What Knowledge Is of Most Worth:
Teacher Knowledge for 21st Century Learning

Kristen Kereluik
Punya Mishra
Chris Fahnoe
Laura Terry
Michigan State University

Abstract

This article offers a critical review of the literature on 21st century knowledge frameworks, with a particular focus on what this means for teachers and teacher educators. The authors accomplish this by identifying common themes and knowledge domains in 15 reports, books, and articles that describe the kinds of knowledge that researchers state are integral and important for success in the 21st century. The authors argue that seemingly disparate frameworks converge on three types of knowledge, as necessary for the 21st century: foundational, meta, and humanistic. Although 21st century frameworks are thought to advocate new types of knowledge, little has actually changed in the new century with respect to the overall goals of education. Despite this sense of continuity, significant changes related to how technologies change all three types of knowledge need to be conveyed. The article ends with specific conclusions and recommendations for teacher education. (Keywords: 21st century skills, Common Core, teacher eduction, TPACK)

πάντα χωρεῖ καὶ οὐδὲν μένει καὶ δὶς ἐς τὸν αὐτὸν ποταμὸν οὐκ ἄν ἐμβαίης

Everything changes and nothing remains still … and you cannot step twice into the same stream.
　　　　　　　　　　　—Heraclitus

Plus ça change, plus c'est la même chose.

The more things change, the more they stay the same.
　　　　—Jean-Baptiste Alphonse Karr

The issue of what our students need to know has been receiving a great deal of recent attention—mostly under the auspices of 21st century learning. There is a feeling of distinct disjuncture between centuries past and the one into which we are now emerging, and that the educational demands of this new century require new ways of thinking and learning (Gardner, 2008; Pink, 2005). As teacher educators, we are particularly sensitive to what 21st century learning means in terms of the knowledge teachers must possess and how to best facilitate that knowledge. Consider for instance a report on the 21stcenturyschools.com website suggesting that today's students, due to their immersion in technology, are fundamentally different from students in the past—and thus by implication have different learning goals and necessitate different teaching approaches:

> You've got a cell phone at one ear and an iPod at the other. You know that Blackberry is now a verb and that Spam is not just canned meat. It's the 21st century…. Today's students, digital natives, were born into a media-saturated world, and their lives are immersed in technologies from cell phones, iPods, handheld gaming devices, PDAs, and laptops they take everywhere, to the computers, TVs, and game consoles at home." (21st Century Schools, n.d.)

So what is 21st century education? It is bold. It breaks the mold. It is flexible, creative, challenging, and complex. It addresses a rapidly changing world filled with fantastic new problems as well as exciting new possibilities. (21st Century Schools, n.d.)

Statements such as these are quite common these days and have driven a spate of books and reports that criticize the current goals and practices of schooling (Keengwe, Onchwari, & Wachira, 2008; Kozma, 2003; Zhao, 2009). These authors and groups suggest that current schooling practices are designed to prepare citizens for the industrial age rather than the needs and demands of the new millennium (Robinson, 2001). Parallel to this are individuals and groups who offer a range of suggestions for what are broadly labeled *21st century skills*.

It is unclear what precisely phrases such as *21st century knowledge*, *21st century skills*, and *21st century learning* mean. In some sense, "21st century" becomes an empty signifier (Barthes, 1977), a term that we all think we understand yet are hard pressed to clearly define. Do the proposed frames or definitions have anything in common, or are they quite different from each other? How are these 21st century knowledge frameworks different from the overarching goals of education that have been espoused in the past? Critics of this new 21st century–oriented discourse argue that this emphasis on the demands of a new century is just another form of chronocentrism, "the egotism that one's own generation is poised on the very cusp of history" (Wikipedia, 2010). Are the proponents of 21st century learning committing chronocentrism and subsequent errors by basing their vision of learning for the 21st century on the tools and technologies available in the

first decade of this century (Mishra & the Deep-Play Research Group, 2012)?

Debates of this nature are not new; they have been part and parcel of educational discourse for a long time. For instance, more than 150 years ago, Herbert Spencer wrote an essay titled "What Knowledge Is of Most Worth," in which he engaged in exactly this discussion, except from the point of view of the late 19th and early 20th centuries (Spencer, 1884). Spencer bemoaned the fact that most of the discussion around what is worth knowing in his day and age was based not on any rational discussion of the issues, benefits, and costs of learning one thing versus the other, but rather was driven by instincts and "personal predilections." As he said:

> Men (sic) read books on this topic, and attend lectures on that; decide that their children shall be instructed in these branches of knowledge, and shall not be instructed in those; and all under the guidance of mere custom, or liking, or prejudice; without ever considering the enormous importance of determining in some rational way what things are really most worth learning. It is true that in all circles we hear occasional remarks on the importance of this or the other order of information. But whether the degree of its importance justifies the expenditure of the time needed to acquire it; and whether there are not things of more importance to which such time might be better devoted; are queries which, if raised at all, are disposed of quite summarily, according to personal predilections. (p. 3)

Reading Spencer's words today gives one a distinct sense of déjà vu. There is a tension between proponents and critics of 21st century knowledge frameworks in which one side sees epic shifts in necessary student knowledge and the other sees only new branding of old ideas.

This article offers a critical review of the literature on 21st century knowledge frameworks, with a particular focus on what this means for teachers and teacher educators. The article begins by addressing the common call for 21st century knowledge frameworks in both popular culture and academia, followed by the contexts and purposes for choosing 15 key documents for further qualitative analysis. Next, the article explains the coding and analysis process leading to the development of a set of overarching categories to offer a coherent integrative framework that would help anchor our understanding of 21st century knowledge. Finally, the article concludes by discussing implications of this new emergent framework for educators.

21st Century Knowledge Frameworks

The call for 21st century knowledge frameworks largely rests on the assertion that education has failed to prepare students for the demands of the 21st century. Schooling (in terms of organization, structure, and format) remains much the same today as it was throughout the 20th century. The recommendations around 21st century knowledge emerged from educators such as Howard Gardner (Gardner, 2008), popular writers such as Daniel Pink (Pink, 2005), and organizations such the Partnership for 21st Century Skills (Partnership for 21st Century Skills, 2007) and the Center for Public Education (Jerald, 2009). These individuals and organizations argued that it had become increasingly evident that the labor force required by an increasingly globalized economy requires an altogether different model of education—one that transcends the 20th century skills of repetition, basic applied knowledge, and limited literacy.

With this in mind, we set out to understand and define what *21st century learning*, according to those involved in the discussion, actually means. This work is critically important because it will aid in determining *what* and, just as important, *how* we teach our students and in turn how we train and prepare teachers to do this.

Numerous institutions, organizations, and individuals responded to the call for a 21st century knowledge framework by identifying the student knowledge necessary for living and learning in the 21st century (as mentioned above), and searches on Google lead to millions (if not more) of websites and pages devoted to these terms. Upon review, there is quite a bit of diversity in the content of the responses from these organizations. If you looked at the popular press, for instance, you would read that 21st century learning appears to be inordinately focused on technological tools, such as wikis and blogs, or mobile learning (21stcenturyschools.com, 2010). The assumption appeared to be that these tools embed within themselves clear ways of thinking about content and pedagogy that conform to the needs of developing 21st century knowledge.

