What We Know About COMMUNICATION

Part of the 4Cs Research Series

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ABOUT THE PARTNERSHIP FOR 21ST CENTURY LEARNING

P21, the Partnership for 21st Century Learning, recognizes that all learners need educational experiences in school and beyond, from cradle to career, to build knowledge and skills for success in a globally and digitally interconnected world. Representing over 5 million members of the global workforce, P21 unites business, government and education leaders from the U.S. and abroad to advance evidence-based education policy and practice and to make innovative teaching and learning a reality for every child.

ABOUT THE RESEARCH SERIES

P21, in collaboration with its research partners, is produced a series of research briefs and annotated bibliographies on key aspects of conceptualizing, developing, and assessing the 4Cs.

The research briefs in this series start with an overview of key conceptual issues related to the 4Cs of Creativity, Critical Thinking, Collaboration, and Communication, review research on interventions designed to increase student proficiency within each of the 4Cs, describe recent work on how to assess on the 4Cs, and conclude with major take-away points from the available research.

The series is edited by Helen Soulé, Executive Director at P21, and Jonathan Plucker, Neag Endowed Professor of Education at the University of Connecticut.

The 4Cs Research Series is dedicated to Dr. Ronald Thorpe, president and CEO of the National Board for Professional Teaching Standards. A friend and visionary we lost too early.

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INTRODUCTION

Communication is one of the key components of 21st century skills, yet it has not attracted the same research attention as related concepts, such as creativity and critical thinking. Communication research in the past has often focused on teacher-to-student communication (e.g., how to make sure students attend to the topic at hand), or explicitly teaching communication at the collegiate level (e.g., public speaking or leadership). Researchers have even collaborated with individuals in the television industry to promote school readiness and language development through educational television programming (Palmer & MacNeil, 1991; Slater & Rouner, 2002). In younger audiences, these interventions have traditionally focused on populations with communicative impairments, such as those on the autism spectrum. The show Sesame Street has been a place where children have learned a multitude of life skills while being entertained (Fisch, 2014). One particular focus of the show has been communication, both verbal and non-verbal communication (Sproull, 1973).

If educators are expected to teach their students how to communicate effectively, researchers need to focus on building a stronger, more empirically grounded framework for teaching these vital skills. As our society evolves, we can no longer assume that communicative competence is something that our students will learn "on their own." In this brief, we will discuss current theories of communication, interventions, and future directions for researchers.

CONCEPTS AND THEORIES

Communication research is a broad field covering topics such as mass communication (McQuail, 2010), computer-mediated communication (Walther, 1996), interpersonal communication (Jensen, 2013), and many other areas (Putnam, Roberts, & Porter, 1987). Some communication theories, however, are more relevant to the K-12 classroom than others.

Communicative competence, as defined by McCroskey and McCroskey (1988) is the "adequate ability to pass along or give information; the ability to make known by talking or writing" (p. 109). This definition closely fits the layperson's definition of communicative competence, and is particularly useful for developing self-report measures of communicative competence. And although assessment of communicative competence has been developing for decades (Hymes, 1971; Weimann & Backlund, 1980), most interventions are focused on populations with obstacles to communication, such as people on the autism spectrum, or language learners (Granlund, 1993; Odom & McConnell, 1992; Schoenbrodt, Kerins, & Gesell, 2003).

Computer-Mediated Communication (CMC) has gained attention recently, due to the abundance of new technologies, and the way those technologies have transformed the way we communicate. It is defined as communication between individuals using computers, while separated in time and/or space (Romizowski & Mason, 1996). CMC may be synchronous (aligned in time) or asynchronous (separated in time), and most of the research to date has focused on asynchronous CMC (Bannan-Ritland, 2002). Also, CMC in schools has mainly been studied in a collegiate population, and has generally been focused on teacher-to-student communication as opposed to inter-student communication, although there has been some research on student-to-student CMC (Swan, 2002).

Interpersonal immediacy behaviors have also been useful in the study of classroom communication, namely teacher immediacy behaviors. Immediacy is defined as behaviors that indicate a desire to communicate, and teacher immediacy has been shown to have a positive impact on student learning (Myers, 2002). Immediacy behaviors in the context of a classroom are things like eye contact, repetition of a student's name, nodding, and other such behaviors. These behaviors have been shown to increase student satisfaction (Hackman & Walker, 1990) as well as motivation (Christophel, 1990). While typically immediacy behaviors are thought of in a direct person-to-person context (Gorham, 1988), many researchers have begun to examine teacher immediacy in distance learning classrooms (Arbaugh, 2001; Baker, 2004; Freitas, Myers, & Avtgis, 1998).

The P21 Framework provides a conceptualization of 21st century communication skills that aligns with these broader definitions and theories. The Framework emphasizes effectively using oral, written, and nonverbal communication skills for multiple purposes (e.g., to inform, instruct, motivate, persuade, and share ideas); effective listening; using technology to communicate; and being able to evaluate the effectiveness of communication efforts—all within diverse contexts. This conceptualization reflects the broader work in communication regarding communicative competence, Computer Mediated Communication, and interpersonal immediacy, suggesting that the P21 Framework can be an effective model of improving K-12 students' communication skills.

COMMUNICATION IN PRACTICE: A P21 Member Perspective

I frequently hear educators and parents talk about how technology has become ubiquitous and how our kids and grandkids are "tech savvy" and "digital natives." I recently had a conversation with a superintendent who was amazed that his five-year-old granddaughter could access PBS for Kids online independent of any assistance from an adult. "I just give her my iPhone 6 and off she goes." I think we all can agree that technology and our youth's ability to use it for communicating has changed the way our society looks, feels and functions.

