First Steps Toward Developing a Teacher's Self-Extending System

By Deborah A. Corpus & Ann E. Giddings

Learning a complex process is — well, complex. Think about learning to drive a car. First, a person has to want to drive a car or have a need to use one to get places. The student driver has to have access to a car and time to practice driving. A learner usually has an experienced teacher who coaches her first in driving around a parking lot, then driving on infrequently traveled streets, and finally on busy streets and highways. The student driver is learning to orchestrate steering, accelerating, and braking all while adjusting to the route and the circumstances. With sufficient practice, the student driver has the knowledge and skills to take the driver's test and can then begin driving on her own. The learning isn't complete though. The driver must handle unexpected mechanical problems. The new driver now must learn how to navigate routes based on her purpose: finding the fastest route between two points using a phone app, planning a leisurely exploration of an area using a road atlas, or negotiating unexpected traffic conditions using her own sense of direction. This additional learning takes time as the new driver gains experiences with different planning methods. She learns from both successful experiences and from her mistakes as a driver and navigator. She builds a self-extending system encompassing her basic driving skills and her growing navigational skills. The more she drives in new situations and settings, the more she learns. The more she has learned, the easier she learns how to negotiate even more complex driving challenges. The driver learns *how* to learn, building a self-extending system allowing her to increase her skills and strategies as a driver without the help of direct instruction. Learning to read and learning to teach are also complex processes. Both developing readers and developing teachers learn *how* to learn, building self-extending systems to become better readers and more effective teachers.

Building a Self-Extending System as a Reader

Marie Clay (2001) explains the internal system a reader develops as he orchestrates all he has learned about print, fluency, constructing meaning, and solving any problems he encounters as he reads: "Supported at first by social contacts the literacy learner gradually has less need of the scaffolded support of the expert, and the reader begins to perform alone *but improves his or her reading and writing processing as those activities are pursued, learning more on his or her own*" (pg. 102, italics original). The child learns more about reading, independent of instruction, every time he reads. More current brain research sheds light on the process. As Clay (2016) states, "I think it is most helpful to think of the learner who is successfully solving reading problems as building a neural network for working on written language *and that network learns to extend itself*" (pg. 128, italics original). This self-extending system allows the reader to become progressively and independently more proficient with each successful encounter with continuous text.

Building a Self-Extending System as a Teacher

In a similar way to the development of a self-extending system for children, teachers can develop a self-extending system throughout all stages of their career. Preservice teachers gain access to the knowledge of subject matter and teaching methodologies through college course work. The preservice teacher experiences teaching in short-term, controlled practicum settings under the eye of methods course professors and then eases into a classroom with the support and coaching of a cooperating teacher and a university supervisor. If all goes well, the preservice teacher passes the state licensing exams and student teaching experience. The learning has just begun though. The new teacher must handle unexpected student behaviors while planning for a classroom full of children who depend on her to teach reading, language arts, math, social studies, science, and possibly art. She must find ways to sequence and teach all the skills, strategies and knowledge for her grade level in about 185 days. She is responsible for her students' achievement as shown on test scores and other measures. She needs to learn to use planning tools to help her sequence instruction and select materials and methods based on her purposes.

This new teacher learns from her professional resources and from both her positive and challenging teaching experiences as she increases her teaching effectiveness.

We propose that effective teachers at all stages in their career continue to build a self-extending system. They learn from professional resources and collaborations, yes, but they also learn from their students as they analyze what methods and materials helped or hindered their students' growth as readers.

We next list actions that occur simultaneously and are fundamental to building a teacher's self-extending system. Just as readers use all they have learned and are learning as they negotiate increasingly more complex text, so teachers use all they have learned and are learning as they teach their developing readers.