We were, however, somewhat skeptical of these claims. First, research shows that specific technologies do not demand specific ways of teaching and structuring content (Mishra & Koehler, 2006). One could use a wiki in a collaborative manner as easily as one could use a repository of instructor slides. This does not imply that technologies do not have specific strengths and weaknesses, but rather that technologies do not determine completely how they are to be used. Instead of predetermined outcomes, technologies provide us with a "zone of possibility" (Dirkin, 2009; Dirkin & Mishra, 2010; Mishra & Kereluik, 2011). Second, given the rapid pace of technological change, it seems shortsighted to base the education of the entire 21st century on the tools available today! Third, we found that much of this discussion appeared to emphasize creativity, innovation, and collaboration but provided (at least on a cursory level) less attention to content (disciplinary knowledge), though it was clear to us that a highly technologically developed society would need deep levels of knowledge of the disciplines. Given these concerns, we deemed the specific pursuit of common themes and ideas across different frameworks and approaches a worthy goal for this research project.

Clearly, inclusion of every piece of writing devoted to 21st century learning (particularly in this age of Google) was impossible, so instead we shifted our focus to independent, high-visibility

frameworks across education and economic organizations. The final list of 15 frameworks includes reports from educational organizations such as the American Association of Colleges and Universities, the Educational Testing Service, the Center for Public Education, the International Society for Technology in Education, WestEd, The Partnership for 21st Century Skills, the MacArthur Foundation, Center for Public Education, the National Academy of Engineering; corporations such as Cisco, Microsoft, and Intel; international bodies such as the European Union; business interests such as the Organization for Economic Cooperation and Development & the Metiri Group; individual scholars such as Howard Gardner and Yong Zhao; and popular writers such as Daniel Pink. These 15 reports, frameworks, and books offer somewhat different perspectives on what is meant by *21st century knowledge/skills/learning* and thus offer a somewhat comprehensive overview of this field. A complete, annotated list of the documents we selected for further analysis can be found in Appendix A (pp. 135–138).

We looked across frameworks with one primary goal in mind: to identify common recommendations and elements of 21st century frameworks in order to understand what types of knowledge are claimed to be integral to a 21st century approach.[1]

One thing became quite clear even through a first reading of these various documents**: T**he various frameworks offered two main justifications for the need to rethink the kinds of knowledge required for learning in this century—*technological modernization* and *globalization*. Technological modernization includes the economic shift in developed countries from manual and routine jobs to an intellectual and knowledge economy, and the diffusion of technology from strictly the workplace into all aspects of personal and professional life. Globalization includes the breakdown of national economic and social boundaries and the introduction of a newly interconnected

and diverse global society, facilitated and accelerated by technological modernization. Given these two powerful forces driving a new millennium of education, this work seeks to elucidate each framework's conceptualization of what knowledge is necessary for the 21st century.

Methodology

In the next part of the study, we focused on a more detailed and systematic analysis of what the 15 frameworks recommended by coding individual elements of each of the different frameworks. We analyzed relevant documents to recognize patterns and themes that emerged from the data. As Anafara et. al. (2002) have suggested, this form of analysis brings "meaning, structure, and order to data" and thus allows the researcher to categorize it in meaningful ways. The ultimate goal of analysis was to develop a synthesis that captured the essential elements of all 15 frameworks.

To make sense of the complex and diffuse textual data at hand, it was necessary to "horizontalize" the data. In doing so, we broke the frameworks into individual elements, which served as the unit of analysis during coding. We accomplished this horizontalization of the data using the traditional "cutting and sorting" technique (Ryan & Bernard, 2003), where we read the 15 manuscripts carefully and typed out the essential elements of each of these frameworks on a separate sheet, printing the coded identification of the origin of the element along with the element so that we could identify where the text came from. We then spread these elements out, read them, and sorted them into natural clusters. We paid close attention to word repetitions and synonyms as well as the occurrence of keywords in context of the phrases or sentences in which they occurred. We then reviewed these individual pieces and re-categorized them with an eye for emergent themes. The first two authors also engaged in a process of "constant comparison": As they placed each element in a "group" or "category," they compared it to all the other ele-

ments that were already in the category (Glasser, 1965). They did this to ensure that the categorization was consistent, and they reconsidered and recategorized elements that did not fit. The first two authors engaged in this continuous iterative process until there were no elements that did not fit in specific categories.

We then arranged the "indigenous categories" hierarchically (i.e., via a branching arrangement of categories and subcategories). The titles of these categories (and subcategories) emerged from the newly reorganized clusters.

The Synthesis:
The Framework of Frameworks

The analysis and review led to the identification of three broad categories with three subcategories within them. The three broad categories are Foundational Knowledge, Meta Knowledge, and Humanistic Knowledge. Each category and subcategory is comprised of references from several, and in most cases a vast majority, of the frameworks. For example, the category Foundational Knowledge emerged from subcategories such as Core Content Knowledge. Core Content Knowledge emerged from distinct references from the Metiri Group (2003) (high academic standards), European Union (2006) (mathematical and scientific competence), Partnership for 21st Skills (2007) (core subjects), American Association of Colleges and Universities (2007) (quantitative literacy), Howard Gardner (2008) (disciplined mind), Center for Public Education (Jerald, 2009) (advanced knowledge in traditional subjects), and Assessment and Teaching of 21st Century Skills (2012) (core curriculum). Similarly, Meta Knowledge emerged from subcategories such as Creativity and Innovation. Creativity and Innovation emerged from references from the Metiri Group (2003) (inventive thinking), European Union (2006) (creativity), ISTE (2007) (creativity and innovation), Yong Zhao (2009) (creativity), Partnership for 21st Century Skills (2007) (creativity), American Association of Colleges and

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Universities (2007) (creativity and critical thinking), Howard Gardner (2008) (creating mind), Daniel Pink (2005) (play, design), and many more. Finally, Humanistic Knowledge was similarly constructed out of subcategories such as Ethical and Emotional Awareness, based on references from the American Association of Colleges and Universities (2007) (ethical reasoning), Daniel Pink (2005) (empathy), Howard Gardner (2008) (ethical mind, respectful mind), European Union (2006) (management of feelings, emotional intelligence), Yong Zhao (2009) (emotional intelligence), and the European Union (2006) (high ethical standards).

Each category represented a different realm of knowledge, as Figure 1 demonstrates. Each of these overarching categories and subcategories are described in greater detail below. Please note that Appendix B (pp. 138–140) gives the actual breakup of the elements of each of the frameworks across these categories.

Foundational Knowledge

This category is the answer to the "what" question (i.e., "What do students need to know?"). The frameworks reviewed saw this in terms of three key subcategories: Core Content Knowledge, Digital Literacy, and Cross-Disciplinary Knowledge.