Lenhart (2010) concurs with this notion of access to ubiquitous technology stating that 95 percent of teens, ages 12-17 are online and 58 percent of 12-year-olds have a cell phone. Moreover, according to Schaffhauser (2015) they not only have access, but invest a great amount of time using technology, "Millennials on average spend 35 hours a week on digital media."

So we have arrived, right? Not by a long shot. Just because kids are digital natives does not ensure a proficiency in digital literacy and online communication. For example, Schaffhauser (2015) states that of those same groups of kids who spend 35 hours a week on digital media 58 percent have "low" technology skills, skills they need to be effective at school and work. The problem of lack of basic digital literacy and 21st century skills is not unique to just Millennials, it effects workers, recent college graduates, younger students and even those who teach. For example, according to Schimel (2015) a recent study showed that only 4 percent of 13 year old students could identify whether a website was credible and a separate study showed that only 8 percent of 13 year olds could send a proper email.
200 million adults in the US are part of the digital workforce, yet only one-in-ten rates themselves as very proficient with the digital tools they use every day at work.

The lack of digital technology skills is "contributing to a decline in the growth rate of employee productivity, to levels last seen in the 1970's." A whitepaper on worker productivity by Webster (2012) shows us that time wasted due to inadequate digital skills adds up to 21% of total productivity for digital workers, at a cost of $1 trillion per year according to a study conducted by Grovo (2015).

Change the Equation (2015), puts it best, "Simply being able to use a smartphone or Facebook isn't enough. To be successful in a global economy, our children must become fluent in the technologies that are revolutionizing our lives and our work, and how best to use them to innovate." (Emphasis Added). The real work that lies before us as business leaders, educators and parents is true integration of opportunities for our students to learn how to apply the 4Cs of Communication, Collaboration, Critical Thinking and Creativity.

Recent research findings are pretty clear. Simply recognizing that digital literacy is no longer a "must have" for all children isn't enough. Lack of digital literacy knowledge, 21st century skills and level of efficacy can be tied to earning power of the individual AND lower productivity of our workforce, which hurts the United States both nationally and globally.

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INTERVENTIONS AND EMPIRICAL STUDIES

For many years, practical interventions to teach communication skills have been focused on special populations. Yet, as we see a shift of teachers being encouraged to teach practical communication skills, more interventions will be needed that focus on mainstream populations. Currently, we have found a number of interventions teaching communication skills to a preschool-age population in a conventional classroom setting. One of these interventions is the Preschool Life Skills program (Hanley, Heal, Tiger, & Ingvarsson, 2007), which teaches not only functional communication, but also delay tolerance, and friendship skills. After implementation of the program, the researchers found a 74% reduction in problem behavior of the participants and received positive feedback from the teachers involved in the implementation of the program. In a follow-up study, Luczynski and Hanley (2013) found that when the program was implemented for students with problem behaviors, both the teachers as well as the participants' guardians rated the intervention satisfactorily.

In a similar study, Farber and Klein (1999) conducted an intervention on kindergarten and first-grade students, involving the teaching of listening, speaking, reading, and writing skills. Their intervention involved the incorporation of speech-language pathologists into the classrooms, to work alongside classroom teachers. The speech-language pathologists worked with the teachers and students to encourage more student communication skills, such as attentive listening. The use of speech-language pathologists as means for intervention in a classroom has other empirical support (Christensen & Luckett, 1990; Farber, Denenberg, Klyman, & Lachman, 1992; Norris & Hoffman, 1990). Farber and Klein (1999) concluded their study optimistically, calling for wider implementation of speech-language pathologists in the classroom. This seems to be a good option; however, it could prove to be difficult for schools to implement, due to the possible extra expense. Other similar research needs to be done, perhaps on older populations (above the preschool and kindergarten level), or examining the long-term impacts of these studies.

One aspect of classroom communication that has garnered a significant amount of research is teacher immediacy, which is part of instructional communication theory. As briefly mentioned, these behaviors have been shown to impact both affective learning (such as willingness to participate) as well as cognitive learning (absorption of the course material) (Kearney, Plax, & Wendt-Wasco, 1985). Recently, research on teacher immediacy behaviors has focused on immediacy in distance learning. Even through computer-mediated communication, immediacy behaviors were shown to impact students' affect, satisfaction, and perceived cognitive learning (Arbaugh, 2001; Baker, 2004) in both synchronous and asynchronous distance learning environments (Arbaugh, 2001, Freitas, Myers, & Avtgis, 1998). This research has focused solely on a population of college students, however, and may not be as useful for K-12 educators who rarely teach online classes. One particularly poignant example of the dramatic impact that immediacy behaviors can have on student achievement is Jane Eliott's famous "Blue Eyes-Brown Eyes" exercise (Stewart, Laduke, Bracht, Sweet, & Gamarel, 2003). In her classroom, Eliott labeled children based on their eye color, and then treated the groups differently, prioritizing one over the other, and then switching the prioritization. By favoring the prioritized group with immediacy behaviors, as well as overt statements about their relative intelligence, Eliott effectively divided her classroom. The students in the "out-group" became dejected, performed more poorly on assessments, and were bullied by the "in-group" students, who improved on assessments and became more confident. This exercise has been repeated numerous times, both by Eliott herself and by others, and has been used as a means to discuss topics such as prejudice and stereotyping, as well as ideas of teachers' self-fulfilling prophecies for students (Peters, 1987). It can be seen as the other side of Rosenthal and Jacobson's (1968) Pygmalion work, in which teachers were told (falsely) that some students were highly gifted; these labeled students then improved in classroom performance (because of the extra attention).