Action: Understand the "Science of Reading" for Beginning Readers Is Not Settled Science. Teachers in 2022 are inundated with conflicting messages about reading. The popular press declares there is one best way to teach reading, and beginning teachers are not taught that "best way" (MacPhee, Handsfield, Paugh, 2021). The International Dyslexia Association (IDA), The International Literacy Association (ILA), and Reading Recovery Council of North America (RRCNA) have published differing definitions of reading and conflicting approaches to beginning reading, especially for students exhibiting reading difficulties (IDL, 2016; ILA, 2016; RRCNA, 2017). The National Council of Teachers of English (NCTE) has weighed in with its position statement (NCTE, 2019). Simply reading through these conflicting reports can confuse preservice and novice teachers because they lack the experience working with many different students to provide context for the claims and counterclaims. New Zealander Clay (2001) explains the origin of many of these controversies:

The authors of instructional programmes select the things they want children to attend to; the best of those programmes are driven by a particular theory and each programme emphasizes and neglects different aspects of literacy processes. These are their selling points. Once children have learned the practical tricks of "the selected method" on "the selected texts," progress is thought to be assured. Children who are active, constructive thinkers do learn from different approaches. It is the constructive children who make most programmes work. An alternative approach, designed especially for children who have pronounced difficulty learning, assumes that a watchful teacher must assist the learner to develop and integrate a complex set of neural processes from the beginning (pg. 105).

The current controversies focus on instruction for beginning readers and is wrapped in the authoritative term, "the science of reading" (Suskind, 2020). The "science of reading" term was first used in the 1830s and has usually been reserved for decoding (Shanahan, 2020). The term has had an increase in popularity since 2018 due to coverage of policy initiatives from the International Dyslexia Association and Hanford's work in the popular press (Shanahan, 2020).

Let us examine the current decoding focus for the term "science of reading." How does a person read? Ask almost any reader who is not a teacher, and you'll hear a common-sense description popularized by Rudolf Flesch's 1955 best seller *Why Johnny Can't Read:* "Reading means getting meaning from certain combinations of letters. Teach the child what each letter stands for and he can read" (Flesch, 1955, p. 1). It sounds so simple. This popular understanding mistakes letters for graphemes, the written representation of phonemes. Sounding out each individual letter of the word "town" (t-o-w-n), for example, provides a very different pronunciation than sounding its graphemes (t-ow-n). Frank Mays identifies five distinct approaches to teaching systematic phonics in his *Unraveling the Seven Myths of Reading* (2000): 1) sounding letter by letter, described by Mays as a "primitive" approach used by those who do not understand how words work (p.48); 2) a synthetic method matching graphemes to phonemes and then blending those phonemes; 3) an analytic method using known words to teach grapheme/phoneme correspondences; 4) a phonogram method using onsets and rimes in single syllable words as the base for decoding multisyllabic words; and 5) a vowel pattern approach. Mays provides the advantages and disadvantages of each approach, but the "common-sense" approach of the first method, sounding letter by letter, is the least effective of any of the methods.

The model proposed by Gough and Tunmer (1986), known popularly as the "Simple View of Reading," can be mistaken as just a reiteration of Rudolf Flesch's 1955 screed against public education. The "Simple View of Reading" (SVR) is presented as a math formula: fluent word reading X language comprehension = reading comprehension where comprehension is the multiplicative product of decoding and language proficiency. No reading comprehension will occur without direct instruction in decoding. Language comprehension is defined as oral language comprehension, something a child brings with him to school. If reading is as simple as putting sounds and letters together, and if teachers need only teach decoding for children to become readers, the public must come to the conclusion that public school educators and teacher preparation programs are the cause of reading problems.