Core Content Knowledge. Core content knowledge and disciplined ways of thinking are characterized by highly complex and deeply ingrained mental processes specific to traditional domains, such as applying mathematical ways of thinking to solve everyday problems or applying scientific ways of thinking to understanding the natural world (Gardner, 2008). From the data we gathered, core content knowledge and high academic achievement in traditional domains appear**ed** to be among the most frequently cited essential skills for success in the 21st century (a complete list is provided in Appendix B, pp. 138–140). Excellence in traditional academic domains such as English and mathematics were considered to be the foundations upon which other 21st century skills are to be developed.
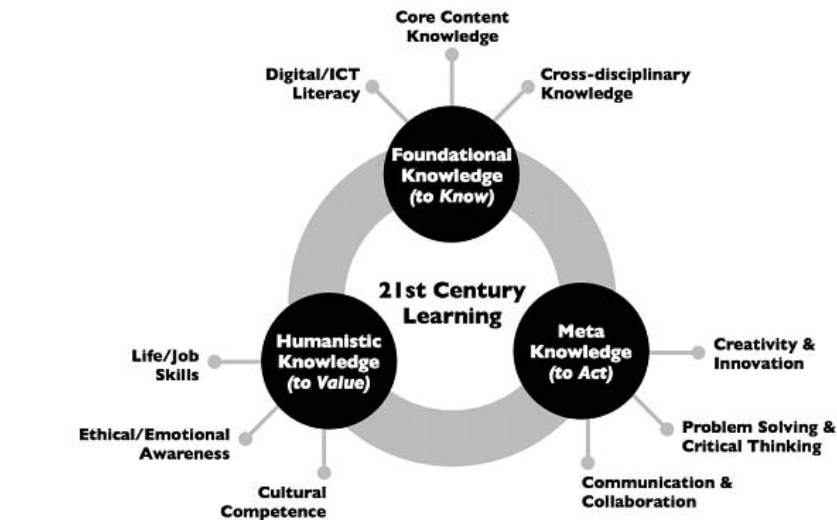

Figure 1. Synthesis of 15 different 21st century learning frameworks into one visual image.

Digital & Information Literacy. Digital and information literacy, like core content knowledge, was often cited as a skill necessary for success in the 21st century. It can be defined as the ability to effectively and thoughtfully evaluate, navigate, and construct information using a range of digital technologies and thus to function fluently in a digital world. An important part of this is the ability to effectively seek out, organize, and process information from a variety of media. This form of literacy also includes a component of responsible use of technology and media, an important moral and ethical consideration beyond understanding basic information and communication technology systems and media forms.

Cross-Disciplinary Knowledge. Cross-disciplinary knowledge is knowledge that integrates and synthesizes information from across fields or domains, such as the application of knowledge to new contexts in the pursuit of specific end goals. Synthesis can be related to both constructing meaning (i.e., making sense of different domains and their relationships) and to the generation of new ideas (i.e., trans-disciplinary creativity). The developers of the frameworks often asserted that this type of knowledge is crucial to success in the 21st century, as it also involves the ability to understand, organize, and connect the vast amounts of information now available with the advent of digital media.

Meta Knowledge

This category was about knowledge of the process of working with foundational knowledge. This could also be seen in terms of three subcategories: Problem Solving & Critical Thinking, Communication & Collaboration, and Creativity & Innovation.

Problem Solving & Critical Thinking. Critical thinking frequently involves the ability to interpret information and make informed decisions based on such information. Problem solving is often conceptualized as the use of critical thinking skills toward the effective resolution of a specific problem or toward a specific end goal. Problem solving and critical thinking most often involve the cognitive skills necessary for success in emerging economic and social domains.

Communication & Collaboration. Communication most frequently involves the ability to clearly articulate oneself through all media of communication— oral, written, nonverbal, and digital—as well as the skills necessary to be an active and respectful listener to diverse audiences. Collaboration includes similar dimensions as communication but also includes important individual contributions, such as flexibility, willingness to participate, and recognition of group and individual efforts and success. Communication and collaboration are cited as essential to success in the 21st century as working with

diverse groups becomes of the utmost importance in our increasingly globalized culture and economy.

Creativity & Innovation. Creativity was one of the skills that was most cited as necessary for success in the 21st century. Creativity and innovation involve applying a wide range of knowledge and skills to the generation of novel and worthwhile products (tangible or intangible) as well as the ability to evaluate, elaborate, and refine ideas and products. It is often reasoned that the highly complex problems facing society in the 21st century necessitate new and creative solutions.

Humanistic Knowledge

A humanistic theme emerged through the analysis of the various frameworks. This form of knowledge offers a vision of the learner's self and its location in a broader social and global context. The three main subcategories that emerged under this broader rubric are: Life/Job Skills/Leadership, Cultural Competence, and Ethical/Emotional Awareness.

Life Skills, Job Skills, & Leadership. Life skills, job skills, and leadership (including aspects of personal and professional leadership) serve to create lifelong learners who are capable of success beyond the confines of the classroom. Job and life skills were most often cited around three realms: those that serve to effectively manage and organize one's efforts, those that serve to coordinate and organize relevant and important information, and those that serve in the development of end products (tangible and intangible) in the pursuit of the resolution of specific solutions to relevant problems (European Union, 2006; Jenkins, 2006; Zhao, 2009).

Cultural Competence. Cultural competence also includes aspects of personal, interpersonal, and intercultural competence evidenced through effective communication, collaboration, and appreciation of ideas and emotions of all types of individuals. Cultural competence, like ethical awareness, is thought to be essential for social and economic success in the 21st century as a result of increased cultural diversity from globalization.

Ethical & Emotional Awareness. Ethical awareness included the knowledge and skills necessary for success in a culturally diverse society, such as the ability to imagine oneself in someone else's position and feel with that individual as well as the ability to engage in ethical decision making. It also includes the ability to intuit the feelings of others, a skill thought to be crucial for success in the 21st century, when success in social and economic realms necessitates a deep understanding of human emotions and successful human interactions.

Discussion

Broad Implications

The review of 15 of the most significant 21st century knowledge frameworks has led to new conclusions and a new categorization of three overarching categories with three corresponding subcategories. Each of these major categories can be seen as what we need to know, how we act on that knowledge, and the values we bring to our knowledge and action. It is important to note that while three realms of knowledge emerged from the initial nine subcategories, many of the subcategories overlap both in terms of their novel significance and the avenues through which they achieved this newly significant status. The realms function not as discrete categories of knowledge but as complimentary categories that support and inform one another. It is also important to note that we did not construct these categories, but rather they emerged from the analysis of these 15 documents. The final and important issue to point out is that knowledge of technology was evident in just one subcategory, Digital and Information Literacy. This is in sharp contrast to most rhetoric that we typically hear in the popular media (as evidenced by the quote on 21st century learners that started the chapter).