Avatars in online communication are another interesting area of research that can be easily leveraged for educational researchers. Kritz and Shonfeld (2012) examined student's use of avatars in 3D learning environments. Their study encompassed a number of research questions, most notably if similarities between students and their avatars would facilitate learning. Other researchers have examined trust and liking between participants (Lim & Reeves, 2007; Witmer & Singer, 1998), and presence (the feeling of being in a certain environment even when not physically there, Lombard & Ditton, 1997) (Bracken & Skalski, 2006, 2009) with the use of avatars. Ward and Sonneborn (2009) have explored the use of avatars for creative expression, another of P21's 4Cs.

The use of video games in education is not an uncommon idea, as Dickey (2005) discusses, and the research being done on presence and trust outside of a classroom environment in this area could be very useful knowledge for educators. Another line of work, by Almond, Kim, Velasquez, and Shute (2014), has used embedded assessments in video games to help assess evaluate basic student knowledge.

Another area of research interest is communication between students. This can have a number of applications, such as the construction of learning communities in an online course (Swan, 2002), an exploration of the facilitation of interactive online learning opportunities (Sargeant, Curran, Allen, Jarvis-Selinger, & Ho, 2006), a comparison between online and face-to-face collaboration (Ocker, & Yaverbaum, 1999; Thompson & Coovert, 2003), or the development and impact of social presence in online discussions (Swan & Shih, 2005). These studies are of interest to educators who would like to facilitate quality communication between their students. However, thus far, these studies have been limited to college populations.

Social and emotional learning (SEL) studies are an area that tangentially hits areas of interest for communication researchers. Some of these studies touch on classroom climate (Rivers, Brackett, Reyes, Elbertson, & Salovey 2013), which we will discuss later. Although SEL theory does encompass more than just communication, positive peer and teacher relationships are nevertheless a prominent focus in the research (Iizuka, Barrett, Gillies, Cook, & Marinovic 2014; VanderWalde, 2013). Social skills are not the same as communication, but they incorporate aspects

COMMUNICATION IN PRACTICE: A P21 Member Perspective

We use digital media tools for many things, but communication is perhaps the most universal. Whether it's via email, text message, video stream, blog post, discussion forum, tweet, or another of the myriad ways we connect to each other using technology and the Web, communicating today requires skills and competencies unimagined in generations past. To communicate successfully in our personal, academic, and professional lives, we need technical know-how, an understanding of the protocols and norms of various digital tools, intrapersonal communication skills that support interactions with a wide variety of people, and a developed awareness of how to use technology safely and responsibly.

Today's teachers know these critical lessons must be addressed in the classroom. Despite kids' general aptitude for technology, guidance and intentional practice in these skills and in using these tools is essential. Fortunately, we are seeing more schools and districts make room for teachers to incorporate media literacy, digital citizenship, and other 21st century communication practices. Teachers can both present teachable moments in safe, low-risk "walled gardens" and offer students authentic purposes for communication by giving them room to interact with a global audience on the wider Web. Using high-quality digital tools along with targeted media literacy and digital citizenship resources, teachers can scaffold learning experiences to help kids build the skills they'll need to communicate effectively in their social and professional lives.

In our work in schools across the country, we've seen teachers building 21st century communication skills in a variety of ways:

- A technology coordinator in Newtown Square, Pennsylvania, uses the Common Sense Digital Citizenship curriculum to help her second-grade students learn safe practices around online communication as they launch their personal blogs using Kidblog.
- A high school English and media teacher in Salt Lake City, Utah, promotes a discussion-based classroom, giving students ample opportunity to talk about their perspectives on a range of issues with classmates and students around the world via online student communities such as Youth Voices.
- A high school English teacher in Oakland, California, encourages her seniors to share their year-end projects with an audience beyond the classroom walls. Through TED-style video presentations posted online, students demonstrate their learning about a topic for peers, family, and the wider community.

However, creating a classroom that supports building 21st century communication skills isn't without its challenges. According to our research, 75 percent of teachers aren't using the best available student tools, and many teachers say they lack information and training to implement edtech that could give their students the edge they need[1]. Additionally, we hear from teachers who struggle to make time for lessons focused on 21st century communication skills given all that's already on their plates. Lastly are the risks around data privacy and student safety, which can create tension between the need for students to have real-world experiences with digital communication practices and the desire to keep kids safe under the watchful eye of a teacher. Because we know it's only through these real-world experiences that they'll hone their skills and learn to navigate the digital world productively, we stress the importance of teaching kids, guiding educators, and educating communities to communicate with tech smartly, safely, and responsibly.

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[1]Common Sense Media (2014b). Common Sense National Teacher Survey, Wave 3. Unpublished Internal Report.

COMMUNICATION IN PRACTICE: A P21 Exemplar Perspective

Saluda Trail STEAM Middle School in Rock Hill, North Carolina, provides numerous programs where students are challenged to develop their communication skills. Saluda Trail hosts a STEAM Boot Camp for all students at the beginning of the year which lasts for 2 to 3 weeks. The 2014-15 Boot Camp included a 2-3 day lesson on building communication skills. Peer rubrics were used to assess both impromptu presentations as well as more polished presentations on the introduction, content, delivery, and conclusion as students mastered their public speaking skills. Public speaking rubrics assess and measure growth of student communication skills on their presence, making eye contact, projecting their voice, pronunciation, and posture, as well as the quality of their message.

The Ambassador program at Saluda Trail STEAM Middle School offers students in grades 6-8 additional opportunities to lead, communicate, and serve. To become an Ambassador, students must participate in a rigorous application process and be willing to positively contribute to the school and community. Many opportunities are provided for Ambassadors to experience success and one of these opportunities is called Oakdale OutReach.

Oakdale OutReach is a partnership program with neighboring Oakdale Elementary STEM School, grades K-5. Eight Ambassadors volunteer one to two days per week, assisting in the Oakdale afterschool program. They read, draw, and interact with the younger children, helping them with homework and playing games. According to the teachers and staff at Oakdale, the Ambassadors are the highlight of the day for many of the children.

