MEASURING STUDENT SUCCESS SKILLS: A REVIEW OF THE LITERATURE ON COMPLEX COMMUNICATION

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Dr. Jeri Thompson
National Center for the Improvement of Educational Assessment

21st CENTURY SUCCESS SKILLS

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INTRODUCTION

As a 21st century success skill, communication has its origins in literacy and communication theory. Literacy generally is associated with the English language arts, which include reading, writing, listening, and speaking. More specifically, communication is an expressive process demonstrated through production, which includes writing and speaking and comprehension is an interpretive, decoding, and receptive process acquired through reading and listening. The abstract skills or abilities linked with literacy often are viewed as being independent of context, and the development of these skills often are associated with social and economic progress, political democracy, educational mobility, and the development of cognitive skills (Kelder, 1996).

Literacy instruction has reflected different iterations since public education began. More importantly, educators typically approached the underlying skills of receptive and expressive language as separate entities: prior to the Civil War, they regarded reading instruction as a recitation activity, with writing viewed as less important than oral communication. School literacy instruction expanded after the Civil War, placing more emphasis on English literature and written expression. Speaking and listening as basic skills of literacy received little attention until 1978 when Congress, in the Title II of the Elementary and Secondary Act of 1965, added effective oral communication to the basic skills of reading, writing, and mathematics (Witkin, Lovern, & Lundsteen, 1996).

Two perspectives arose during World War II that influenced current understanding of literacy. The *Cognitive Information Processing Perspective* developed from the introduction of computer technology. Reading and writing, the cognitive scientists contended, comprise subprocesses for performing specialized tasks — accessing background knowledge, organizing ideas, making decisions about relevant and redundant information, and monitoring—and successful reading and writing requires juggling these subprocesses. As automaticity increases with respect to these subprocesses, the reader/ writer enjoys greater success on cognitively demanding literacy tasks (Alexander & Fox, 2004; Lipson & Wixson, 1997).

Simultaneously, the *Social Perspective* held that language and learning are not an individual construction, but rather a social negotiation through supportive interaction and shared use of language (Alexander & Fox, 2004; Langer, 1987; Lave & Wenger, 1991; Lipson & Wixson, 1997; Vygotsky, 1978). The individual constructs knowledge through interactions with the sociocultural environment, and the cognitive processes related to reading and writing are acquired through contextualized activity and assisted learning.

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These two perspectives led to an integrated view of reading and writing, which include the following propositions:

> 1) Interpretative and expressive language are processes of constructing meaning;
>
> 2) The construction of meaning results from an interaction between the individual and the context of the literacy situation;
>
> 3) This interaction is dynamic, or variable, as a function of numerous factors.

The subdomains of communication as a success skill are associated with school success and student achievement. In their meta-analysis of studies on writing, for example, Graham and Hebert (2010) found that writing about text enhances the student's comprehension of it. Further, instruction in writing strengthens students' comprehension, fluency, and word skills, and increasing how much students write improves reading. First-grade oral reading skills predict growth in reading and math skills in subsequent grades, and third-grade reading skills predict high school graduation (Metusalem, Belenky, & DiCerbo, 2017).

New technologies, such as on-line reading, collaboration platforms, and on-line social practices, have transformed the meaning of literacy (Alexander & Fox, 2004; Leu, et al., 2011; Miller, 1996). And because of the changing literacy construct, reading comprehension now includes communication (writing and discussion) and problem-based inquiry (Leu et al., 2011).

Communication theorists have debated the meaning of communication as well, resulting in the embedding of literacy concepts into seven theories of communication. These theories range from the rhetorical, with a focus on persuading audiences through the art of discourse, to the sociocultural, where communication is a "symbolic process that produces and reproduces shared sociocultural patterns" (Craig, 1999; Miller, 1996). Table 1 describes these different communication theories (Craig, 1999).

Table 1.
Communication Theories

Theory	Meaning
Rhetorical	*Communication is* discourse as a means of persuading audiences.
Semiotic	*Communication is* language and other sign systems to mediate between different perspectives. Words can mean different things to different people so miscommunication is a constant threat. Meanings can be conveyed indirectly or by subtle aspects of behavior, and certain ideas are easier to express in certain forms.
Phenomenological	*Communication is* a dialogue or experience of otherness; the interplay of identity and differences in authentic human relationships cultivates communication practices.
Cybernetic	*Communication is* an information processing experience; individual thought is intrapersonal communication, groups or organizations think and communicate, and whole societies think and communicate.

Table 1.
Communication Theories (continued)

Theory	Meaning
Sociopsychological	*Communication is* a process of expression by which individuals interact and influence each other. Human judgments can be influenced by the immediate social context and are often biased in predictable ways by beliefs, attitudes, and emotional states.
Sociocultural	*Communication is* a symbolic process that produces and reproduces shared sociocultural patterns. Everyday interactions with others depend heavily on preexisting, shared cultural patterns and social structures.
Critical	*Communication is* asking questions that provoke critical reflection about the contradictions that come to light in the communication process.

Communication, as a 21st century success skill, encompasses the subdomains of reading, writing, speaking, and listening, which can occur in various contexts and content areas, take various forms, and serve various goals (Metusalem et al., 2017). The concept of communication, as a success skill, also includes features such as informational exchanges, use of linguistic and nonlinguistic symbols, social interactions, and mutual understanding (Metusalem et al., 2017). Given the many communication theories and views of literacy practices, the term *complex communication* will be used here to represent the various ways for thinking about this construct and the expected outcome of "eliciting critical information and conveying a convincing interpretation of it" (NRC, 2011, p. 8). The purpose of this literature review is to (a) determine a working definition of complex communication as a success skill, (b) gain a deeper understanding of how complex communication is related to other success skills, (c) describe how the domain of complex communication develops, (d) examine the instructional approaches that support the development of complex communication, and (e) determine how teachers can use student artifacts for evaluating the domain of complex communication.