Two key contributions emerged from this review. We argue that our analysis indicates a somewhat paradoxical state of affairs when we think about 21st century knowledge. First, we argue that our synthesis of these different frameworks sug-

gests that *nothing* has changed, that this tripartite division between what we know, how we act on that knowledge, and what we value has always been important. That said, though these foundational ideas have always been key to learning, in some vital ways (particularly given advances in technology and globalization), everything *has* changed. Taking each of these positions in turn, we explain them more comprehensively below.

Nothing has changed. It is clear that not all of the knowledge and skills present in 21st century frameworks are unique and novel to this century. This idea is not unique to our analysis; Diane Ravitch seems to share this sentiment: "There is nothing new in the proposals of the 21st century skills movement. The same ideas were iterated and reiterated by pedagogues across the twentieth century" (2009). The world of the future will continue to depend on specialized knowledge (or domain knowledge) and high-level cognitive skills (such as creativity and critical thinking). These skills, rather than being novel to the 21st century, are required for successful learning and achievement in any time, including but not limited to the 21st century. Additionally, interpersonal skills (such as life skills, leadership, and cultural competence) have also been important in the past and will continue to be in the future.

Everything has changed. For a variety of reasons, though core ideas and goals of education have not changed, the specifics of how each of these is instantiated have changed (Jerald, 2009; Keengwe, Onchwari, & Wachira, 2008; Metiri Group, 2003). Although this may seem contradictory to the previous statement that nothing has changed, it remains true and highlights the complex and even sometimes ambiguous impact of technology and globalization on teaching and learning.

Changes to foundational knowledge. Technology in the foundational realm asserts itself as something "to know." Information literacy, while not unique to the 21st century, is uniquely pressing in the 21st century. Clearly multiple forms of media existed prior to the dawn

of the 21st century; however, the social, economic, and informational impact of the Internet and digital media is unprecedented. The Internet and digital media represent a new realm of interaction of which successful navigation is essential for success in the 21st century, and once gathered and comprehended, new skills and knowledge are necessary to collaborate digitally and contribute to the collective knowledge base.

The effect of technology on foundational knowledge in the 21st century goes well beyond the obvious dimension of digital and information literacy. Content has also been altered with the rapid advancement of technology in the 21st century in terms of both access to information and how information is represented (Summers, 2012, p. ED26). Individuals now have nearly instant access to information on an unprecedented scale, and the advent of easy-to-use software has lowered the barrier of entry to many activities. For example, online music simulators (e.g., Audacity, Open Orchestra) make it possible for students to learn about and experience music in new ways that, although possible previous to the 21st century, had much more significant barriers of entry, including necessary prerequisite knowledge and access to equipment.

More important, the nature of disciplinary knowledge itself and the methods for acquiring it have changed significantly due to the advent of the digital computer. The introduction of digital technologies has changed the methods and techniques of acquiring, representing, and manipulating knowledge in almost all disciplines, from mathematics to music, astronomy, and archeology. It is clear that the education of the next generation of citizens needs to change to keep up with these developments (Mishra, Terry, Henriksen, & the Deep-Play Research Group, 2013).

Finally, most of the progress in the recent past has been in areas that cut across traditional disciplinary boundaries (Mishra, Koehler, & Henriksen, 2011; Mishra & the Deep-Play Research Group, 2012), caused in large measure by the protean nature of digital

technologies (Koehler & Mishra, 2008). From bio-technologists to computational political scientists, from experts in data-mining who seek patterns in user behavior on the Web to programmer-artists who create scientific simulations to represent complex multidimensional phenomena, the world of the future depends on people who have deep knowledge of more than one discipline and the ability to see connections between these disciplines. Thus, cross-disciplinary knowledge and the ability to synthesize information are ultimately different in the 21st century than in the past, and an ever-expanding amount of information necessitates the ability to synthesize information and derive meaning.

Changes to meta knowledge. Technology in the meta realm asserts itself as knowledge "to act" with foundational knowledge and technology. This includes the ability not only to use technology in basic, predetermined (by the designer) ways, but to reuse and repurpose technology to meet specific educational needs and teaching/learning goals. Problem solving and critical thinking are not unique to the 21st century. However, they are transformed by technology as the unprecedented access to vast amount of information available on the Internet place a greater burden on individuals accessing information, as they must now possess the ability to discern, beyond simple aesthetics, between high-quality information and information of questionable quality.

Technology also changes communication and collaboration in crucial ways. The need to effectively communicate and collaborate is not novel, but ease of access has made large-scale communication and collaboration across thousands of miles commonplace. With increased globalization and affordances of new technology, individuals from diverse cultures are exposed to one another on an unprecedented level, and successful collaboration—and consequently cultural competence—is essential (Jerald, 2009). Communication and collaboration serve as an effective bridge between meta knowledge and humanistic knowledge as cultural competence (a subcategory

of humanistic knowledge) aids in, and is necessary for, successful communication and collaboration in the 21st century.

Changes to humanistic knowledge. Technology in the humanistic realm asserts itself as something to value both in others and in the possibilities of technology. Humanistic knowledge, while seemingly the most distant from the effects of technology, has nonetheless been modified by technology in the 21st century in that the ability to regulate one's efforts has become a multifaceted effort that necessitates organization of one's demands in different realms of life (personal, professional) to successful ends. In fact, self-regulation is becoming an important skill for students to learn (Mishra, Fahnoe, Henriksen, & the Deep-Play Research Group, 2013). Ethical and moral questions abound, many in arenas that had not typically been areas of doubt or discussion. Whether we consider issues of privacy and intellectual property or bio-technology and stem-cell research, individuals today (and in the future) have to develop fine-tuned ethical and moral modes of thought and action. All of this is, of course, exacerbated by the ability to easily and efficiently communicate with diverse groups of individuals across the world. Ethical and emotional awareness, while not novel to the 21st century, are uniquely important when working with diverse groups of individuals. The issue of humanistic knowledge becomes even more critical in an increasingly globalized and interconnected world, where different cultures have to meet and interact (Jerald, 2009). In contexts like this, developing a value system that respects differences and yet maintains a core of empathy and understanding becomes critically important.

Implications for Teachers and Teacher Educators
This framework provides some specific recommendations for teachers and teacher educators. In brief, we point to three key suggestions.

First, disciplinary knowledge and domain knowledge are as important as ever and will continue to be so well

into the foreseeable future. Educational systems remain fundamentally based on disciplinary knowledge and, as such, require teachers to be adequately trained and proficient in the disciplines. The advancement of the Common Core State Standards not only maintains a focus on disciplinary knowledge, but also appreciates the importance of students as critical thinkers with the ability to analyze information in the execution of daily tasks (NGA Center, 2010). The need for students to develop deep disciplinary knowledge has always been important; what has changed is access to disciplinary knowledge and authentic disciplinary inquiry made available through technology and subsequently experts and resources. Although some may argue that there is a divide between those promoting these types of 21st century skills and the structure of the Common Core State Standards, meaningful alignments exist between the two. For example, the 4 C's (critical thinking and problem-solving, creativity and innovation, communication, and collaboration) are represented throughout the standards. Students and teachers must work in purposeful learning communities, engage with questions that require reflection, defend conclusions, and problem-solve like detectives while responding like investigative reporters. Therefore, the current base of disciplinary knowledge that the Common Core expresses encompasses both traditional content knowledge and concepts forwarded in modern frameworks, such as students having strong communication skills integrated across content areas, being metacognitive in an iterative process, engaging with complex texts and complex problem solving, and developing a world focus.