The Ambassadors share their experiences in group meetings at Saluda Trail. They talk about how good it makes them feel when the children welcome them into the classrooms with squeals of excitement, and how important they feel accepting this responsibility. They share their amazement at how many questions one child can pose about a single topic.

The Ambassadors communicate in ways which promote positive relationships with these young students through their actions and words. Daily conversations, reading picture books, role-playing, and story-telling are all opportunities to influence the behavior and attitudes of these small children. Being an effective communicator is a STEAM Student Quality at Saluda Trail, and Ambassadors are keenly aware of the importance that effective communication plays in success.

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of communication. More interestingly, researchers are already implementing interventions in K-12 classrooms focusing on SEL. For a review of classroom interventions focused on social and emotional learning, see Durlak, Weissberg, Dymnicki, Taylor, and Schellinger (2011).

ASSESSMENT

There are possibilities of altering current communication assessments in other fields to make them applicable in an educational context. For example, in business, the “elevator pitch assessment” (i.e., if you only have a couple minutes to pitch an idea to someone, how would you do it?) is sometimes used both to assess current communication competence and to practice and improve these communication skills. This can subsequently improve communication skills. Cameron and Dickfos (2013) constructed a rubric by which to evaluate performances on the elevator pitch utilizing this assessment. In their study, they used the elevator pitch assessment to practice communication skills, and used self-reported confidence in communication as their outcome variable. One could use the rubric stated in their paper to evaluate communication skills in a business environment, as well as an academic environment. Certain aspects of the rubric, such as use of voice, audience engagement, and pacing, could also likely be used to rate communication in less formal settings..

Another area besides business that has developed numerous scales for rating communication is medicine. Medical professionals are often evaluated on their “bedside manner,” and, as such, medical educators have needed to develop measures to assess these skills. Hobgood, Riviello, Jouriles, & Hamilton et al. (2012) review the current assessments in this field, which range from self-report to direct observation, and also include portfolio review, peer review, and more. It would be valuable for educational researchers to examine these assessments and determine if there are ways to make them applicable in a classroom setting.

A growing area of interest in the field of communication education is media literacy. Media literacy is defined as "the ability to understand, analyze, evaluate and create media messages in a wide variety of forms" (Aufderheide & Firestone, 1993; Thoman, 2003). While there has been widespread encouragement of the teaching of media literacy (Kubey, 1998), measures are still being developed to measure the effectiveness of these programs intended to teach media literacy. Although many of these measures are developed using typical college age populations (Arke & Primack, 2009; Ashley, Maksl, & Craft, 2013), there are a number of scales have been developed for younger children. Chang et al. (2011), for example, developed a self-report scale for elementary school students by modifying a pre-existing Media Literacy Self-evaluation Scale (MLSS). Other researchers have constructed instruments to address specific media literacy issues. For example, the work done by Primack et al. (2006) on media literacy addressing adolescent risk factors concerning smoking.

A related area of work is that of digital media literacy (Coiro, Knobel, Lankshear, & Leu, 2014). Leu et al. (2011) note that this is an important area of work because, "The Internet is the defining technology for literacy and learning in the 21st century," and, therefore:

> "Individuals, groups, and societies who can identify the most important problems, locate useful information the fastest, critically evaluate information most effectively, synthesize information most appropriately to develop the best solutions, and then communicate these solutions to others most clearly will succeed in the challenging times that await us." (p. 5).

Although this is a growing body of research with limited classroom-level assessment development, some interesting and unique approaches to data collection are being attempted. For example, Greene, Seung, and Copeland (2014) have used a think-aloud protocol analysis to assess student digital literacy skills.

Dwyer et al. (2004) developed a measure of classroom climate, which is another area of interest for communication researchers. Classroom climate can be loosely understood as the feeling of community within a classroom or school. Researchers have examined climate at both at the individual classroom level and at the school-wide level (Anderson, 1982), and have also examined a multitude of factors impacting classroom climate, such as teacher personality (Walberg, 1968), gender differences (Hall & Sandler, 1982), and school size (Koth, Bradshaw, & Leaf, 2008). Although Dwyer et al.'s (2004) Connected Classroom Climate Inventory (CCCI) was developed for a university population, it can be leveraged for use in the K-12 classroom. This measure focuses on student-to-student interaction, whereas other researchers (e.g., Nadler & Nadler, 1990) have also developed measures of teacher-to-student interaction and classroom climate. Nadler and Nadler examined student perceptions of teachers' dominant or supportive behaviors in the classroom.

There has been some relevant K-12 work in the development of scales and techniques for evaluating the creativity of student products. Part of this development has been fueled by the influence of education models that emphasize student communication in their work (e.g., Renzulli, 1994), and part derives from the growth of problem- and project-based learning, in which students produce concrete products at the end of a given lesson or unit (e.g., Wirkala & Kuhn, 2011). Much of this assessment activity has been concentrated in higher education in recent years, but there have been some systematic efforts to develop high-quality product assessments for K-12 settings. The most widely used, the Consensual Assessment Technique (Amabile, 1983), does not assess student communication about the product and is therefore of limited utility in the present context, although it has been applied in a peer setting (Kaufman, Gentile, & Baer, 2005). Both the Creative Product Semantic Scale (Besemer, 1998; Besemer & O'Quin, 1999) and the Student Product Assessment Form (Reis & Renzulli, 1991) require educators to rate specific characteristics of students' products. For example, the Creative Product Semantic Scale allows raters to judge the novelty, problem resolution, and elaboration and synthesis attributes of products, and the Student Product Assessment Form provides ratings of nine product traits (e.g., problem focusing, appropriateness of resources, originality, action orientation, audience). The common trait of these two scales is that consideration of one's potential audience is valued and assessed.