> ...*complex communication*...
> "eliciting critical information and conveying a convincing interpretation of it"

DEFINITIONS
What is Complex Communication as a Success Skill?

> *Language is the most highly developed, most subtle, and most complicated of human symbolism because anything can stand for anything (Bowman & Targowski, 1987, p. 22).*

Defining complex communication as a 21st century skill is tricky. Literacy is often used interchangeably with communication, and much of the literacy literature portrays reading and listening comprehension as a separate entity from communication or from the expressive skills of writing or speaking. Communication theory posits that communication is "an ongoing contextualized process of interaction in which meaning emerges from the relationship of the individual interaction and the system of articulation" (Campbell & Level, 1985, p. 38). Craig (2017) identifies various definitions of communication in the Oxford Bibliographies, such as *human interaction, the transfer of information, effect or influence, mutual understanding, community,*

and culture, which include the domains in literacy, but also alludes to additional subdomains such as social and cultural considerations.

The difficulty of defining complex communication is complicated further by the Common Core State Standards, which separate reading, writing, and speaking and listening. The standards for speaking and listening are further delineated into subdomains: comprehension and collaboration, and presentation of knowledge and ideas (Common Core English Language Arts State Standards, 2010). Additionally, The Partnership for 21st Century Learning states that students must master key subjects including English, reading, and language arts, as well as learning and innovation skills—which include "communication"—and information, media, and technology skills, such as literacy in "information, communications, and technology" (NEA, 2020).

Complex communication, according to the National Education Association (2020), involves "explanation, negotiation, and other forms of intense human interaction." Communicators in the 21st century must (a) develop proficiency with the tools of technology; (b) build relationships with others to pose and solve problems collaboratively and cross-culturally; (c) design and share information for global communities to meet a variety of purposes; (d) manage, analyze, and synthesize multiple streams of simultaneous information, and (e) create, critique, analyze, and evaluate multimedia texts.

According to NRC (2012), complex communication comprises these components: observing and listening, eliciting critical information, interpreting the information, and conveying the interpretation to others.

In order to incorporate the various views of communication into a single definition of complex communication as a success skill, we must consider (a) the interrelationships among reading, writing, speaking, and listening as one success skill; (b) the impact of technology on communication; and (c) how interpersonal skills, such as verbal and nonverbal proficiencies in various situations, and culture are related to communication.

Interrelationships among reading, writing, speaking, and listening as complex communication skills

Casner-Lotto and Barrington (2006), in their report *Are They Really Ready to Work?*, differentiate basic skills from applied skills. Basic skills are normally gained through core academic subjects in school and include reading comprehension, and speaking and writing in English, along with the use of grammar and spelling. Applied skills reflect the use of basic skills for engaging in cognitively complex communication activities, such as writing memos, letters, and complex technical reports, and orally conveying thoughts and ideas.

Demonstrating clear and effective complex communication goes beyond the basic knowledge and skills identified in state standards for reading (comprehension) and writing (communication). Communication as a success skill requires the ability to meet complex demands by drawing on knowledge, skills, and resources applicable to the particular context (Child & Shaw, 2019). This expectation holds true for any competency or success skill, but particularly helps to understand the interrelationships of the English language arts subdomains described in the Common Core ELA State Standards and in the explanation of communication put forth by The Partnership for 21st Century Learning as students are expected to integrate the basic skills and apply them in novel situations.

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Impact of Technology

The amount of information available in the 21st century is greater than ever before, including the ability to access ideas, information, and audiences. Additionally, technologies require different ways to access information. For example, mass media "sound bites," and multimedia "infotainment," and hypertexts which encourage skipping and browsing, make it difficult to analyze complex communications (Alexander & Fox, 2004; Miller, 1996). Online reading comprehension requires skills that differ from offline reading comprehension (Leu et al, 2011), such as (a) identifying and framing important questions that are understood by the search engine; (b) generating effective keyword search strategies within multiple websites; (c) critically evaluating information for accuracy, reliability, and bias; (d) synthesizing vast amounts of information presented in various formats from a wide variety of sources; and (e) communicating via the internet to collaborate, engage in discussion, and so on.

Brown and Slagter van Tryon (2010) discuss various technology considerations—time, size, distance, audience, and available data—that affect the meaning of communication, which are summarized in Table 2.

Table 2.
Technology Considerations and Impact on Communication as a Success Skill

	Considerations	Impact
Time	Sharing information today is almost instantaneous and there is an extensive trail of information that has the potential for being preserved forever on the Internet.	Presentations and information may be transmitted in an instant and stay available to the world for most or all of one's life.
Size	Network environments require the need to communicate sophisticated ideas in very few keystrokes (Twitter, social media sites).	Finding one's voice in these micro environments requires clear and concise vocabulary development.
Distance	Physical and geographic constraints are much less of a limitation allowing for creating a community outside the boundaries of neighborhoods, countries, or cultures of one's own.	Creates an obligation to employ good judgment in composing messages sent to members of other cultures, to know one's audience, and to be aware of people who have different viewpoints.
Audience	Web-based avenues for displaying and sharing original work allows for audience availability cuts across school, grade level, occupation, socioeconomic status, age level, and purpose.	Information may be viewed out of context and may attract comments and feedback that are not indicative of the intended message of the work displayed.
Data	Large data sets (Wikipedia, Google, Slashdot) are generated and distributed via the Internet, are easy to obtain, and may or may not be reliable or connected.	Recognizing and using reliable datasets for specific purposes must be learned and practiced.

Binkley et al. (2010) further explore the knowledge, skills, values, and ethics pertaining to communication. They discuss how technology allows professional and personal communications to exist side-by-side and how different presentation forms of the same information can be effective.