Second, knowing the technology is important, but knowing *when* and *why* to use it is more important. This is closely related to the TPACK framework and knowledge that teachers must possess to teach effectively with technology (Mishra & Koehler, 2006). However, it is distinctly different in that the TPACK framework is admittedly content neutral and pedagogically neutral. In sharp contrast, this framework identifies and places great emphasis on the foundational knowledge that students and teachers must possess. That being said, basic digital literacy skills are essential for both students and teachers. Knowing when to use a particular technology for activities such as collaboration, or why to use a certain technology for acquiring specific disciplinary knowledge, is a vastly more important, transferable, infinitely relevant type of knowledge, one that will not quickly become antiquated with ever-changing technological trends.

Third, technological advances of the 21st century have brought us closer together and at the same time further apart. Advances to technology and infrastructure have made physical proximity optional, not only in education, but also in fields such as business and medicine, and they have made availability for interaction effortless. As a result of the increased opportunity for interaction across countries and around the world, teachers need to know how to foster cultural competence, emotional awareness, and leadership skills to facilitate not just interactions, but *meaningful* interactions and relationships. Interestingly, this specific type of knowledge is largely absent of the "standards-based" movements in education and not always seen as worthy of prolonged instructional time and effort.

Conclusion

We see this analysis as a significant contribution to the discussion on 21st century skills. Our emergent categorization scheme gives us a "big picture" of what we mean when we say *21st century learning*. Clearly the demarcation between the three categories (and the subcategories) is not clear cut; there are overlaps between them, but our emergent framework does provide a clearer vision of a field that had been dominated by multiple, seemingly conflicting perspectives.

We began with the question of what knowledge is of greatest worth at a time of flux and change. The Greek philosopher Heraclitus argued that because our reality is always changing, our knowledge of the world is constantly going out of date. As he famously said, "You cannot step into the same river twice." This continual turmoil, argued Heraclitus, implied that we can never have true knowledge. We are faced with a somewhat similar conundrum when we speak of what knowledge is worth having. The rapid changes we see in the world around us brought about by the forces of globalization and technological and cultural change often make it difficult to gauge what exactly it is that our students need to be learning in schools and how teachers are to be trained in order to prepare our students for the future.

Our analysis indicates that this seeming paradox of "nothing has changed" *and* "everything has changed" provides us a way forward. It suggests that, though the 21st century is different from previous times, it does not mean that our core roles (to know, to act, and to value) have changed. So, in that sense, there is no disjuncture between what we have been doing as educators in the past and what we do today (and in the future). That being said, it also indicates, even as we hold onto these core ideas, that we have to continually shift and come up with newer ways of instantiating them. So, though the manner in which we represent knowledge and act upon it may change, the core idea of what we do as educators has not.

Finally, we end by returning to Herbert Spencer (1884), who a century and a half ago wrote:

> If there requires further evidence of the rude, undeveloped character of our education, we have it in the fact that the comparative worths of different kinds of knowledge have been as yet scarcely even discussed—much less discussed in a methodic way with definite results. Not only is it that no standard of relative values has yet been agreed upon; but the existence of any such standard has not been conceived in a clear manner. And not only is it that the existence of such a standard has not been clearly conceived; but the need for it seems to have been scarcely even felt. (p. 147)

Our true and sincere hope is that our careful analysis and discussion of the term *21ˢᵗ century learning* is one way of addressing the concerns of Spencer and truly moving education into the future.

Author Notes

Kristen Kereluik is a researcher at the Michigan Virtual Learning Research Institute at Michigan Virtual University and pursuing her doctorate at Michigan State University. Her current work focus on research and policy around online teaching and learning both within Michigan and nationally. Her specific research focuses on preparing online K–12 teachers and supporting online K–12 students. Please address correspondence regarding this article to Kristen Kereluik, Michigan Virtual Learning Research Institute, Michigan Virtual University, 3101 Technology Blvd., Suite G, Lansing, MI 48910. E-mail: kereluik@msu.edu

Punya Mishra is a professor of educational psychology and educational technology at Michigan State University, where he directs the Master's of Arts in Educational Technology. His research has focused on the technology integration in teaching, teacher creativity and trans-disciplinary learning. Please address correspondence regarding this article to Dr. Punya Mishra, College of Education, Michigan State University, Erickson Hall, 620 Farm Lane - Room #509A, East Lansing, MI 48824-1034. E-mail: punya@msu.edu

Christopher Fahnoe is currently a PhD candidate at Michigan State University in the Educational Psychology and Educational Technology (EPET) program. In addition he currently serves as the Director of Technology and Assessment for Arlington Heights School District 25 (PK–8) in Arlington Heights, Illinois. His current research interests include self-directed learning, the response to failure and creativity, and the design of technology-enhanced learning spaces. Please address correspondence regarding this article to Christopher Fahnoe, Director of Technology and Assessment, Arlington Heights School District 25, 1200 S. Dunton Ave., Arlington Heights, IL 60005. E-mail: fahnoech@msu.edu

Laura Terry is a doctoral candidate in the Educational Psychology and Educational Technology Program at the College of Education at Michigan State University. Her research interests include issues of academic motivation for student-athletes as well as factors affecting urban classroom teachers' integration of technology. Please address correspondence regarding this article to Laura Terry, College of Education, Michigan State University, Erickson Hall, 620 Farm Lane, Room #509A, East Lansing, MI 48824-1034. E-mail: terrylau@msu.edu

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Appendix A

The following are references and brief descriptions of frameworks included in the review.

American Association of Colleges and Universities. (2007). *College learning for the new global century.* Washington, DC: AACU.

The American Association of College and Universities framework for college learning in the 21st century outlines essential aims, learning outcomes, and guiding principals for college education in the 21st century. According to the AACU, college education is now more important to individual success and America's future as a global leader than ever before. The framework is born out of the assumption that the world is being reshaped by technology and globalization and seeks to answer the question of what matters in college. The framework identifies learning outcomes for college education necessary for 21st century success and includes knowledge of human cultures, the physical and natural world, intellectual and practical skills, personal and social responsibility, and integrative learning.

Assessment and Teaching of 21st Century Skills. (2012). Retrieved from http://atc21s.org

The assessment and teaching of 21st century skills is an international partnership organized around providing clear operational definitions of 21st century skills, finding solutions to technical psychometric problems, developing strategies for administering assessments using information and communication technology (ICT), and identifying classroom strategies for helping students develop 21st century skills. The ATC21S project is sponsored by Cisco, Intel, and Microsoft and grows out of the assertion that technology has fundamentally changed all aspects of human life, and as such, students and teachers need to develop new skills to be successful in the 21st century. The project asserts that it is a collaboration among academics, governments, and members of industry to change the way students are taught and provide education relevant to "the 21st century and beyond."