In the same vein, the growth in popularity of design-based education also promises to produce helpful communication assessments that can be adapted for K-12 settings. A case in point is the research of Horn and Salvendy (2006a, 2006b, 2009), in which the researchers have questioned the applicability of existing product measures to the design context and propose an alternative model consisting of six components: novelty (the newness of the product), resolution (the ability of a product to resolve a problem), emotion (the pleasure or arousal induced by the product), centrality (ability to match consumer needs), importance (importance to consumer needs), and desire (how critical or desirable the product is). Although this work is relatively new, the increasing importance of design suggests that evaluation of creative products and communication could become more prominent.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion: The P21 Framework provides a comprehensive definition and model of K-12 communication skills that reflects current definitions and theories within the broader field of communication studies.

> **Recommendation:** Educators should work to adopt common definitions and goals related to the communication skills development of their students.

Conclusion: Much of the intervention research has focused on addressing student communication deficits or helping prevent teacher bias when communicating with students. These interventions generally look to be effective, but they do not necessarily provide guidance on promoting 21st century communication skills within the entire student population.

> **Recommendation:** A great deal of additional work is needed to produce K-12 interventions for promoting the development of 21st century communication skills.

> **Recommendation:** Many K-12 schools, such as those highlighted in the P21 Exemplar Program, have developed their own interventions, and these efforts should be studied carefully and disseminated widely to other schools and educational settings.

Conclusion: Although considerable, related assessment work is being done across a number of educational contexts, we did not identify a single assessment or set of assessments that provides educators with information on K-12 student development of 21st century communication skills.

> **Recommendation:** Educators should look to related assessments being developed for other purposes (e.g., higher education, evaluation of creative products) to see if they can be adapted for K-12 purposes.

> **Recommendation:** As with interventions, many K-12 schools are developing their own strategies to assess 21st century communication skills, and these should be evaluated and, if promising, disseminated widely.

Conclusion: A broad-based, integrated approach to teaching communication within K-12 settings has only recently become an area of interest for teachers and researchers. As such, there is clearly room for more research in this field. While a research foundation may have been formed, it is very thin in some places.

> **Recommendation:** There are numerous places where researchers can easily leverage existing university-level research to test if the findings are the same for a K-12 population.

> **Recommendation:** Some areas of future study should include the development of communication assessments aimed at K-12 students, as well as more research on interventions concerning the teaching of communication skills to all students, not just those with disabilities.

TABLE 1: What do we need to do?

Education Level	Intervention	Assessment	Evaluation
P-12 Classroom	Determine whether oral, written, and visual communication is being developed within the classroom environment; embed diverse forms of communication into the classroom culture	Embed student communication in all aspects of student work; include in curriculum and instruction; ensure communication includes diverse audiences such as peers, parents, and community members	Incorporate assessment of communication as a major student outcome of teaching and learning; regularly assess student's growth and report the results to parents
School	Examine how communication is being taught across classrooms and grades; ensure various effective communication vehicles are embedded in school culture and learning spaces; take steps to address gaps	Establish communication skills as high priority and develop common vision, plan and strategy for teaching and learning; build staff capacity, allocate resources and support innovative teaching practices in communication	Include communication as key outcome; assess communication in all assignments and projects; encourage use of formative assessment to assess student growth; use a common communications assessment across all classes
Out-of-School	Evaluate and redesign learning environment to support communication. Use multiple environments to teach and reinforce the value of communication skills	Ensure activities and support services emphasize communication components; support building staff capacity through professional development	Encourage measurement of students' growth in communication as integral part of program outcomes; document evidence of students' growth in communication skills
School District	Provide resources to promote 21st century communication practices	Provide PD and resources; support opportunities for students to share work and identify audiences; support educators in sharing resources and teaching strategies	Develop and support 21st century assessment data systems for educators, parents, and students that include communication and monitor student performance
State	Promote student communication outcomes in schools and districts; support teaching practices and learning environments that promote communication	Develop and disseminate curricula, resources, and professional development to promote 21st century communication skills	Promote the assessment of communication as important student outcome; develop assessments of communication and ensure it is a key part of the overall assessment system
National	Support research on effective communication outcomes and develop resources; Evaluate efforts to teach communication and policy supports	Fund research and development projects on interventions designed to increase students' 21st century communication skills	Support development of high-quality formative and summative communication assessments

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Witmer, B. G., & Singer, M. J. (1998). Measuring presence in virtual environments: A presence questionnaire. *Presence: Teleoperators and Virtual Environments*, 7(3), 225-240.

ANNOTATED BIBLIOGRAPHY

Communication is included in the P21 Framework for 21st Century Learning as one of the Learning and Innovation Skills (www.P21.org/Framework). Also known as the "4Cs," they include creativity, critical thinking, collaboration, and communication.

The learning and innovation skills of the P21 Framework, are being recognized, increasingly, as the skills necessary for students to be prepared for the complex life and work environment of the 21st century. Communication is a vital piece of this preparedness, as the ability to easily and effectively transfer your ideas to others is an important piece of living and working in a society. In this annotated bibliography, an emphasis was placed on resources that are likely to be found online or in most university and many public libraries, that are especially comprehensive, are accessible to the lay reader to the extent possible, and collectively represent the major figures in the field.

The communication bibliography was compiled by Anna Dilley, Ronald Beghetto, James Kaufman, and Jonathan Plucker at the University of Connecticut's Neag School of Education. They appreciate the helpful feedback and recommendations provided by the P21 Staff.

GLOSSARY

Asynchronous Learning – Learning that occurs outside of time constraints, wherein the student accesses learning materials at their own pace. This can also involve an emphasis on peer-to-peer interactions, and constructivist learning.