Verbal and nonverbal proficiencies in various situations and cultures

Communication involves information exchange, linguistic and nonlinguistic symbols, mutual understanding, social interaction, and intentionality. Judith Langer (1997) defined communication (literacy) as "an activity, a way of thinking not a set of skills" and a "culturally specific phenomenon" which cannot be separated from its social context and purpose. Communication models typically have three general components (Metusalem et al., 2017): (a) conveyance of a message for a desired outcome, 2) dependence on the specific content, structure, and delivery method of what is being communicated, and 3) impact of emotions, beliefs, and social orientations of both the communicator and receiver involved in the communication process. Bearing these components in mind, Metusalem et al. (2017, p. 5) define communication as a "social process in which information is exchanged in order to establish shared meaning and to achieve desired outcomes." Their definition reflects real-world situations, which include reading, writing, listening, and speaking; both verbal and non-verbal exchanges; paper as well as digital media; casual and formal contexts; and widely differing outcomes (informing, persuading, questioning, entertaining). These authors also identify a range of complex skills necessary for effective communication, which they consider within the production and receptive subdomains of literacy (see Table 3).

Table 3.
Skills Necessary for Communication

Production Skills	Explanation of Meaning
Identifying desired outcomes	Determine one or more desired results or consequences of the communication.
Crafting clear messages	Create messages that accurately convey intended meaning, appropriately utilizing nonlinguistic cues (body language, visual aids).
Modeling others' minds	Recognize and account for others' knowledge, beliefs, dispositions, and emotions.
Adhering to conventions	Follow the rules or norms of specific disciplines or contexts.
Accounting for social and cultural differences	Identify and account for variability in social and cultural norms.
Selecting appropriate channels	Utilize the most appropriate communicative channel.
Receptive Skills	**Explanation of Meaning**
Active listening	Actively attend to a sender's message, withhold judgment, monitor and clarify understanding.
Deep reading	Critically analyze text or speech, monitor comprehension, draw inferences, question, and reflect.

The EBSCO Competency Center (2016) identifies four components of effective communication, which include both verbal and nonverbal proficiencies:

1) Listening – "listening with their eyes" by picking up on visual cues, listening as emotions and opinions are expressed, and demonstrating empathy;

2) Knowing the audience – assessing the audience, including attention to demographics (age, gender, cultural background, experience, education), personal perspective, ego, and background knowledge;

3) Tailoring the message – determining the formality, language, tone, sensitivity, and medium to communicate the information; and

4) Being clear and deliberate – encoding messages (oral, written, electronic, using nonverbal cues) so they are received or decoded correctly.

Given the above considerations, the transmission of a message is not communication, but rather communication also must require the perspective of the receiver (Beamer, 1992). Beamer identifies four cultural factors that affect communication: values, attitudes, beliefs, and behaviors. She further shows that the social and cultural environment influences intercultural communication. For example, intercultural communication can be dysfunctional because of how the communicator expresses or lacks empathy, sensitivity, or flexibility.

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Moving Toward a Common Definition of Complex Communication

Several definitions of communication follow from the considerations just discussed. First, the NRC (2012, p. 4) report, *Education for Work and Life,* identifies three broad domains of competence: cognitive, intrapersonal, and interpersonal. Each domain includes clusters of competencies. The cognitive domain includes the competencies of information literacy, reasoning and argumentation (including with critical thinking and innovation); the intrapersonal domain includes the competency of appreciation for diversity (along with flexibility, initiative, and metacognition); and the interpersonal domain includes the competency of communication such as expressing ideas, and interpreting and responding to messages from others (along with collaboration, responsibility, and conflict resolution). Further explanation of complex communication within the interpersonal domain includes skills in (a) processing and interpreting both verbal information from others in order to respond appropriately, (b) selecting key pieces of a complex idea to express in words, sounds, and images, in order to build shared understanding, and (c) negotiating positive outcomes with customers, subordinates, and superiors through social perceptiveness, persuasion, negotiation, instructing, and service orientation (NRC, 2011). However, the competencies within these three domains are fluid; teaching and assessing them as separate entities would be difficult. For example, the ability to effectively communicate draws on an individual's knowledge of language, information, and communication technology skills, as well as the attitudes toward those whom the person is communicating (NRC, 2012, p. 23).

In their report *Defining 21st Century Skills,* Brinkley et al. (2010) offer a second definition of communication; it focuses on ways of working together (see Table 4).

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Table 4.
Ways of Working - Communication

Knowledge	Skills	Attitudes/Values/Ethics
Competency in language in mother tongue: • *Sound knowledge of basic vocabulary, functional grammar and style, functions of language.* • *Awareness of various types of verbal interaction (conversations, interviews, debates, etc. and the main features of different styles and registers in spoken language.* • *Understanding the main features of written language (formal, informal, scientific, journalistic, colloquial, etc.)* Competency in additional language(s): • *Sound knowledge of basic vocabulary, functional grammar and style, functions of language.* • *Understanding the paralinguistic features of communication (voice-quality features, facial expressions, postural and gesture systems).* • *Awareness of societal conventions and cultural aspects and the variability of language in different geographical, social, and communication environments.*	Competency in language in mother tongue and additional language(s): • *Ability to communicate in written or oral form, and understand, or make others understand, various messages in a variety of situations and for different purposes.* • *Communication includes the ability to listen to and understand various spoken messages in a variety of communicative situations and to speak concisely and clearly.* • *Ability to read and understand different texts, adopting strategies appropriate to various reading purposes (reading for information, for study or for pleasure) and to various text types.* • *Ability to write different types of texts for various purposes. To monitor the writing process (from drafting to proof-reading).* • *Ability to formulate one's arguments, in speaking or writing, in a convincing manner and take full account of other viewpoints, whether expressed in written or oral form.* • *Skills needed to use aids (such as notes, schemes, maps) to produce, present or understand complex texts in written or oral form (speeches, conversations, instructions, interviews, debates).*	Competency in language in mother tongue: • *Development of a positive attitude to the mother tongue, recognizing it as a potential source of personal and cultural enrichment.* • *Disposition to approach the opinions and arguments of others with an open mind and engage in constructive and critical dialogue.* • *Confidence when speaking in public.* • *Willingness to strive for aesthetic quality in expression beyond the technical correctness of a word/phrase.* • *Development of a love of literature.* • *Development of a positive attitude to intercultural communication.* Competency in additional language(s): • *Sensitivity to cultural differences and resistance to stereotyping.*

Reproduced from Brinkley et al. (2010), p. 22.

