= p > .05$, ** $= p < .05$ Standard deviations appear in parentheses below means.

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reported student use. Video editing was also reported by participants with the greatest increase in use by teachers.

The open-ended responses completed by participants provided interesting results. Several themes emerged from analysis of the feedback from both reports after years two and three. Participants responded to the following statement, "*Please describe your most significant change due to your involvement with the CoL, and to what do you attribute that change.*" Many described several things that contributed to their change. In both years, the most common element mentioned by participants was confidence using technology. In both years, one-half of participants mentioned their increase in *comfort* and/or *confidence* in using technology. Out of 18 responses for year three, eight participants mentioned some element of community, collaboration, or building professional relationships. Having these elements emerge might not

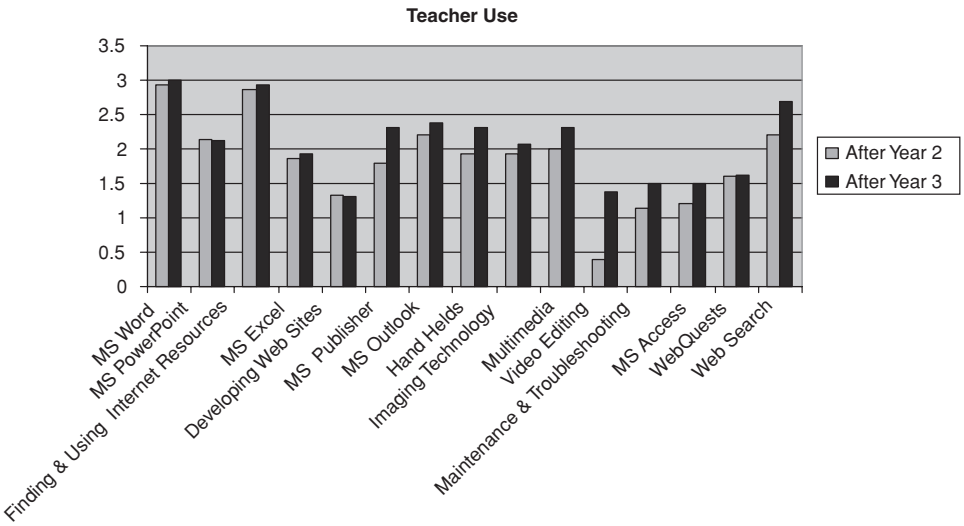

FIGURE 2 Participant self-report of teacher instructional use (Year 2; $n = 15$, Year 3; $n = 16$).

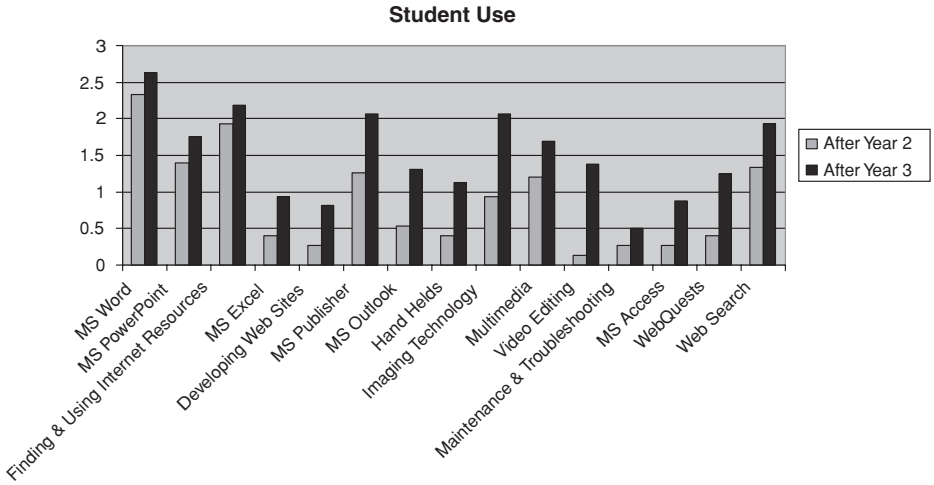

FIGURE 3 Participant self-report of student use (Year 2; $n = 15$, Year 3; $n = 16$).

be a surprise given the intense nature of the technology training, which had at its foundation collaboration and the building of a learning community. However, what was interesting was the difference in participants' mention of *personal learning* of technology and technology use for *student learning* between years two and three. After year two, five participants responded with learning, in terms of *personal learning* of technology skills, as one of the most significant changes that they experienced as a result of their engagement in the CoL. Only two participants mentioned technology use for students or student learning as a significant change for them due to their engagement. Conversely, after year three, seven respondents mentioned students or *student learning* as a significant change due to their engagement, while six mentioned personal learning of technology skills.

For example, one member's statement after two years describes the comfort level change: "My most significant change would be that I feel more comfortable with going out on a limb through technology. I have tried many programs in this class that I would never have tried" (CoL member most significant change response).