The reading process is not so simplistic, however. The National Reading Panel (NRP) (2000) dissected reading instruction into five components or pillars: phonemic awareness, phonics, fluency, vocabulary, and comprehension in order to examine the research behind each component. Because the phonics section of the NRP report is often cited as the base for the "science of reading" claims (Hanford, 2018; Shanahan, 2020), this discussion focuses primarily on the pillar of phonics instruction. For the phonics component, the NRP compared different forms of systematic phonics instruction to "alternative forms of instruction not focusing at all or only incidentally on the alphabetic system" (NRP, 2000, p. 2-137). Unsurprisingly, students in programs that focused on phonics instruction fared better on phonics assessments than those who were in programs that did not focus on phonics. The NRP grouped phonics programs into three categories: synthetic phonics programs, larger-unit phonics programs emphasizing analysis and blending of phonograms and phonemes, and a miscellaneous category that still provided systematic instruction but could not be categorized. The effect sizes for the three categories of programs were compared. "All were significantly greater than zero and did not differ statistically from each other" (2-132). None of these approaches was the primitive letter-by-letter approach. All of the approaches require an understanding of how words work and how phonics can be integrated into effective reading instruction.

The NRP cautions:

Finally, it is important to emphasize that systematic phonics instruction should be integrated with other reading instruction to create a balanced reading program. Phonics instruction is never a total reading program. In first grade, teachers can provide controlled vocabulary texts that allow students to practice decoding, and they can also read quality literature to students to build a sense of story and to develop vocabulary and comprehension. Phonics should not become the dominant component in a reading program, neither in the amount of time devoted to it nor in the significance attached. It is important to evaluate children's reading competence in many ways, not only by their phonics skills but also by their interest in books and their ability to understand information that is read to them (2-136).

The National Reading Panel report provides directions for further research, an acknowledgement that their findings are not "settled science," especially in the "active ingredients" of systematic phonics programs. The report writers note, "Systematic phonics programs–even those of the same type, such as synthetic phonics programs–vary in many aspects" (2-136). Contrary to popular press reports, the NRP did not identify the best method of teaching phonics or portray phonics as the only component in beginning reading instruction. The report calls for further research "to objectively determine the ways in which systematic phonics instruction can be optimally incorporated and integrated in complete and balanced programs of reading instruction" (2-137). Part of that work, concludes the phonics instruction section, "should be directed at preservice and inservice education to provide teachers with decision making frameworks to guide their selection, integration, and implementation of phonics instruction within a complete reading program" (2-138).

Summary. The "Science of Reading" focusing on phonics instruction is not settled science. An important action toward developing a self-extending system as a teacher of reading is to understand developmental patterns of children as they develop phonological awareness, phonemic awareness, and phonic understandings. A teacher needs to know systematic approaches to teaching phonics and have "decision making frameworks to guide their selection, integration, and implementation of phonics instruction within a complete reading program" (NRP, 2000, 2-138).

Action: Develop a More Complete View of Reading Informed and Changed by New Understandings of the Sciences of Reading and Reading Instruction. The "simple view of reading" depicted in the formula by Gough and Tunmer (1986) does not account for all the aspects of reading identified by the National Reading Panel's "five pillars" (phonemic awareness, phonics, fluency, vocabulary, comprehension). The writers of the NRP report recognized that the science of reading was not settled in 2000, and outlined areas of needed research in each of the pillars. A recent article by Duke and Cartwright (2021) updates and expands the Simple View of Reading. The resulting model is not the simplistic mathematical formula promoted by those advocating a static view of the Science of Reading. The updated model accounts for more recent research including the impact a reader's active self-regulation has on reading. The following chart, based on the work of Duke and Cartwright (2021), outlines key areas of difference affecting the information presented to both preservice and practicing teachers. Each "side" has its valid research base, but the sides differ in underlying beliefs about how children learn and how teachers should organize and deliver instruction.