Blended Learning – A distance learning environment that includes or incorporates an on-site portion.

Cognitive and Affective Learning – Two of the domains of learning as proposed by Bloom.

Computer-Mediated Communication – Any communication between two people that happens across electronic devices. This can include emails and instant messages, as well as text messages on a phone.

Communicative Competence – This refers to a person's understanding of grammar (such as syntax) as well as the social knowledge of how and when to use language.

Distance Learning – Students have access to educational materials outside of a traditional classroom or regular school schedules.

Functional Communication Training – An intervention developed to assist people with severe behavior problems. It is often used with autistic patients, and was first described by Carr and Duran 1985.

Verbal/Nonverbal Immediacy – Immediacy behaviors, generally, are behaviors that increase or produce interpersonal closeness or relatability. These can be verbal (the repetition of the listener's name) or nonverbal (open posture, eye contact).

OVERVIEWS

Burton, G., & Dimbleby, R. (2002). *Teaching Communication*. Kentucky, USA: Routledge.
A guide to the teaching of communication, covering communication skills, theory, and processes, as well as teaching strategies, and practical guides to help teachers.

McCroskey, J. C., & Richmond, V. P. (2005). *Introduction to communication in the classroom: Role of communication in teaching and training*. Allyn & Bacon.
An overview of theories of communication in the classroom, from theories of interpersonal communication, to common classroom communication problems such as class size, quietness, and the impact of feedback. It also covers student willingness to communicate and other personality variables that could get in the way of communication, power in the classroom, teacher behaviors, and nonverbal communication in the classroom.

Vangelisti, A. L., Daly, J. A., & Friedrich, G. W. (Eds.). (2013). *Teaching communication: Theory, Research, and Methods*. Kentucky, USA: Routledge.
An edited collection of chapters covering a range of topics in communication education, primarily focused on the university level. After an introduction covering the goals of communication education, there are chapters detailing how to prepare specific courses on subtopics of communication education. Then the authors cover organization of the instructional content, as well as instructional tools and strategies. The book concludes with some special issues, and professional issues.

KEY CONCEPTUAL MODELS

Bodie, G. D., Powers, W. G., and Fitch-Hauser, M. (2006). Chunking, priming, and active learning: Toward an innovative and blended approach to teaching communication-related skills. *Interactive Learning Environments*. 14(2), 119-135.
The authors propose a blended teaching method intended to teach communication skills by breaking them down into chunks that can be more easily assimilated into student's pre-formed schema.

Celce-Murcia, M., Dornyei, Z., & Thurrell, S. (1995). Communicative competence: A pedagogically motivated model with content specifications. *Issues in Applied Linguistics*, 6(2), 5-35.
The authors propose a model for language teaching that is based upon theories of communicative competence.

Faucette, P. (2001). A pedagogical perspective on communication strategies: Benefits of training and an analysis of English language teaching materials. *Second Language Studies*, 19(2), 1-40.
This paper examines the definition, conceptualizations, and controversy surrounding the teaching of communication strategies, arguing in favor of teaching them to students learning English as their second language.

Jonassen, D., Davidson, M., Collins, M., Campbell, J., & Bannan Haag, B. (1995). Constructivism and computer-mediated communication in distance education. *American Journal of Distance Education*, 9(2), 7-26.
The authors propose ways to use constructivist theory as a basis for distance learning environments.

Lamy, M.-N., & Hampel, R. (2007). *Online communication in language learning and teaching*. New York, NY: Palgrave Macmillan.
The authors present both theoretical and practical perspectives on the use of technology to support digital communication in language learning.

McCroskey, J. C., & McCroskey, L. L. (1988). Self-report as an approach to measuring communication competence. *Communication Research Reports*, 5(2), 108-113.
The authors present a new scale for measuring self-reported communicative competence, after examining the failings of previous communication competence measures.

Pena-Schaff, J. B., Nicholls, C. (2004). Analyzing student interactions and meaning construction in computer bulletin board discussions. *Computers and Education*, 42(3), 243-265.
A social constructivist perspective on student communication during a course in which students used a computerized bulletin board system to assist with communication about coursework. The authors then provide recommendations for practitioners interested in incorporating such technologies into their work.

Tiger, J. H., Hanley, G. P., & Bruzek, J. (2008). Functional Communication Training: A review and practical guide. *Behavior Analysis in Practice*, 1(1), 16-23.
The authors present a review of practices in Functional Communication Training (FCT), and offer guidelines to help guide practitioners that implement FCT for clients with severe problem behaviors.

Witmer, D. F. (1998). Introduction to Computer-Mediated Communication: A master syllabus for teaching communication technology. *Communication Education*, 47, 162-173.
Witmer offers a foundation for instructors teaching computer-mediated communication to undergraduate and graduate students so that they may use it in their own research and learning.

EMPERICAL STUDIES

Arbaugh, J. B. (2001). How instructor immediacy behaviors affect student satisfaction and learning in web-based courses. *Business Communication Quarterly*, 64(4), 42-54.

In this study Arbaugh finds a significant association between instructor immediacy behaviors and student learning and satisfaction. They also found that student attitudes towards course software, length of a course, and prior experience with web-based learning were predictors of student satisfaction.

Baker, J. D. (2004). An investigation of relationships among instructor immediacy and affective and cognitive learning in the online classroom. *Internet and Higher Education*, 7, 1-13.
Baker finds that students enrolled in online classes expressed more positive affect, and higher perceived cognitive learning when they also rated their instructors more highly on verbal immediacy. This mirrors results found in the traditional classroom.

Bodie, G. D., Powers, W. G., and Fitch-Hauser, M. (2006). Chunking, priming, and active learning: Toward an innovative and blended approach to teaching communication-related skills. *Interactive Learning Environments*. 14(2), 119-135.
The authors propose a blended teaching method intended to teach communication skills by breaking them down into chunks that can be more easily assimilated into student pre-formed schema.