Bernie, T., & Hood, P. (1999). Learning, technology, and education reform in the knowledge age, or "We're wired, webbed, and windowed, now what?" *Educational Technology, 39*(3), 5–18.

Bernie and Hood developed the Learning, Technology, and Education Reform in the Knowledge Age framework in conjunction with WestEd to address the challenges of the new knowledge-based society of the 21st century. The authors advocate reviewing the previous two decades of educational reform efforts and propose new reform measures. The proposed reform grows directly out of the new needs of the knowledge age. According to the authors, this reform strategy is already transforming learning and train-ing in business, medicine, science, and technology. The framework advocates "Seven C's": societal goals that, according to the authors, have not necessarily changed, as rather the context around the goals has changed. The Seven C's are critical thinking and doing, creativity, collaboration, cross-cultural understanding, communication, computing, and career and learning self-reliance.

Educational Testing Service. (2007) *Digital transformation: A framework for ICT literacy.* Princeton, NJ: ETS.

Educational Testing Services ICT framework was part of a two-phase project designed to create a large-scale assessment of ICT knowledge (iSkills assessment) and develop a framework for defining and understanding ICT literacy. ETS defines ICT literacy as using digital technology, communication tools, and networks to access, manage, integrate, evaluate, and create information as a functioning and contributing member of society. The ICT Literacy framework strongly asserts that ICT literacy is more than mastery of technology; rather it is the integration of cognitive and technology skills alongside traditional literacy, numeracy, and problem solving. The ICT Literacy framework includes five critical components: access to collect/retrieve information, management through organization and classification, integration of information, evaluation of information, and creating.

Gardner, H. (2008). *Five minds for the future.* **Boston, MA: Harvard Business Press.**
Gardner's new minds rest on the assertion that the new millennium and continues to be a time of immeasurable changes so prominent in the lives of individuals and society at large that the effects will be felt long into the future. The changes of the new millennium were ushered in following advancements in science and technology and subsequent globalization. According to Gardner, these changes necessitate new education processes, as our educational system is not designed to respond to the needs of the new digital and global age. Education needs to adapt to stretch and shape the minds of learners in five ways that will lead into the future. Gardner's disciplined mind is the master of at least one domain and through mastery achieves autonomy. The synthesizing mind takes information from disparate sources and domains and then evaluates the information and reorganizes it in new ways—skills necessary for success in the new age because of the vast amount of easily accessible information. The creating mind puts forth new ideas and asks and seeks answers to important unasked questions, and in doing so stays ahead of computers and robots, which rely on rule-governed logic. The respectful mind welcomes and encourages differences among individuals, a skill necessary because the world is now linked and has no place for intolerance or disrespect. Gardner's final new mind is the ethical mind, which works beyond self-interest and contemplates one's work in conjunction with the needs of society at large.

International Society for Technology in Education (2007). *The National Educational Technology Standards and performance indicators for students.* **Retrieved from http://www.iste.org/standards.aspx**
The International Society for Technology in Education's (ISTE) National Educational Technology Standards for Students (NETS·S) are a roadmap to effective teaching and professional growth in an increasingly technology-driven world. According to ISTE, technological literacy is crucial to success in a modern, globalized world that places a premium on highly skilled labor. The NETS include higher-order thinking skills and consider digital citizenship crucial for students to become effective lifelong learners and productive members of a globalized society. Education must adapt and provide students with the skills necessary for digital age professionalism, skills built on a base of solid technology literacy. Technology literacy includes knowledge of technology systems as well as the ability to apply knowledge in authentic ways for authentic purposes. The NETS include broad categories, such as the ability to demonstrate creativity and innovation, communicate and collaborate, conduct research and use information, think critically, solve problems, make decisions, and use technology effectively and productively.

Jenkins, H., Clinton, K., Purushotma, R., Robinson, A. J., & Weigel, M. (2006). *Confronting the challenges of participatory culture: Media education for the 21st century.* **Chicago, IL: The MacArthur Foundation.**
Jenkins' new literacies emerge out of a discussion of the new participatory culture. According to Jenkins, a participatory culture has relatively low barriers to artistic expression and civic engagement, support for creation and sharing, and informal mentorship. Participatory culture also has important interpersonal features: Members of participatory culture believe their individual and collective contributions matter and feel connected to others through their creations. Jenkins also asserts that a participatory culture shifts the focus from individual efforts to community involvement, and as such, new literacies are required for successful engagement within the community. Jenkins' new literacies are built upon the foundation of traditional literacy, research skills, technical skills, and critical analysis skills integral to traditional classroom instruction. Jenkins' skills include play and experimentation, performance and improvisation, simulation, appropriation, multitasking, distributed cognition, collective intelligence, judgment, transmedia navigation, networking, and negotiation.

Jerald, C. D. (2009). *Defining a 21st century education.* **Retrieved from the Center for Public Education website: http://www.centerforpubliceducation.org/Learn-About/21st-Century/Defining-a-21st-Century-Education-Full-Report-PDF.pdf**
The Center for Public Education's attempt to define a 21st century education arises from the notion that technology is changing the world through automation and globalization. The CPE asserts that technological automation has already replaced "doing" tasks and is now beginning to replace "thinking" tasks in which information can be broken down and digitally translated and outsourced. As such, nonroutine skills such as expert thinking and complex communication are essential for success in the 21st century. The CPE identifies three realms of necessary knowledge and skills: foundational knowledge in subject matter, literacy or ability to apply academic knowledge to real-world problems, and the competence to call on knowledge and literacies as needed in both personal and professional realms.

Metiri Group. (2003). *enGauge 21st century skills for 21st century learners.* **Retrieved from http://www.metiri.com/21/Metiri-NCREL21stSkills.pdf**
The Metiri Group's enGauge 21st Century Skills framework is built on the premise that students need new skills to survive and thrive in a rapidly changing digital world. The Metiri Group asserts that its framework is built on research and calls from governments and industry to define the skills necessary for success in the 21st century. The enGauge framework consists of four main realms of necessary knowledge, all conceptualized within a frame of high academic standards. Digital age literacies include the ability to use digital technology to organize and evaluate the vast amount of information available in the digital age. Inventive thinking and high-level cognitive skills are essential for success in the 21st century, as technology has simplified routine tasks, placing greater

importance on complex cognitive skills. Effective communication is necessary as technology has enabled widespread communication and collaboration and high productivity determines success in the workforce.

The National Academy of Engineering. (2004). *The engineer of 2020: Visions of engineering in the new century.* Washington, DC: The National Academy Press.