Finally, The Partnership for 21st Century Skills (2006) offers a third definition of communication, which they view as the ability to:

- Articulate thoughts and ideas effectively using oral, written, and nonverbal communication skills in a variety of forms and contexts;

- Listen effectively to decipher meaning, including knowledge, values, attitudes, and intentions;

- Use communication for a range of purposes (e.g., to inform, instruct, motivate, and persuade);

- Use multiple media and technologies, and know how to assess impact and their effective a priori;

- Communicate effectively in diverse environments (including multilingual and multicultural)

This definition most closely represents the literature for defining complex communication as a success skill as it incorporates both basic and applied English language arts, technology use, and communication across cultures. However, this definition lacks key pieces, such as reading, listening, and observing to interpret meaning, focusing on complex ideas, and using non-verbal communication when presenting information. These additional concepts are woven into the operationalized definition below.

Toward an Operationalized Definition

A critical factor in operationalizing communication as a success skill which can be measured requires synthesizing these multi-faceted definitions, considering the interrelationships among reading, writing, speaking, and listening skills, the role of technology, and verbal and nonverbal proficiencies in various situations and cultures. The continua for defining complex communication requires application and moving beyond basic skills, and therefore should include:

> Operationalizing communication as a success skill which can be measured requires synthesizing the interrelationships among reading, writing, speaking, and listening skills, the role of technology, and verbal and nonverbal proficiencies in various situations and cultures.

- **Comprehension of information:** understands, recognizes, and selects appropriate and compelling information and perspectives provided through various sources (e.g., close reading of texts and/or media, attention and adjustment to nonverbal cues, active listening of oral presentations and discussions).

- **Presentation of information and ideas:** creates an engaging and appropriate message for the intended audience, task, and purpose, whether orally, in writing, through multimedia, or a combination of these modes; actively engages in discourse by expressing feelings, preferences, needs, and opinions in a way that is neither threatening nor punishing to another person; and uses nonverbal communication (e.g., body language, gestures, voice) to reinforce or replace other forms of presentation.

- **Implementation of information communication technology:** enhances comprehension, presentation, and sharing of content information through the thoughtful use of information communication technology, which moves beyond a superficial use.

- **Recognition of cultural and diverse differences:** communication deliberately accounts for differing values, attitudes, beliefs, and behaviors found in different cultures and social backgrounds.

Are Communication Skills Generic or Discipline-Specific?

Much of the literature considers communication skills to be generic. According to Kedler (1996, p. 1), for example, communication is an "abstract set of reading and writing skills or abilities that exist independent of any context." Others argue, however, that communication skills are not separate from disciplinary content knowledge because, after all, there must be content that is being communicated (Rotherham & Willingham, 2009). Understanding the role of content knowledge in complex communication is critical for instructional and assessment considerations, a topic to be further explored later in this paper.

What is the Relationship between Communication and Other Success Skill Concepts?

Communication overlaps with other success skills. While not necessarily a core component of learning other success skills, such as critical thinking and problem-solving, collaboration, creativity and innovation, and self-direction, communication clearly allows for their demonstration and, in turn, for inferring the student's success in employing these other success skills.

Creativity. Soule and Warrick (2015) describe creativity as idea creation techniques, such as brainstorming, creating new and worthwhile ideas, and elaborating, refining, analyzing, and evaluating one's own ideas to improve and maximize creative efforts. The creativity process requires individuals working with others through "developing, implementing, and effectively communicating new ideas to others; being open and responsive to new and diverse perspectives; incorporating group input and feedback" (p. 181).

Critical Thinking. Kelder (1996) describes communication as a contributor to higher-order thinking or critical thinking. This theory supports the definition of communication as more than reading and writing, but the ability to apply communication knowledge in a variety of different contexts and for different uses.

Collaboration. The National Education Association (2020) notes that communication as a 21st century success skill is clearly connected to collaboration—the student's ability to work effectively with diverse teams, make necessary compromises to accomplish a common goal, and share responsibility for collective work. Communication is the link among these activities, ensuring the message is received and understood. Additionally, communication embeds a sophisticated use of technology as information is ubiquitously provided through digital devices, requiring social-cultural competencies as individuals engage in collaborative cross-cultural environments.

Students engaged in a curriculum that combines collaborative, hands-on science inquiry activities with reading text, writing notes and reports, and small-group discussions, demonstrate significantly greater gains on measures of content understanding, vocabulary, and content writing (NRC, 2012). NRC further states that "the students developed the intrapersonal competencies of oral communication and discourse, as well as the interpersonal competencies of metacognition and positive dispositions toward learning" (p.7).

Collaboration depends on successful oral and written communication, as well as critical thinking and problem solving. Casner-Lotto and Barrington (2006) describe the combination of these success skills, as being important in entry-level production jobs and front-line positions that involve working with an array of customers. Specifically, as previously noted, they identify basic reading, writing, and speaking abilities that underpin effective communication as a success skill in order to effectively articulate thoughts and ideas when building relationships with colleagues and customers, working with diverse teams, and negotiating and managing conflicts.

Self-Direction. Communication paired with technology requires self-direction, given the many hyperlinks typically encountered in online reading materials (Leu et al., 2011). Students choose links to online texts, and beyond constructing meaning, they must follow various pathways to locate, sample, and evaluate unique sequences of information; this requires critical thinking.

Communication is related to other success skills, such as creativity, critical thinking, collaboration, and self-direction.

In summary, communication is related to other success skills, such as creativity, critical thinking, collaboration, and self-direction.

DEVELOPMENT

How Does Communication Develop?