Cameron, C., & Dickfos, J. (2014). 'Lights, camera, action!' Video technology and students' perceptions of oral communication in accounting education. *Accounting Education: An International Journal*, 23(2), 135-154.
The authors employ an "elevator pitch assessment" in order to help accounting undergraduates master oral communication skills, raise their self-efficacy, and improve their relevance.

Faucette, P. (2001). A pedagogical perspective on communication strategies: Benefits of training and an analysis of English language teaching materials. *Second Language Studies*, 19(2), 1-40.
Faucette argues in favor of teaching communication strategies to English language learning students, and presents empirical evidence to support this claim.

Freitas, F. A., Myers, S. A., & Avtgis, T. A. (1998). Student perceptions of instructor immediacy in conventional and distributed learning classrooms. *Communication Education*, 47, 366-372.
This study examines the difference in student perceptions between a conventional classroom and a synchronously transmitted distance learning environment. The authors find no difference between classroom settings in student perceptions of instructor verbal immediacy, but the students in the distance learning environment reported less nonverbal immediacy.

Hackman, M. Z., & Walker, K. B. (1990). Instructional Communication in the televise classroom: The effects of system design and teacher immediacy on student learning and satisfaction. *Communication Education*, 39, 196-206.
The authors in this study find that both instructor immediacy and system variables such as interactivity as well as clear audio and video transmission contribute to student satisfaction and learning.

Jarmon, L., Traphagan, T., Mayrath, M., & Trivedi, A. (2009). Virtual world teaching, experiential learning, and assessment: An interdisciplinary communication course in Second Life. *Computers and Education*, 53, 169-182.
An exploration of the impact that the video game Second Life has on experiential learning in an interdisciplinary communication course

Myers, S. A. (2002). Perceived aggressive instructor communication and student state motivation, learning, and satisfaction. *Communication Reports*, 15(2), 113-121.
Myers examines the relationship between perceived instructor argumentativeness and verbal aggressiveness, and student self-reported state motivation, satisfaction, and affective and cognitive learning. He found that instructors rated as high in argumentativeness and low in verbal aggression corresponded to the highest levels of positive student reported outcomes.

Ocker, R. J., & Yaverbaum, G. J. (1999). Asynchronous Computer-Mediated Communication versus face-to-face collaboration: Results on student learning, quality and satisfaction. *Group Decision and Negotiation*, 8, 427-440.
The authors demonstrate that asynchronous communication and face-to-face collaboration both led to equitable results of student learning. However, students were significantly less satisfied with the asynchronous experience.

Pratt, M. W ., Scribner, S., & Cole, M. (1997). Children as Teachers: Develop-mental Studies of Instructional Communication. *Child Development*, 48, 1475-1481.
These studies investigated listener-adaptation in young children teaching others. The first experiment showed

that first and third graders adapt to listener needs, and in the second experiment the researchers showed that children as young as preschool also adapt to listener needs to some degree, but with less planned instructions than those of the older children.

Rau, P. L. P., Gao, Q., & Wu, L. M. (2008). Using mobile communication technology in high school education: Motivation, pressure, and learning performance. Computers & Education, 50(1), 1-22.
The researchers examined the impact of mobile and internet communication technologies on students' motivation, and perceptions of pressure. They found that instant messaging combined with internet technologies could be used to significantly increase student extrinsic motivation without increasing pressure. However, when students were forced to communicate publicly, instead of through private dialogue with their instructor, their pressure was increased.

Sang, G., Valcke, M., Braak, J. V., & Tondeur, J. (2010). Student teachers' thinking processes and ICT integration: Predictors of prospective teaching behaviors with educational technology. *Computers & Education*, 54(1), 103-112.
The authors studied the willingness of future teachers to incorporate information and communication technology (ICT) into their teaching in the future. They found that student teachers with constructivist teaching beliefs were more likely to be willing to integrate ICT into their teaching.

Swan, K. (2001). Virtual interaction: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. *Distance Education*, 22(2), 306-331.
Swan finds in this study that active discussion among students is one of three major factors associated with student perceived learning and satisfaction.

Swan, K. (2002). Building learning communities in online courses: The importance of interaction. *Education, Communication, & Information*, 2(1), 23-49.
Swan compares 22 course design factors to various student outcomes, and finds that clarity in course design, contact with course instructors, and active, valued discussions correlate with positive outcomes for students in asynchronous learning environments.

Swan, K., & Shih, L. F. (2005). On the nature and development of social presence in online course discussions. *Journal of Asynchronous Learning Networks*, 9(3), 115-136.
This study finds a significant relationship between perceived social presence of instructors and peers, and student satisfaction and learning. The authors also add that the perceived social presence of the instructor seems to have a greater impact than the perceived social impact of peers.

Tolmie, A., & Boyle, J. (2000). Factors influencing the success of Computer Mediated Communication (CMC) environments in university teaching: A review and case study. *Computers & Education*, 34(2), 119-140.
In this paper, Tolmie and Boyle posit that the factors that most impact the effectiveness of computer mediated communication (CMC) are factors that contribute to the construction of a shared purpose between the users.

Weyers, J. R. (1999). The effect of authentic video on communicative competence. *The Modern Language Journal*, 83(iii), 339-349.
Weyers conducts a study that shows that exposure to authentic video (in this case a Spanish-language telenovela) increases student's listening comprehension, as well as the number of words they used in discourse.