Simple View of Reading: SVR (Gough & Tunmer, 1986; Hoover & Gough, 1990) as the basis for the "Science of Reading"	**Active View of Reading** Updated "Science of Reading" (Duke and Cartwright, 2021)
In the original "simple view of reading" formula (Decoding x listening comprehension = reading comprehension), all reading difficulties stem from either word recognition or language comprehension issues. Readers with decoding issues are dyslexic, those with difficulty in listening comprehension are hyperlexic, and those with difficulties in both processes have a general reading disability (Gough and Tunmer, 1986; Hoover and Tunmer, 2020). The original model (Decoding x listening comprehension = reading comprehension) implies the two multiplicands are separate, non-overlapping entities. This model has been translated into classroom practice by some as teaching phonics first, then comprehension (Houck & Ross, 2012). The simple view of reading (SVR) model does not address the active role of the reader in the process.	The SVR terms are updated to word recognition and language comprehension. Current research has clearly shown there are readers with grade-appropriate decoding and listening comprehension who have difficulty with reading comprehension. Updated research shows other factors that may cause reading difficulties, e.g, a mismatch between a reader's cultural and content knowledge, including concepts and experiences, and the reading material. Important processes bridge word recognition and language comprehension include vocabulary, reading fluency (accuracy, speed, prosody), and morphological awareness, especially with written texts where the spelling of morphemically related words can be seen. The updated research on reading points to the importance of active self-regulation in reading. *Executive function skills* (EF) allow proficient readers to direct their attention as needed, use working memory, attend, and plan, as well as inhibit distracting information. Duke and Cartwright (2021) summarize the research for domain-general executive function skills (those mentioned above) and reading specific executive function skills, e.g., the ability to consider either or both the letter-sound and meaning features of printed words as needed. In addition to EF skills, current research highlights the role of motivation and engagement in successful readers and their deliberate use of strategies to decode words and construct meaning.

The "simple view of reading" and the "active view of reading" models are just two of many models of reading used to explain a complex process: reading. A compilation of reading theories (Alvermann, Unrau, and Ruddell, 2013) highlights eleven different types of reading models categorized as cognitive-processing models, a dual coding model, a transactional model, integrated reading and writing models, and a sociocognitive model. These models provide different insights into the reading process based on both the author's and the user's perspectives, assumptions, and purposes. The models attempt to explain aspects of reading based on the current research in related disciplines (e.g., neuroscience, linguistics, comprehension), but they cannot be translated into effective instructional practices without further research. Shanahan (2020) distinguishes between "the science of reading" as basic research and "the science of reading instruction" as applied research. He compares these types of research to the basic research in medicine where discoveries are later tested for safety and efficacy in applied research. He notes,

"Education is necessarily an applied science, not a basic one." He continues, "In the end, the only way to know if any instructional approach is effective is to try it out in classrooms and to measure its impact on student learning" (Shanahan, 2020, p.8). The National Reading Panel report is based on a science of reading instruction. It provides directions for further research at the conclusion of each of its sections. No one model of reading and no single study on the effectiveness of an instructional method holds the secrets to *the* best way to teach reading in all its complexity. Professional organizations focusing on various learning disabilities will have different perspectives than those focusing on instruction for all students. One cannot assume that the techniques offered for disabled readers are warranted or even effective for readers who are developing normally without evidence from the "science of reading instruction."

Summary. To develop their own self-extending system, teachers read professional literature and participate in professional gatherings to understand the broad dimensions of reading and new findings from the sciences related to reading and learning. They use a critical lens when studying claims for particular approaches to reading instruction to determine if the recommended instructional procedures are based on extrapolations from basic research or are the results of tested effectiveness with readers.

Action: Teach Readers, Not Simply Skills or Strategies. Many current standardized programs do not take into account the updates to the science of reading outlined by Duke and Cartwright (2021) including the importance of a reader's own cultural and content knowledge, reading processes bridging word recognition and language comprehension, and the importance of a reader's own executive functioning skills. Programs focused on skills or strategies may not reach children traumatized by multiple years of pandemic restrictions or community tragedies or their own family's hardships. Teachers who engage in professional development focusing on discrete aspects of reading may see a mismatch between these demonstrations and their students' strengths and needs.

To complicate matters, teachers are accountable to many stakeholders: the adopted program, their grade-level team, the teachers at the next grade level, the district's prescriptions, and the parents' expectations. This accountability is often assessed through checklists and test scores and teacher evaluations. Teachers may assume that following the teacher's manual or the assigned script will be the safest way to proceed to please all the groups. Stakeholders often not considered in all these levels of accountability, however, are the students themselves as readers and learners. Knowledgeable teachers recognize no one scripted or standardized program addresses all aspects of reading for all learners (Clay, 2001). Effective teachers flexibly adapt their methods and materials to their unique group of students.

