

Focus on Research

A paper on the scientific validation of
effective reading programs and the development
of the *Academy of Reading*®



PASSPORT™
LEARNING

Overview

As a developer and provider of software-based learning programs, AutoSkill International stands out in the industry for its focus on research. AutoSkill products are not only built on the platform of extensive investigation into the learning process, but they are also evaluated in ongoing studies to ensure continual improvement and refinement.

This document examines the findings of key research into the process of reading and summarizes many of the educational conclusions that have been drawn from them. It proceeds to illustrate how this constantly growing body of CPL (Computerized Programmed Learning) knowledge has informed the development of the *Academy of Reading*® and how a basis in research has led the *Academy of Reading*® to become one of the most effective tools available for teaching learners how to read. The document also offers clear-cut evidence of the program's effectiveness, in the form of research study summaries, case studies, and site evaluations.

Ultimately, the goal of the Focus on Research is to provide educators with the necessary information to make confident, well-informed instructional decisions.

The precursor to the *Academy of Reading*® was the AutoSkill Component Reading SubSkills (CRS) program. Between 1985 and 1995, the CRS was expanded to create a DOS application known as the AutoSkill Reading Program. This in turn became the *Academy of Reading*® when the solution migrated to the Windows platform.

For the sake of simplicity and clarity, most references to AutoSkill software in this document use its present and most recognizable name: the *Academy of Reading*®. Please note that as of February 12, 2003, the *Academy of Reading*® began to be marketed under a new name, Passport Learning™.

A Balanced Approach to Reading Instruction

The heart of a powerful reading program is the relationship between explicit, systematic skills instruction and literature, language and comprehension. While skills alone are insufficient to develop good readers, no reader can become proficient without those foundational skills.

—California Department of Education, 1995

In recent years, science has shown persuasively that learning to read is a complex, difficult process. As such, it requires a systematic, balanced approach—one that involves the development of fundamental, core skills as well as exposure to a variety of higher-order literacy experiences in a dynamic, literacy-rich environment. In the words of Dr. Reid-Lyon:

Substantial evidence shows that many children in the first and second grades and beyond will require explicit instruction to develop the necessary phoneme awareness, phonics, spelling, and reading comprehension skills. But for these children, this will not be sufficient. For youngsters having difficulty learning to read, each of these foundational skills should be taught and integrated into the textual reading formats to ensure sufficient levels of fluency, automaticity, and understanding.

What makes adopting a balanced approach to reading instruction all the more challenging is the fact that no single instructional formula can be used to teach every student how to read. Every child is different, requiring a different combination of instructional components.

The authors of the National Research Council Report “Preventing Reading Difficulties in Young Children” (Snow, Burns & Griffin, 1998) concluded that the most effective teachers construct a unique blend of instructional ingredients for every child with whom they work. The authors were also quick to point out, however, that these teachers did so by drawing on a “common menu of materials, strategies, and environments.”

Looking Inside: Brain Research

Research has determined that reading is a whole-brain process involving a careful orchestration of several areas in the organ at once. This finding has provided significant insight into the nature of reading disabilities and has illuminated the way toward effective approaches for remediation. Understanding and developing approaches for solving some of the most difficult reading-acquisition challenges also helps solve those that are more common.

Most profound reading disabilities are designated by the label *dyslexia*. While numerous studies have examined this multifaceted impediment to reading, there has not, until recently, been a clear understanding of its neurological underpinnings.

With the advent of functional Magnetic Resonance Imaging (MRI) technology in the late 1980s, neuropsychologists and other researchers gained the ability to look inside the human brain while it performs cognitive tasks. Using the same technology that significantly enhanced the field of medicine, MRI can measure changes in the metabolic activity of the brain. Because it is noninvasive and does not use radioisotopes (as was the case with the previous imaging technology), it is particularly well suited for working with children.

Several imaging labs across the United States are currently performing studies into dyslexia using MRI (Demb, Boynton & Heeger, 1998; Eden et al., 1996; Pugh et al., 2000; Wood et al.; 1996). Their results are remarkable.

Case Study: Yale University

Dr. Sally Shaywitz and her colleagues at Yale University School of Medicine recently presented 29 dyslexic readers with a range of reading tasks to be performed while inside an MRI scanner. The reading tasks were generally phonological in nature and required the readers to consciously manipulate the letter sounds in words.

As expected, the dyslexic readers—in comparison with the other test subjects—had difficulty performing such tasks as reading nonsense rhyming words (e.g., “lete” and “jeat”).

What excited the Yale research team was that through MRI technology they could see clear differences in brain activity between the dyslexic and normal readers.

Yale University Test Group

- 29 dyslexic readers: 14 men and 15 women, ages 16–54
- 32 normal readers: 16 men and women, ages 18–63

(Shaywitz et al., 1998)

Dyslexic readers showed relative under-activation in the brain region that links print skills to the brain's language areas. There was also less activity in the angular gyrus, a large brain region linking the visual cortex and the visual-association areas to language regions in the superior temporal gyrus, or Wernicke's area (Shaywitz et al., 1998).