INTERVENTIONS

Hanley, G. P., Heal, N. A., Tiger, J. A., & Ingvarsson, E. T. (2007). Evaluation of a classwide teaching program for developing preschool life skills. *Journal of Applied Behavioral Analysis*, 40(2), 277-300.
A class wide intervention was implemented, designed to teach preschoolers life skills including functional communication. The study shows a 74% decrease in problem behavior after the implementation of the intervention.

Ingvarsson, E. T., Tiger, J. H., Hanley, G. P., & Stephenson, K. M. (2007). An evaluation of intraverbal training to generate socially appropriate responses to novel questions. *Journal of Applied Behavior Analysis*, 40(3), 411-429.
This study concerned the teaching of useful communication techniques to preschool age children, both with and without disabilities, who had previously demonstrated inappropriate responses to questions.

Luczynski, K. C., & Hanley G. P. (2013). Prevention of problem behavior by teaching functional communication

and self-control skills to preschoolers. *Journal of Applied Behavior Analysis*, 46, 355-368.
This study investigated the impact of the Preschool Life Skills program (see Hanley, Heal, Tiger, & Ingvarsson, 2007 cited earlier). The study took preschool students with problem behavior and taught them valuable communication skills. The intervention was rated satisfactorily by stakeholders in the children's life.

JOURNALS

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P21 MEMBERS ORGANIZATIONS

AFT

American Camp Association

Apple Inc.

Asia Society

Bahcesehir K-12 Schools

Cable Impacts Foundation

Common Sense Media

Crayola

Destination Imagination

Duck Learning

EF Education First

ENA

First Five Years Fund

Fisher-Price

Ford Motor Company Fund

Future Problem Solving Program International

Gale Cengage Learning

The Goddard School

Intel Corporation

Learning.com

LEGO Education

National Board for Professional Teaching Standards

National Education Association

PBS

Pearson

People to People International

Playworld, Inc.

Project Management Institute Educational Foundation

VIF International Education

The Walt Disney Company

P21 LEADERSHIP STATES

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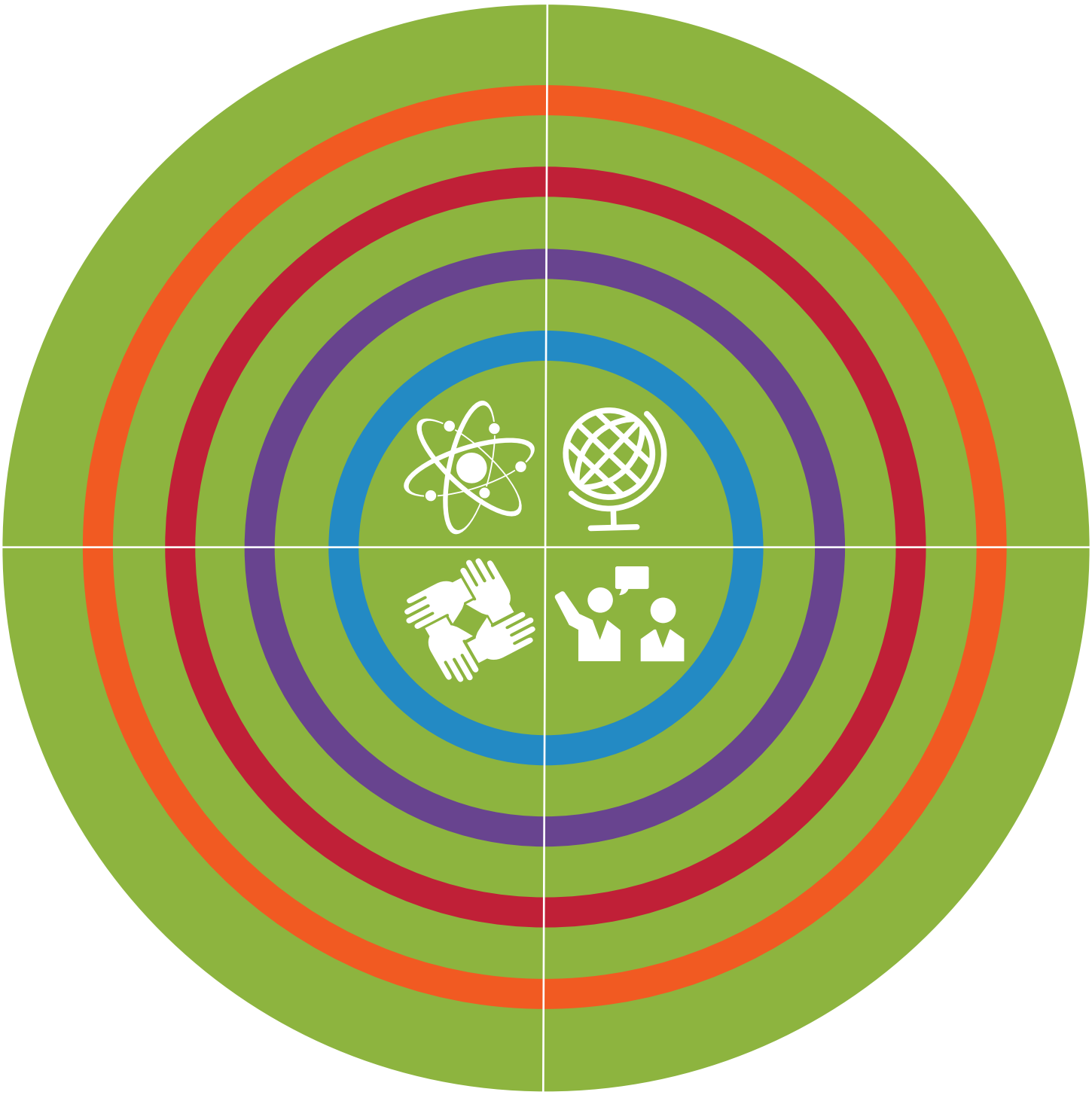

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