Shanahan (2020) points out we do have basic research in reading acquisition, but the subsequent applied research is lacking. There are relatively few studies examining the effect of elementary teachers' knowledge of the science of reading on the effectiveness of their instruction as measured by their students' reading growth or desire to read (Hudson, A., More, K., Han, B., et al, 2021; Shanahan, 2020). Teachers may not see how to effectively translate the recommended teaching methods to a classroom of 25 with varying strengths and needs. What teachers can do is use a variety of assessment tools to note the effectiveness of particular teaching methods on their students and the conditions under which those methods are used. Classroom based assessment tools (Serravallo K-2, 2014: Serravallo 3-6, 2014) provide a starting point to test the effectiveness of instructional methods and materials for individual students and groups. A classroom teacher can learn from this data collection if readers are accelerating or falling behind and make adjustments to fit the readers.

A teacher's purpose is to ensure students, not programs, succeed. Sharing and analyzing data with colleagues and instructional coaches is one way to find what is or isn't working and make needed adjustments in materials or approaches to help students become readers. Teachers' reluctance to engage in instructional practices advocated from a particular viewpoint could stem from many factors: a healthy skepticism about the scientific underpinnings of the approach demonstrated, a mismatch between the skill instruction offered and the teacher's knowledge of her own class, or a distrust of how prescribed approaches can be translated into actual classroom practice.

Summary. To develop their own self-extending systems, teachers need to thoughtfully engage in learning new information about the science of reading. Knowing that assessment informs instruction, teachers need to critically engage as researchers within their own classrooms to track the effect of specific instructional practices on their students' growth as readers, writers, and thinkers. As part of their own applied research, teachers must test their assumptions, observations, and conclusions in collaboration with other knowledgeable teachers and coaches. Through all this, teachers plan ways to develop competent, avid readers.

Action: Foster Intrinsic Motivation. There is a vast amount of research correlating the amount of time students spend reading continuous text of their choice and their greater proficiency as readers (NRP, 2000; Guthrie, J., Wigfield, A., Metsala, J, et. al, 1999; Allington, R. & Mcgill-Franzen, A., 2021). Do proficient readers read more because they are already proficient, or do they become proficient by avidly reading self-selected texts? The answer does not matter. Successful reading teachers know their goal is to teach children who not only can read but who DO read. Teacher practices are key to increasing students' enthusiasm and engagement in reading (Brandt, Sharp, & Gardner, 2021). Smith and Wilhelm (2006) capitalize on Csikszentmihalyi's theory of flow (1990) to identify five main principles supporting highly engaged adolescent readers: experiences provide a sense of control and competence, a challenge that requires an appropriate level of skill, clear goals and feedback, a focus on enjoyment of the immediate experience, and social relationships.

The avid readers in Smith and Wilhelm's study (2006) control what they read and feel competent in their reading. Because the reading is self-selected, the readers aren't bored by the content. The goals may vary with readers from reading every book by a particular author to reading every book the adolescent could find on a particular topic. The readers expressed an enjoyment in their reading, often describing themselves as frequently "lost in their book." Sharing reading with others, the social experience, makes reading even more enjoyable.

We propose the same principles can be applied to teachers' motivation to continue teaching. 1) Teachers who are actively improving their knowledge of the new discoveries in the science of reading are increasing their competence. They have a sense of control if they can adjust their teaching based on the needs of their students, particularly in light of students' cultural and content knowledge needs. 2) Successful teaching of reading continuously presents challenges as teachers assess what their students are able to do and what they need to know next to accelerate their progress. 3) Clear goals and feedback can be tricky for teachers. There are goals set by state, district, and grade-level evaluations. There are goals set by adopted instructional programs. Successful reading teachers understand the complexity of reading instruction and consistently assess and track students on what they are able to do in the components of reading as they become more self-directed and strategic. 4) Effective teachers find joy in their teaching. They celebrate the "aha!" moments as students learn. They notice students' new understandings and abilities. They recognize their own growth as teachers as they apply new understandings about reading to their teaching and to their own reading. 5) Finally, teachers enjoy the social experience of working with the students and with their colleagues. Professional collaborations extend beyond the classroom and grade-level team to colleagues who are members of reading groups and professional organizations. Attending to the factors that support teachers' engagement in teaching and learning is especially important as the years of pandemic teaching and the continued retirement of seasoned teachers cause a shortage of classroom teachers.