Cognitive Cooperation

Each of the brain regions employed in the reading process is required to function cooperatively for the activity to be successful. This concept of a careful orchestration of brain regions is often referred to as an issue of "functional connectivity" (Friston, Frith, & Frackowiak, 1994; Horowitz, 1994; McIntosh & Gonzalez-Lima, 1994; Shaywitz et al., 2000).

The results of the Yale studies have led some researchers to conclude that functional connectivity in the brains of dyslexic readers is insufficient for the regions to act as a system for decoding print into phonological structures (Shaywitz et al., 1998; Shaywitz et al., 2000). This has prompted research to determine what types of instruction will benefit dyslexic readers—and how the brain might change in response to such instruction.

Case Study: University of Washington

Researchers at the University of Washington believe they have found effective instructional strategies for dyslexic readers—and have the brain scans to prove it.

Todd Richards and his colleagues carried out a study involving six dyslexic and seven non-dyslexic boys ranging from ages 10 to 13. These subjects were matched on a variety of controls, including IQ. The non-dyslexics were above average readers for their age, while the dyslexics were significantly below.

Prior to treatment, all of the boys were imaged, using a new noninvasive technique called "proton echo planar spectroscopic imaging, or PEPSI (Posse et al., 1997). Like MRI, PEPSI measures metabolic activity in brain regions, but it takes a more direct approach by measuring "tissue-based lactate changes caused by a temporary mismatch of oxygen delivery and consumption in response to neuronal activation" (Richards et al., 1999).

The dyslexic readers were given a three-week, phonologically driven instructional treatment consisting of 15 two-hour group sessions. These included activities that taught the boys to analyze the sound structure of spoken words as well as automatic sound-symbol correspondence training and decoding strategies using high-frequency English spelling patterns.

Approximately one year after the first imaging session, both test groups were re-imaged, performing the same tasks to determine the long-term effect of the treatment they had undergone. The dyslexic boys also had their reading skills tested.

Richards and his colleagues found that the dyslexic boys had maintained their gains in reading skills, and the imaging scans also revealed they were now expending just 1.8 times the energy to perform the phonological processing tasks as the controls. Prior to treatment, their energy expenditure was roughly 4.0 times that of the controls.

Summary of Case Study

This research provides compelling evidence that a well-structured instructional intervention program—one that focuses on phonological processing, sound-symbol correspondence training, and the development of decoding skills—can significantly improve the skills of dyslexic readers.

The Passport Learning™ program constitutes a deliberate and thoroughly researched response to these observations.

A dynamic software program, the *Academy of Reading*® incorporates the theories of a balanced approach to reading into its instructional fabric. Its contents include

- Phonemic-awareness
- The subskills of reading for developing fluency in decoding different modalities of text
- Automaticity principles for ensuring automatic recognition of words and the mastery of the component skills
- A comprehension program that helps students develop fluency

The combination of these elements into a single program has proved highly effective and efficient for addressing the needs of both emergent readers and students experiencing delays or disabilities in the reading-acquisition process.

Meeting the Requirements

By providing training in all the requisite areas as determined by scientific research—phonemic-awareness, decoding fluency, and accuracy—and by providing comprehension practice activities, the *Academy of Reading*® program has been extremely successful at improving students' reading abilities. It meets all the requirements of an effective reading strategy.

Phonemic-Awareness

Much of today's reading research touches on the significance of phonemic-awareness in reading acquisition. Phonemes are the smallest sound units that make up spoken language. In English, various combinations of some 44 different phonemes are used to form the words we speak. For example, the phonemes /k/, /a/, and /t/ blend together to form the word "cat." When we speak, the phonemes blend together so tightly that the word "cat" is produced as a single pulse of sound.

Phonemic-awareness refers to the ability to pull this sound pulse apart into its components. It is the ability to recognize, focus on, and manipulate the individual sound units of spoken language.

Phonemic-awareness is a sophisticated form of knowledge. It is part of—but distinct from—**phonological awareness**, which includes larger sound units such as syllables, onsets, and rimes (Ehir et al., 2001).

Numerous studies have established the critical role of phonological processes in reading acquisition: Adams, 1990; Ball & Blachman, 1991; Blachman, 1994, 1997; Brady & Shankweiler, 1991; Goswami & Bryant, 1990; Rieben & Perfetti, 1991; Shankweiler & Liberman, 1989; Share, 1995; Shaywitz, 1996; Stanovich, 1992; Wagner & Torgesen, 1987.

Unfortunately for many children, the development of phonemic-awareness does not come easily and requires explicit, systematic instruction. And research indicates that weak phonological processing skills persist for poor readers through their teenage years (Fawcett & Nicholson, 1995) and into adulthood (Pennington et al., 1990).

According to results from the Connecticut longitudinal study (Shaywitz et al., 1992), deficits in phonological processing are at the core of the difficulties experienced by the majority of reading-delayed young adults.