Communication development is multifaceted and much too involved to fully include in this literature review. In brief, however, it begins with developing oral language (recognizing, comprehending, producing); then learning to read, comprehend, and produce written language, and finally, reading to learn

Communication development is multifaceted.

(NRC, 1998). Through early adolescence, communication development is intertwined with cognitive experiences, behavioral and physical opportunities, social/emotional experiences, physical development, and culture. Layered onto this is the development of speech and language and the complexities of skillful reading. There are multiple philosophies related to skillful reading. One philosophy is that skillful reading includes decoding, which requires knowledge of letters and phonemic awareness with a high degree of accuracy and automaticity, and listening comprehension. Another philosophy is students engage early on in reading, writing, and language in a holistic manner in order to make sense of their world and to engage in big ideas (NRC, 2012).

Communication development continues throughout school, adolescence and into adulthood (Alexander & Fox, 2004; Wood & Hartshorne, 2017). The expectations in secondary school requires students to use a range of language skills, such as asking questions, reflecting on their work and that of their peers, and using complex grammar and subject-specific vocabulary. The ability to apply skills of making inferences, employing comprehension-monitoring strategies, and accessing complex text structures exemplifies the need for continuous learning.

Communication development continues throughout school, adolescence and into adulthood.

There are several instructional considerations regarding communication development. Snow (2002) discussed several factors related to reading which are adapted below to include communication:

1. **Unit focus.** Instruction on comprehending and communicating short texts or bits of information provides less scope for instruction of complex communication than activities using longer texts and complex ideas.

2. **Teacher-defined task.** During instruction, teachers may define the task for the student as one of recovering or expressing low-level information (identifying/explaining the main idea) versus analyzing and synthesizing critical information which are requirements for complex communication.

3. **Teacher goals, expectations, and epistemological beliefs.** Teachers define different goals for different groups of students. When goals derive from assessments that identify students'

instructional needs, the goals are highly appropriate. But when goals are based on depressed expectations about the capabilities of students, these goals can result in instruction targeting only simple purposes for communication, such as finding particular words or answering low-level questions. Consequently, access and opportunity to learn the knowledge and skills of complex communication is limited, at best.

4. **Curriculum.** Curricula define to a large extent the communication purposes, by explicitly structuring activities for teachers. District-adopted curriculum with low-level expectations will thwart the ability for teachers to instruct students on the components of complex communication and for students to learn how to apply basic skills in real-world situations.

5. **Grouping.** Purposeful and flexible grouping allows for different short- and long-term objectives for students in the various groups. Such grouping strategies work well if instruction is efficient so that students can move into higher-level groups having more challenging targets.

6. **Pacing.** Setting the proper instructional pace is important for student success in complex communication. Pacing depends, in part, on the individual student. Skillful instruction is striking a balance between (a) keeping students challenged by teaching advanced communication skills and (b) ensuring that all students have the appropriate skill level to handle the demands of new lessons.

7. **Coverage.** Teachers should plan how much material to cover on a particular topic, especially when teaching communication in different content areas. In doing so, they should consider concept complexity, specialized vocabulary, and the depth of understanding they expect students to achieve. Further, they should teach strategies that foster deep understanding of relevant content matter, and give students ample opportunities to use them.

8. **Setting.** The purposes of electronic and paper texts have differing purposes. Instructing students on these differences is necessary for their ability to approach different texts efficiency and effectively.

Beamer (1992) describes several models concerning the development of cultural sensitivity and intercultural communication. The development of cultural sensitivity, which is required for intercultural communication, develops across different cultures in a similar manner. Table 5 presents a synthesis of these models.

Table 5.
Development of Cultural Sensitivity

Level 1	**Acknowledging diversity:** awareness of cultural differences and recognizing that fluency in another language does not necessarily produce cultural fluency.
Level 2	**Organizing information according to stereotypes:** developing categories of selected characteristics for distinguishing a particular culture; recognizing that stereotypes are complex and multi-dimensional.
Level 3	**Posing questions to challenge the stereotypes:** asking questions about other cultures to move beyond stereotypes increases knowledge of a particular culture.
Level 4	**Analyzing communication episodes:** seeking new meanings for personal communication behavior; attaining a deeper understanding of culture, given the questions asked in Level 3.
Level 5	**Generating other culture messages:** the communicator is inter-culturally competent: messages are encoded and directed as if the communicator is from within the new culture, and messages are decoded and responded to successfully.

Complex communication development is connected to the adopted curriculum and daily instruction that occurs throughout the school year for all students in all grades. The instruction must move beyond basic skills, providing students with opportunities to develop complex communication skills in applied situations. Additionally, opportunities for considering cultural sensitive, not typically taught in school, requires consideration as real-world situations are explored by teachers and students.

INSTRUCTION
What Instructional Approaches are there for Teaching Complex Communication?
Complex communication instruction is dependent on many factors and often occurs through English language arts content standards. However, the literature generally concentrates on teaching complex communication through specific communication domains, including reading, speaking and listening, and writing, with additional considerations given to struggling students and cultural issues. While these strategies may be appropriate as students are developing the underlying skills for complex communication, there will ultimately need to be a shift to a more holistic instructional approach. This holistic approach, as previously described, provides students with situations that combine the components of English language arts in order to engage in communicating for a real-world purpose.

Reading
The successful transfer of communication skills will most likely occur when students have an understanding of the underlying principles of this construct (NRC, 2012). Readers, and subsequently writers, assume different stances when engaging in communication situations. These stances include the reader as a:

- *Decoder:* what does the text say?
- *Meaning Maker:* what does the text mean?
- *Text Analyst:* what tools does the author use to achieve his or her goals and purposes?
- *Text Critic:* what are the author's intentions, what is the meaning of connotations, what are the motivations?

Instruction would assist students in moving to deep and critical learning by being able to combine the stances of a text analyst and text critic, and ultimately being able to combine all four stances in order to create texts for others to read.