The Engineer of 2020: Visions of Engineering in the New Century is Phase 1 of a two-phase project by the National Academy of Engineers designed to prepare and guide the future of engineering by asking (and hypothetically answering) the question: "What will or should engineering be like in 2020?" The report discusses the future of engineering as a whole and presents a discussion of the key attributes of successful 2020 engineers. The Academy of Engineers discussion is framed by several guiding principals that are thought to play a critical role in shaping the future of engineering. Among the guidelines is that technology will continue to develop rapidly; the world will be increasingly globally interconnected; the population of individuals exposed to and influenced by technology will continue to increase; social, cultural, political, and economic forces will continue to shape technological innovation; and technology will become even more seamlessly integrated into everyday life.

Organization for Economic Cooperation and Development. (2005). *The definition and selection of key competencies: Executive summary.* Paris, France: OECD.

The Organization for Economic Cooperation and Development's key competencies arise out of a need to define and assess key competencies necessary for success in a newly challenging and complex society. Globalization and modernization have created a diverse and interconnected world, and key competencies allow individuals to make sense and meet the demands of such a world. The OECD framework includes main realms in which individuals must possess knowledge and skills: using tools

interactively, interacting in heterogeneous groups, acting autonomously, and resting on reflective thought and action. According to the OECD, using tools such as language and technology interactively is necessary to stay current with technology, effectively utilize tools, and collaborate effectively. Interacting in heterogeneous groups is necessary for effective collaboration and management of interpersonal relationships. Acting autonomously is not functioning in isolation, but rather it includes awareness of one's environment, realization of one's goals, and acting responsibly.

Partnership for 21st Century Skills. (2007). *Framework for 21st century learning.* Retrieved October 29, 2010, from http://www.p21.org/documents/P21_Framework_Definitions.pdf

The Partnership for 21st Century Skills' (P21) stated mission is to position 21st century readiness at the center of K–12 education in the United States. The framework that P21 developed is constructed from a solid foundation of content knowledge and supported by the specific skills, expertise, and literacies necessary for success in personal and professional domains. Within the foundation of core content knowledge are the essential skills, such as critical thinking, problem solving, communication, and collaboration, for success in a highly digital and globalized world. The P21 framework is born out of the assumption that individuals now live in a technology-rich environment that brings with it an abundance of information, rapid advancements in technology, and an unprecedented ability to communicate and collaborate with individuals around the world. To be successful in the new digital and globalized world of the 21st century, individuals must possess and use a wide range of learning and innovation skills related to information, media, and technology. P21 asserts that learning and innovation skills are currently recognized as skills that separate the students who are prepared for life and work in the 21st century from those who are not—a separation that stands to become more apparent as the demands

for success continue to increase. In addition to the P21 framework of necessary knowledge and skills, P21 also advocates for 21st century support systems for educators and students, including 21st century curriculum and instruction, 21st century professional development, and 21st century learning environments.

Pink, D. H. (2005). *A whole new mind: Moving from the information age to the conceptual age.* New York: Riverhead Books.

According to Pink, the future belongs to right-brainers, or those individuals who possess the conceptual senses to be successful in an increasingly conceptual age. Pink's senses arise from the assertion that a definitive shift is taking place in the advanced world from a logical technical age to conceptual age, which places a premium on knowledge. Pink's senses include design to change the world in significant ways, story or narrative imagining focused on understanding, symphony and synthesis, empathy, play, and the pursuit of meaning.

Recommendation of the European Parliament and of the Council of the European Union on Key Competences for Lifelong Learning, L394/10 C.F.R. (2006, December 12). Retrieved October 29, 2010, from http://ec.europa.eu/dgs/education_culture/publ/pdf/ll-learning/keycomp_en.pdf

The Recommendation of the European Parliament and of the Council of the European Union on Key Competences For Lifelong Learning is a combination of knowledge, skills, and attitudes necessary for personal fulfillment, successful integration into society, and productive employment. The eight key competencies allow for flexibility and increased adaptation of individuals and the workforce to the ever-changing and increasingly complex world. Communication in the mother tongue, communication in foreign languages, mathematical and scientific competence, digital competence, learning to learn, social and civic competence, sense of initiative and entrepreneurship, and cultural awareness and expression are essential for success

in the digital and globalized world. Although they represent different realms of competence, they are all interdependent.

Zhao, Y. (2009). *Catching up or leading the way.* Alexandria, VA: ASCD.

Zhao asserts that the United States—and the U.S. education system—needs to adapt to a newly globalized and ever-changing digital world to remain a leader in the 21st century. In a review of several frameworks that purport

knowledge and skills necessary for success in the 21st century, Zhao attempts to identify the needs of the learners in the 21st century. Zhao presents five assumptions that need to be driving forces behind educational reform. The first assumption is that educators must cultivate skills and knowledge within students that cannot be reduced and reproduced by machines or outsourced overseas. The second assumption asserts that creativity and adaptability are

essential for living in a new globalized and digital age. The third assumption is that the ability to effectively communicate and collaborate is essential for living in a global society. The fourth assumption is that complex cognitive skills are more important than memorization. The fifth and final assumption is that emotional intelligence is an essential component to effective communication and collaboration.

Appendix B

Table 1. Framework References and Abbreviations

Framework Reference	Framework Abbreviation
American Association of Colleges and Universities. (2007). *College learning for the new global century.* Washington, DC: AACU.	AACU
Assessment and Teaching of 21st Century Skills. (2012). Retrieved from http://atc21s.org/	ATC21S
Bernie, T., & Hood, P. (1999). Learning, technology, and education reform in the knowledge age, or "We're wired, webbed, and windowed, now what?" *Educational Technology, 39*(3), 5–18.	Seven C's
Educational Testing Service. (2007) *Digital transformation: A framework for ICT literacy.* Princeton, NJ: ETS.	ETS
Gardner, H. (2008). *Five minds for the future.* Boston, MA: Harvard Business Press.	Gardner
International Society for Technology in Education (2007). *The National Educational Technology Standards and performance indicators for students.* Retrieved from http://www.iste.org/standards.aspx	ISTE
Jenkins, H., Clinton, K., Purushotma, R., Robinson, A. J., & Weigel, M. (2006). *Confronting the challenges of participatory culture: Media education for the 21st century.* Chicago, IL: The MacArthur Foundation.	Jenkins
Jerald, C. D. (2009). *Defining a 21st century education.* Retrieved from the Center for Public Education website: http://www.centerforpubliceducation.org/Learn-About/21st-Century/Defining-a-21st-Century-Education-Full-Report-PDF.pdf	CEP
Metiri Group. (2003). *enGauge 21st century skills for 21st century learners.* Retrieved from http://www.metiri.com/21/Metiri-NCREL21stSkills.pdf	MG
The National Academy of Engineering. (2004). *The engineer of 2020: Visions of engineering in the new century.* Washington, DC: The National Academy Press.	E2020
Organization for Economic Cooperation and Development. (2005). *The definition and selection of key competencies: Executive summary.* Paris, France: OECD.	OECD
Partnership for 21st Century Skills. (2007). *Framework for 21st century learning.* Retrieved October 29, 2010, from http://www.p21.org/documents/P21_Framework_Definitions.pdf	P21
Pink, D. H. (2005). *A whole new mind: Moving from the information age to the conceptual age.* New York: Riverhead Books.	Pink
Recommendation of the European Parliament and of the Council of the European Union on key competences for lifelong learning, L394/10 C.F.R. (2006, December 12). Retrieved October 29, 2010, from http://ec.europa.eu/dgs/education_culture/publ/pdf/ll-learning/keycomp_en.pdf	EU
Zhao, Y. (2009). *Catching up or leading the way.* Alexandria, VA: ASCD.	Zhao