Summary. Csikszentmihalyi's theory of flow may give us insight into our growth as teachers as we build new understandings about the science of reading; engage as teacher researchers to test the effectiveness of our instructional practices; have agency to help all students in our classes become avid readers, critically questioning the professional literature and commercial programs offered to us; incorporate students' cultural and content knowledge in our work with students; and find joy in the work that we do with students and colleagues.

Working Together to Build a Self-Extending System

A self-extending system develops over time and adapts to new challenges for teachers, e.g., changing to new grade levels, welcoming new students with varying language backgrounds, incorporating the ever-changing cultural and content knowledge needed by students.

A professional is one who has specialized knowledge and who keeps that professional knowledge updated. Throughout one's teaching career, a teacher extends her understanding and knowledge through professional reading, participation in professional development and educational conferences, and analyzing how her students are learning. She acts as a professional by increasing her competence, gaining new knowledge, and critically reflecting on her knowledge and actions. A professional is one who belongs to a recognized group of professionals, and this group shares in the development of a teacher's self-extending system. The following are major contributors to the development of a teacher's self-extending system.

Schools of Education and Teacher Training Programs

These provide basic information about how children learn, how children develop as language users, and how children make meaning. Teacher preparation courses include current understandings of phonological and phonemic awareness, phonics, fluency, vocabulary, and comprehension. They provide the guidance and coaching as the aspiring teacher gains experience and begins to build a framework for decision making and continued learning.

School-Based Support Systems

More experienced teachers and literacy coaches support novice teachers by sharing planning and materials and by providing other perspectives on student responses to instruction. A novice teacher continues to build and refine her framework for decision making with the support of school-based colleagues and her experiences with alternative approaches to reading instruction as she works with her more challenging learners.

Professional Organizations

Collaborating with colleagues, continuing professional development, and reading professional journals representing different perspectives on reading instruction help practicing teachers deepen their knowledge, test their assumptions, and share what works to nurture avid readers.

Conclusion

We began this discussion by talking about teaching as a complex process analogous in many ways to learning to drive a car and navigate routes for different purposes and through many challenges. A driver education class prepares a new driver with the patient help of adults who spend hours coaching the neophyte driver. In a similar manner, teacher preparation programs provide the basic information on how to teach while methods class instructors, cooperating teachers, and university supervisors provide the side-by-side coaching aspiring teachers need as they learn to coordinate the complex tasks involved in teaching. After a preservice teacher passes her licensing exams and her student teaching, this new teacher will have curriculum guides and pacing charts to help her get her students from point A to point B in grade level expectations. She may initially have structured programs to help her juggle the planning for multiple subject areas at the elementary level. She will be crippled, however, if she does not develop the framework for decision making advocated in the National Reading Panel report.

Just as there is no one navigation tool that is best in all driving situations, there is no research from the science of reading identifying the best phonics program or the best comprehensive reading program for all children.

Effective teachers build a self-extending system as they learn from their students. They develop a decision-making framework based on knowledge and on experience. Our goal as successful reading teachers is to teach, guide, and support students as they become competent, purposeful, and even avid readers. Our goal as professionals is to continuously improve our effectiveness in teaching readers. First steps toward our goal of developing our own self-extending system is to learn the current science of reading and reading instruction in all facets of reading, to value the measurable and immeasurable markers of effective reading, and to use the research on intrinsic motivation to be our best selves as teachers whether this is our first year of teaching or our 50th.

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