Speaking and Listening
While students have considerable opportunities to listen and speak in the classroom, teachers typically direct little attention the instruction, process, and expected outcomes of communication among students (Spies & Xu, 2018; Witkin et al., 1996). Given this lack of purposeful instruction for listening and speaking, NEA (2020) poses, to teachers, the following questions for integrating communication practices and instruction into the classroom:

- How can you model communication skills for your students?
- How can you emphasize communication skills in general and oral communication skills in particular in your classroom?
- How can students be encouraged to give oral presentations to varied community audiences?
- How can you encourage students in your class to be better communicators?
- How can students be encouraged to use technology and new media to communicate innovatively and effectively?

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Writing

Students should write about what they read. Reading skills, comprehension, and writing are communication activities that require the ability to organize information into knowledge (Graham & Hebert, 2010). Instructional practices that are effective in improving communication skills include:

- Having students write about the texts they read by responding to a text in writing. This includes (a) writing personal reactions, and (b) analyzing and interpreting the text. Graham and Herbert recommend writing summaries and notes about a text, answering questions about a text in writing, or creating and answering written questions about a text, such as through Reciprocal Teaching (Palinscar & Brown, 1984). For example, students write about information in a science text to facilitate comprehension and learning, thus allowing writers to gain insights about reading through the creation of their own texts, and consequently leading to better comprehension of the texts they read.

- Teaching students the writing skills and processes that go into creating text by, including the instruction of text structures for writing, paragraph or sentence construction skills, and spelling skills.

Struggling Students

Communication instruction for struggling students should include explicit strategies that make an explicit link between language skills for supporting comprehension and communication (Wood & Hartshorne, 2017), such as:

- providing necessary think time to respond to questions,

- encouraging and praising students for asking questions,

- providing visual displays of words alongside the ideas and concepts they represent to facilitate contextual understanding,

- teaching strategies such as mind-mapping, highlighting key words, and writing and drawing the steps involved in completing an activity,

- providing structure for written work,

- teaching interaction skills, such taking turns, keeping to topics, and accepting other opinions.

Cultural Considerations

Instructional practices must also take into account cultural differences. Teachers risk processing language through a middle-class lens, not recognizing how their socio-cultural experience may impose meaning on the students' narrative—a narrative possibly born out of a quite different socio-cultural experience (Kelder, 1996). Problem- or project-based learning, where teams of diverse learners tackle real-world problems, and engage in simulation games can be effective instructional practices for facilitating intercultural communications (Metusalem et al., 2017).

Holistic Approaches

Communication instruction, Metusalem et al. (2017) argue, should focus on a combination on three skills: production, reception, and intercultural communication.

Production Skills. The instruction of production skills entails oral presentation, interpersonal communication, and written presentation, with the provision of constructive feedback and opportunities for self-reflection. Instruction in written communication should shift from a focus on the written product to the writing process. The recommendations offered by Graham and Hebert (2010), described above, are relevant here as well.

Reception Skills. Reception skills instruction includes teaching active listening and reading comprehension. Here, instruction should focus on such strategies as paying attention to the speaker, engaging in close or strategic reading of text, blocking out distractions, developing questions, connecting what one is hearing to their own knowledge, generating predictions, and summarizing.

Intercultural Communication Skills. Instruction in intercultural communication should help students recognize how other cultures may differ from their own in meaningful ways and, further, provide practice with effective strategies for improving intercultural communication which follow from the development of cultural sensitivity. For example, having students identify sounds, shapes, and/or gestures to signify an acknowledgment of diversity. This allows for discussions related to bias, ethnocentricity, stereotype, value, and culture (Beamer, 1992).

NEA also provides guidance on communication instruction, such project-based activities that entail exchanging information related to work or projects undertaken in a different country (12th grade world language class); interviewing local scientists about how their computer models inform their work, and then create a digital gallery of images from the different models (8th grade science class); or choosing a person, place, or event from their state's history and organizing an associated storyboard for digital presentation (4th grade social studies). Such project-based activities have students analyzing and processing information while engaging in complex communication (e.g., explanation, negotiation) using modern media. These activities also require other success skills, such as collaboration, critical thinking, and self-direction.

Rotherham and Willingham (2009) explain that these complex skills must be taught in the context of particular content knowledge, allowing students to practice using the skill and improving by noticing what is done well, what is done incorrectly, and formulating strategies to do better. Practice requires feedback from someone more skilled, and they note that when success skills are embedded in instruction, the teacher must treat both the content and the success skill as equally important.

Given the complexities of classroom instruction and, further, the many educational aims to which teachers must attend, taking on complex communication instruction is no small feat. In short, teachers will need robust training and support in order to provide meaningful and effective instruction in communication.

What Do We Know About the Effects of Instruction on the Development of Communication Skills and Student Achievement?

Communication, language, and literacy skills greatly impact student achievement. Poor language skills in young children affects future achievement in reading and writing (NRC, 1998). Primary-grade students who experience reading difficulties are at risk of continuing to have reading difficulties in the future (Coker, Jennings, Farley-Ripple & MacArthur, 2018). Poor communication skills explain, in part, why students do not complete high school; those who do graduate are not prepared for the post-secondary world, where communication skills are central for success (Graham & Herbert, 2010). According to Wood and Hartshorne (2017), poor communication skills negatively impact students' ability to process information, understand and use vocabulary, or demonstrate appropriate social skills. Poor communication makes it difficult for students to form explanations, change the style of talking to suit the situation, and ultimately impacts writing skills and reading comprehension.

> Communication, language, and literacy skills greatly impact student achievement.

While there are multiple factors that influence the development of communication skills, including physical, emotional, cognitive, and social capacities of students, as well as the ecological structure of the school, teacher beliefs, and teacher efficacy, instruction does matter (Davies, Janus, Duku, & Gaskin, 2015; Poggio, 2013).