After three years, many members stated that they had gained confidence using technology within their teaching practice. One member stated:

> I am no longer afraid of computers. I don't feel like I have to know everything in order to use a program. I feel like I am computer literate now. I have confidence that I can learn and use new programs. I am able to help other teachers who are less confident. I use technology in the classroom as a tool for myself and for the students. Students in my classroom use technology in the classroom for learning on a daily basis. (CoL member most significant change response)

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Another participant stated:

> As I have participated in the Consortium, I have gained confidence in using technology with my students. This has been due to several factors. The first thing that helped get me to this point was having the support around me to back me up if I needed help. The second factor was being exposed to the different technologies out there. This got me thinking about how I could incorporate technology with my students. (CoL member most significant change response)

However, perhaps this participant's statement describes it best:

> I was actually afraid of technology before I joined this amazing group of instructors and colleagues. I was worried everything would break or that it would not work. As a result of taking these classes, I am not afraid to try anything and am planning on revising even more of my lessons to include technology on a more regular basis. There are also a variety of resources I have at my disposal from our own tech people on campus to the people on my list who I can write to and ask questions and even those who I do not know, but are experts in the field on line and on the phone if cyber space is not available. The people in this class have allowed me to spread my wings and fly when I only thought I could crawl by demonstrating, encouraging, and assigning me to try new and exciting adventures. (CoL member most significant change response)

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DISCUSSION

The methods used in this professional development project modeled technology integration through activities that engaged participants in activities that embedded technology skills within the context of pedagogy as it related to content. This approach seemed to engage these participants where knowledge of TPACK intersect to support technology integration. Even though these participants reported that they did not possess the technology skills and knowledge at the onset of the professional development project, they also reported that their technology competencies increased significantly in the first two years of professional development activities. When asked to identify what the most significant change was due to your involvement with the CoL, most reported the gain in comfort or confidence using technology. It stands to reason that one who believes that he/she knows how to use technology would feel comfortable doing so, at least for personal use. However, participants also reported a significant increase in the use of technology by their students between years two and three of the professional development project. Indeed, many reported that they were integrating technology within their teaching practice on a regular basis. It stands to reason that an increase

in technology self-efficacy might change one's beliefs and attitudes—thus overcoming one of the barriers that inhibit teachers from integrating technology into their teaching practice.

However, there are limitations to this study and issues to consider. First, self-reported data can be unreliable. There are many reasons why a participant may not give an accurate self-report, not the least of which might be an error in self-assessment. Second, although the participants did report a gain in their understanding of, and comfort in integrating technology, they were supported with training spanning a three-year period. Having professional development over a long term is a luxury that often is not possible, but more effective (Hall & Hord, 2001). Second, the members of the CoL, made up of a consortium of multiple school districts, worked together and were encouraged and supported to become leaders within their districts. Although this is often a goal of professional development, the approach of building a community of leaders fostered inter-district support, where participants built relationships over the extended period and therefore called upon one another for support and outside resources. While this goal seemed to be achieved in this professional development, often professional development programs are held for one district or even one school. Regardless, the notion of community and collaboration can, and the authors believe should, be considered for more localized participants as well.

While keeping in mind the limitations of this study, the reader is encouraged to draw his or her own conclusions as to how these findings might inform technology instruction or training designed to enhance a teacher's ability to integrate technology. For example, this professional development focused on engaging in-service teachers within learning activities where knowledge of TPACK intersect. However, there are questions that arise, in terms of how this approach might differ if one were designing technology integration lessons for pre-service teachers. What effect did possessing a greater understanding of pedagogy and content or teaching in general have? Did having an understanding of pedagogy and content provide a scaffold upon which to situate the technology skills and knowledge? If so, what does that say about undergraduate pre-service teachers who may be digital natives with greater confidence in using many technologies? Will their lack of pedagogical or possibly content knowledge hinder their ability to gain understandings of technology integration? Could their greater technology knowledge help scaffold their gaining pedagogical knowledge? Will they need a very different approach to help them situate pedagogy and content within their understandings of technology? While this study was not designed to investigate or collect any supporting evidence to these speculations or questions, they may bear fruit as topics for future research—as they could well influence how educators might design technology instruction for digital natives in teacher preparation programs.

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REFERENCES

Gess–Newsome, J., Blocher, J. M., Clark, J., Meansco, J., & Willis, E. M. (2003). Technology infused professional development: A framework for development and analysis. *Contemporary Issues in Technology and Teacher Education*, *3*(3), 324–340.

Hall, G. E., & Hord, S. M. (2001). *Implementing change: Patterns, principles, and potholes*. Boston, MA: Allyn & Bacon.

Hew, K. F., & Brush, T. (2007). Integrating technology into K–12 teaching and learning: Content knowledge gaps and recommendations for future research. *Educational Technology Research & Development*, *55*(3), 223–252.

Hixon, E., & Buckenmeyer, J. (2009). Revisiting technology integration in schools: Implications for professional development. *Computers in the Schools*, *26*(2), 130–146.

Jonassen, D. H., & Land, S. M. (2000). *Theoretical foundations of learning environments*. Mahwah, NJ: Erlbaum.

Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? *Contemporary Issues in Technology and Teacher Education*, *9*(1), 60–70.

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, *9*(5), 1–2. Retrieved from http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf

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