Table 2. Foundational Knowledge: Core Content Knowledge Elements and Descriptions

Knowledge Type	Framework	Description
High academic standards	MG	Traditional benchmarks in education characterized by rigorous curricula
Mathematical and scientific competence	EU	Mastery of the required mathematical and scientific domain skills and knowledge
Core subjects	P21, CPE, ACT21S	Mastery of English, language arts, world languages, arts, mathematics, economics, science, geography, history, government, and civics
Financial and business literacy	P21	Understanding of finance, financial resource management, and business fundamentals
Quantitative literacy	AACU	Understanding of numeracy and quantitative reasoning
Environmental literacy	P21	Understanding of environmental processes and society's impact on the natural world
Health literacy	P21	Understanding of healthcare information and the ability to make informed health-related decisions
Civic literacy	P21	Understanding and participation in civics, including exercising and understanding the impact of one's civic rights and responsibilities
Disciplined mind	Gardner	Mastery and deep domain knowledge aligned with one or more of the fundamental disciplines

Table 3. Foundational Knowledge: Digital and Information Literacy Elements and Descriptions

Knowledge Type	Framework	Description
Technological concepts and operations	ISTE	Understanding of technological systems and efficient selection, use, and troubleshooting of applications
Digital competence	EU, MG, Jenkins, ETS, ACT21S, Seven C's	Mastery of the skills and knowledge required to interact successfully with digital technology
Using tools interactively	OECD	Ability to use and respond to a variety of tools, including digital technologies
Information literacy	AACU, P21, ISTE, ETS, ACT21S	Understanding and ability to locate, evaluate, and effectively use information from a variety of sources
Digital citizenship	ISTE	Understanding of the norms of safe, appropriate, respectful, and responsible technology use
Distributed cognition	Jenkins	Ability to interact meaningfully with tools that expand mental capabilities
Judgment	Jenkins	Ability to evaluate the reliability and credibility of different information sources
Access	ETS	Knowledge of how to collect and/or retrieve information

Table 4. Foundational Knowledge: Cross-Disciplinary Knowledge Elements and Descriptions

Knowledge Type	Framework	Description
Synthesis	Gardner, AACU	Ability to combine elements from separate domains into a single, unified idea or entity
Symphony	Pink	Ability to cross disciplinary boundaries and combine disparate elements into new ideas or entities
Meaning	Pink	Understanding of the motivation that drives human existence
Story	Pink	Understanding of the power of stories to add depth to knowledge, enhance relationships, and provide context for disciplinary knowledge
Networking	Jenkins	Ability to search for, synthesize, and disseminate information
Integrate	ETS	Ability to interpret, summarize, compare, and contrast information using different representations

Table 5. Meta Knowledge: Problem Solving and Critical Thinking Elements and Descriptions

Knowledge Type	Framework	Description
Critical thinking	EU, ISTE, P21, CPE, ACT21S, Seven C's	Ability to reason effectively, use systems thinking, make judgments and decisions
Cognitive skills	Zhao	Mastery of high-level cognitive skills, such as critical thinking and problem solving
Inquiry and analysis	AACU, E2020	Ability to use knowledge to solve problems through breaking the problem into smaller parts
Risk assessment	EU	Ability to determine risks associated with concrete situations
Decision taking	EU, ISTE	Ability to utilize available information to appropriately select a course of action among several alternatives
Problem solving	ISTE, EU, ACT21S	Ability to identify gaps in knowledge and ask significant questions that inform gaps and lead to solutions

Table 6. Meta Knowledge: Communication and Collaboration Elements and Descriptions

Knowledge Type	Framework	Description
Communication	EU, ISTE, P21, MG, ATC21S, E202, Communication	Ability to effectively communicate using oral, written, and nonverbal means
Collaboration	EU, OECD, AACU, P21, Jenkins, ATC21S, Seven C's	Ability to work effectively and respectfully with diverse teams

Table 7. Meta Knowledge: Creativity and Innovation Elements and Descriptions

Knowledge Type	Framework	Description
Creativity	MG, EU, ISTE, Zhao, P21, Gardner, AACU, ETS, ATC21S, Seven C's, E2020	Ability to use a wide range of idea creation techniques in the creation of new and worthwhile ideas
Initiative/entrepreneurship	EU	Ability to turn ideas into action through creativity, innovation, risk-taking, effective planning, and project management
Play	Pink	Ability to bring humor and light-heartedness to business and products
Design	Pink	Ability to move beyond function to engage one's senses
Performance	Jenkins	Ability to adopt alternative identities for the purpose of improvisation and discovery
Appropriation	Jenkins	Ability to meaningfully sample and remix media content

Table 8. Humanistic Knowledge: Job, Life Skills, and Leadership Elements and Descriptions

Knowledge Type	Framework	Description
Skills that cannot be out-sourced	Zhao	Mastery of nonroutine skills such as expert thinking and complex communication
Learning to learn/lifelong learning	EU, AACU, E2020	Ability to pursue and persist in learning and to effectively organize one's learning
High productivity and quality	MG	Ability to effectively prioritize, plan, and manage one's efforts in producing high-quality products
Life and career skills	P21, ATC21S, Seven C's	Mastery of flexibility, initiative, self-direction, productivity, and responsibility
Acting autonomously	OECD	Ability to manage one's life in meaningful and responsible ways
Multitasking	Jenkins	Ability to scan one's environment and shift focus as needed to salient details
Leadership	ATC21S, E2020	Ability to organize a diverse group of people to achieve a common goal

Table 9. Humanistic Knowledge: Cultural Competence Elements and Descriptions

Knowledge Type	Framework	Description
Global awareness	AACU, Zhao, P21, EU, Seven C's	Understanding of pressing global issues as well as other nations and cultures
Communication in foreign language	EU	Ability to understand, express, and interpret concepts, thoughts, feelings, facts, and opinions in a foreign language
Civic competence and engagement	AACU, EU, ATC21S	Mastery of personal and interpersonal competencies and effective participation in diverse societies
Negotiation	Jenkins	Ability to travel across diverse communities, discerning and respecting multiple perspectives

Table 10. Humanistic Knowledge: Ethical and Emotional Awareness Elements and Descriptions

Knowledge Type	Framework	Description
Ethical reasoning	AACU, Pink, Gardner	Ability to go beyond logic and engage emotion and intuition
Empathy	EU	Ability to recognize emotions experienced by another individual
Constructive management of feelings	EU, Zhao	Ability to channel one's emotions toward positive and productive outcomes
High ethical standards	E2020	Understanding of right and wrong and seeking positive actions and outcomes