Communication instruction generally has focused on helping students read with ease, write fluently, think deeply, and communicate effectively. In the 1970s through early 2000s, communication researchers began to concentrate on how social dynamics in the classroom can facilitate the development of cognitive and linguistic processes associated with communication (Applebee, Langer, Nystrand, & Gamoran, 2003). Informed by socio-cognitive theory, for example, educators should provide students with opportunities to discuss the texts they are reading and to exchange ideas through discussion, which helps students make meaning of new information through social interactions with adults and peers (Rosenblatt, 1988; Lave & Wenger, 1991; Applebee et al., 2003). Further, as Bleich (in Probst, 2004, p. 12) states:

> The practice of formulating response statements is a means for making a language experience (hearing, speaking, reading, or writing) available for conversation into knowledge. A response can acquire meaning only in the context of a predecided community (two or more people) interest in knowledge.

Additionally, low-achieving students, students from disenfranchised situations, and second-language learners do better when they have opportunities to voice, and refine, their understandings through collaborative discussions that provide new knowledge and strategies necessary for continued discussion (Applebee et al., 2003). Toward this end, teachers should engage students in thought-provoking authentic questions, provide time for discussion of ideas, and allow for a productive struggle with text and/or new ideas.

MEASUREMENT/ASSESSMENT

How is Communication Typically Measured or Assessed?

Metusalem et al. (2019) identify several traditional methods for assessing communication skills, based on their categorization of production skills, reception skills, and intercultural communication skills.

Production skills

- Observation of public speaking as a performance assessment, where students are provided (or select) a topic and produce a public speech which can be given live or recorded on video. The performance would be scored with validated oral-communication rubrics.
- Writing assessments would result in student writing samples, scored with validated writing rubrics.

Reception Skills

- Active listening has traditionally involved students listening to a passage and then answering selected-response questions (so to not confound the measurement of listening with writing).
- Reading comprehension assessments often focus on the subcomponents of reading: concepts of print, letter identification, phonological awareness, accuracy, fluency, and basic reading comprehension; these usually are assessed using selected-response items.

Intercultural communication skills

- Knowledge of cultural norms typically is measured using self-rating scales, case studies, and awareness tests.
- The ability to apply this awareness often is assessed using self-rating scales, case studies, observation of interactions or presentations, and ratings of written work, whether single pieces or portfolios.

Because they measure only the underlying skills for complex communication, however, these traditional assessments do not fully capture this construct. Assessments of complex communication must reach beyond traditional reading and writing assessments and measure richer learning and more complex tasks—tasks that comprise "multiple elements, attitudes, behaviors, ways of acting and thinking, with a focus on their application to real-life contexts" (Ercikan & Oliveri, 2016, p. 310).

Advocates of communication (and other 21st century skills) recommend student-centered assessments, such as performance assessments and those typically used in problem-based and project-based learning which are open-ended and allow for multiple pathways to achieve a solution. These provide students with opportunities to "engage with novel, authentic problems and to create complex, extended responses in a variety of media" (NRC, 2012, p. 147). Additionally these assessments allow students to communicate in a collaborative manner with different stakeholder groups (e.g., peers, community members) while working on authentic problems. Complex communication also can be assessed using portfolios of student work (NRC, 2011). Portfolios allow for measuring achievement of complex communication over time, and in a variety of situations and content areas. They can include self-reflections as well as demonstrations that integrate the domains of complex communication and other success skills.

What are the Measurement/Assessment Issues Related To Communication?

There are instructional, practical, and technical considerations when selecting (or designing) measures of 21st century competencies (Soland et al., 2013). Instructional considerations pertain to the use of assessment information. For example, is the measure intended to be used formatively or summatively? Is it to provide actionable information to teachers, or useful feedback to students? Is the assessment grade, context, or culturally appropriate? Practical considerations relate to cost and ease of administration, delivery, and scoring. And technical considerations center on validity, reliability, and fairness.

The desired inferences that educators wish to make from assessment results will influence what evidence will be collected (NRC, 2011; Wilson et al., 2012). The development of educational and psychological tests typically proceed as follows: define the targeted construct; create tasks to elicit desired responses; select item types; consider the various administration issues; determine the values, codes, or scores to be assigned to student responses; pilot the assessment, using a large and diverse sample of students; model and analyze responses, attending to technical issues such as validity, reliability, and test fairness.

The overlap of the communication construct with a disciplinary area poses a major challenge when assessing communication as a success skill (Vista, Kim, Care, 2018). Measuring the 21st century components of communication can occur in any content area; however, the discipline's declarative knowledge, the basic and applied communication skills, and the role of other success skills all need to be taken into account in the design of assessments.

Meaningfully assessing communication as a success skill requires application through real-life problems and discipline-specific projects. But does student performance on such tasks generalize to task performance involving other disciplinary contexts (Ercikan &Oliveri, 2016, Vista, et al, 2018)? Snow (2002, p. 75) identifies several

factors pertaining to generalizing reading knowledge, which is applicable to complex communication more broadly. These factors include:

- *Sociocultural factors* in which learners from some social groups experience a disconnect between their notions of communication and those they encounter at school, whereas other groups find the school-based texts and literacy activities familiar and congruent.

- *Group membership* can impact teachers "varying expectations of literacy success for children, such as students from low- versus middle-income families Second-language readers are likely in general to have less-extensive vocabulary knowledge than first-language readers, and recent immigrants are likely to be less familiar with presupposed background knowledge than long-term residents."

- *Individual differences* where "the individual capacities that codetermine success in literacy acquisition, such as short-term memory, vocabulary knowledge, or sensitivity to discourse markers, can show large differences among children from the same social group or family."

- *Intra-individual differences* arising from the readers' use of their capabilities and varying as a function of setting, text, purpose, and preferences for communicating.

Another challenge when assessing communication is the development of tasks that reflect the complexities of communication skills. Tasks may include reading, writing, listening, and speaking, as well as using multiple media and technologies; but it is questionable whether students have regular opportunities to communicate in diverse environments. Additionally, in order to permit valid score-based inferences, tasks assessing complex communication must be culturally appropriate (Ercikan &Oliveri, 2016). Complicating this challenge further is the relationship between communication and other success skills, such as critical thinking, self-direction, and collaboration. Developing and scoring tasks that meaningfully assess these various skills could be unwieldy (Vista et al., 2018).

Yet another challenge is the difficulty, time, and cost of developing these multidimensional assessments, which need to go beyond a selected-response format and include opportunities to demonstrate these intricate expectations (Ercikan &Oliveri, 2016; Rotherham & Willingham, 2009). Designing the assessments and scoring protocols, scoring student work, making score-based inferences about student performance, and adjusting instruction as indicated by the assessment results—this all takes time.

Most large-scale assessments of student achievement do not reflect deeper learning goals, due to constraints associated with item format and testing time (NRC, 2012). Project- and performance-based assessments in large-scale testing programs provide additional challenges related to reliability, generalizability, and validity for the intended use. Large-scale assessments of communication as a success skill will also need to ensure (a) proper alignment with agreed-upon skills, (b) cross-cultural acceptability, (c) congruence with curricular programs and established instructional practice, and (d) agreed upon expectations of the skills in order to make interpretations that can be compared in multiple contexts.

What are the Implications of the Research on Communication Assessment and Rubric Design and Use?

Complex communication can occur in any content area and in a variety of situations. It also can embed a swath of expectations, such as attitudes, behaviors, and ways of acting and thinking within a real-life context. Consequently, assessment designers must first consider the knowledge, skills, and abilities to be measured (Ercikan & Oliveri, 2016). In other words, the targeted construct should be described with enough specificity to guide the assessment design and, in turn, the

> Complex communication can occur in any content area and in a variety of situations.

scoring rubric. Ercikan and Oliveri also address the need for combining scoring judgments with cognitive validity evidence of student reports of their thinking and response process when complex constructs are being measured. These cognitive reports can be in the form of cognitive labs or think-aloud protocols. Finally, given the intricacies of complex communication, measures of this construct must take into consideration how communication is manifested in different cultures.

Assessment and Rubric Design

Complex communication requires non-routine interactive skills (NRC, 2012). Consequently, designers of complex-communication assessments should consider using an evidence-centered design (Mislevy & Haertel, 2007). Here, designers of the task describe the construct with enough specificity to guide the design; capture the progression and definition of the targeted construct (student model); identify the task features for assessing different construct components and levels (task model); and specify the scoring rules, criteria, and statistical models for evaluating and interpreting student performance in relation to the targeted construct (evidence model).

> Complex communication requires non-routine interactive skills.

Assessment and Rubric Use

Creating a pathway, or continuum, that describes the demonstration of complex communication as a success skill may be necessary, given the nature of this construct and its interrelationships with other success skills. Using a continuum in lieu of a scoring rubric signals its use as an aid in the learning progress rather than in measuring complex communication as a learning outcome. By regarding the task as a formative tool for authentic practice, it can align more closely with local curriculum and instructional practices, and with the diverse learners being assessed. The task also allows for self-reflection and formative feedback, which benefits the student as well as the teacher in monitoring progress and making instructional and learning decisions (Shepard, 2019).

CONCLUSION

This paper synthesized the literature on complex communication as a success skill to provide a working definition and inform the development of a scoring rubric. Complex communication, "such as eliciting critical information and conveying a convincing interpretation of it," is a required expectation in the work force (NRC, 2011). The components of this domain include observing, listening, and reading; eliciting and interpreting critical information; and conveying one's interpretations to others. Proficiency with technology tools and the ability to solve problems collaboratively and cross-culturally are additional components of complex communication.

Complex communication extends beyond English language arts content, requires the application of the content along with other academic disciplines, and anticipates the proficient use or interpretation of technology and needs of diverse populations. Embedding complex communication into schools and classrooms as a success skill is no small task, and has implications for curriculum, programs, instructional practice, and assessment. Both instruction and assessment need to engage students in real-world situations that call for

> Complex communication extends beyond English language arts content, requires the application of the content along with other academic disciplines, and anticipates the proficient use or interpretation of technology and needs of diverse populations.

complex communication. Students need multiple opportunities to practice, self-assess, and receive formative constructive feedback in order to improve this success skill.

Many of the basic skills underlying reading, writing, listening, and speaking are currently assessed in English language arts programs. The focus on complex communication requires educators to extend assessments across disciplines, including the use of informational technology, and to provide opportunities for students to explore meaningful issues considering a variety of individual values and beliefs. Measuring complex communication may best occur through a formative process by considering a pathway for instructional and learning purposes rather than for assigning a grade, allowing students to self-reflect and to adjust their own learning. Complex communication moves beyond basic skills and requires application in real-world situations; therefore we recommend the pilot testing of these draft continua against student work to determine the accuracy of their descriptions of student performance and usefulness for teaching and learning purposes in K-12 classrooms.

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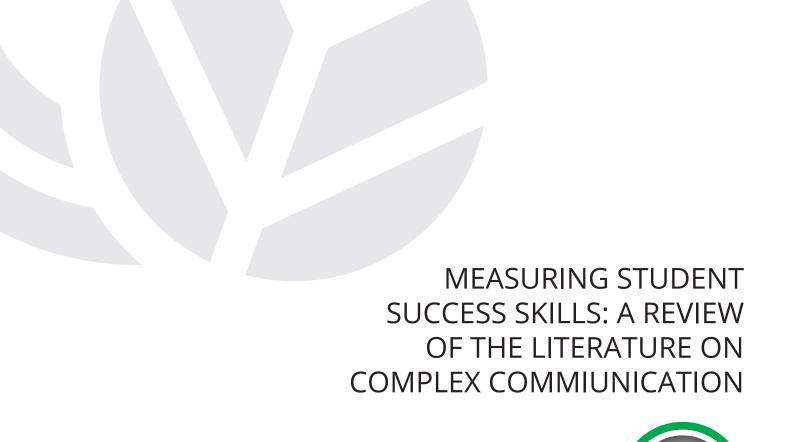
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