In short, success in early reading depends on achieving a certain level of phonological awareness. Moreover, instruction in phonological awareness is beneficial for most children and seems critical for others.

—Chard & Dickson, 1999

Fortunately, research indicates that phonemic-awareness instruction can significantly benefit children’s reading abilities and remediate those who have fallen behind.

In its meta-analysis of research related to the importance of phonemic-awareness on reading acquisition, a National Reading Panel directed by the United States Congress found consistently positive results. Analyzing 52 studies that met its rigorous research methodology criteria, the panel concluded that the benefits of phonemic-awareness instruction were replicated many times across the experiments and therefore solidified claims of the beneficial impact of phonemic-awareness instruction (Ehri et al., 2001). Specifically, the panel determined that phonemic-awareness instruction assists reading and spelling acquisition and reading comprehension, despite recent claims to the contrary (Coles, 2000; Krashen, 2000).

Given the wealth of research pointing to the essential role that phonemic-awareness plays in reading acquisition, it seems reasonable to suggest that an effective reading program must train students to become phonemically aware. For this reason, Passport Learning™ includes a comprehensive phonemic-awareness training module.

The Passport Learning™ Phonemic-Awareness Training Module

Responding to research confirming the hierarchical or developmental nature of phonemic-awareness (Bruce, 1964; Fox & Routh, 1975; Griffith & Olson, 1992; Liberman et al., 1974), the phonemic-awareness training module within Passport Learning™ covers the essential skills in a developmental sequence.

Students begin with rhyming word-matching activities and then progress to matching words that begin with the same sound. Once this skill has been acquired, students learn to match words that have the same ending sound.

Passport Learning™ Phonemic Testing and Training Areas

Word Matching	Sound Matching
Rhyming	Beginning
Beginning	End
Ending	Middle
Blending	Segmentation
3 Phonemes	3 Phonemes
4 Phonemes	4 Phonemes

Training is first conducted in the areas listed above without any text present. On second rounds of training, target text and options text can be added to reinforce the concept that phonemes are associated with text; in other words, to establish in emergent readers an understanding of the sound-symbol relationship.

Once students have demonstrated an ability to analyze the phonemic structure of words, they progress to phonemesynthesis activities, working on blending three- and four-phoneme words. Finally, students are trained in segmenting these types of words.

All ten skills are developed without any text present; combined, they represent the first series in the phonemic-awareness training module of Passport Learning™. Series two consists of the same ten exercises, except this time the target words are presented both aurally and visually in text.

Decoding Accuracy and Fluency

Skilled reading can be characterized as accurate and fluent decoding of text that allows for the extraction of meaning. If a reader reads in a laborious, inefficient manner, it is extremely difficult for him or her to comprehend or remember what has been read, or to relate the ideas to background knowledge (Reid-Lyon, 1998).

Phoneme Isolation

The development of phonemic and grapho-phonemic-awareness is a difficult undertaking. There is some debate in research literature regarding the most appropriate presentation of the sounds of the English language. Some researchers suggest that phonemic awareness is best taught through the presentation of the phonemes that require a vowel sound in order to be audible, such as /b/ and /p/, and that the phonemes should be presented with a vowel or *schwa* sound.

Passport Learning™ offers two sets of sound presentations—one that presents the phonemes in as much isolation as possible, and one that presents the phonemes with *schwa* extension. Some teachers prefer to use the extended phoneme + *schwa* sound; others choose phonemic sounds that minimize the *schwa* presence.

The decoding and word-recognition abilities of skilled readers are “so rapid, automatic, and efficient that skilled readers need not rely on contextual information. It is the poor readers who must guess from context out of necessity because of weak decoding skills” (Stanovich & Stanovich, 1995).

Research studies have consistently found that efficient decoding and word-recognition skills are closely connected to improved reading comprehension (Calfee & Piatotkowski, 1981; Herman, 1985; Stanovich, 1986). The National Reading Panel Report (2000) explains the connection this way:

Both decoding and comprehension require cognitive resources. At any given moment, the amount of cognitive resources available for these two tasks is restricted by the limits of memory. If the word recognition task is difficult, all available resources may be consumed by the decoding task, leaving little or nothing for use in interpretation. Consequently, for the nonfluent reader, difficulty with word recognition slows down the process and takes up valuable resources that are necessary for comprehension. Reading becomes a slow, labor-intensive process that only fitfully results in understanding.

The importance of accuracy while reading is well understood. Without accurate letter and word recognition, text has no possibility of being comprehensible. As a result, reading programs and remediation efforts often emphasize decoding accuracy at the expense of fluency (Torgesen, in press).

A recent National Assessment of Educational Progress (NAEP) report highlighted the lack of fluency achievement in American education (Pinnell et al., 1995). The NAEP study of a nationally representative sample of fourth graders found that 44 percent of students were “disfluent” when reading appropriate grade-level stories. Although decoding and word recognition accuracy are essential to skilled reading, they are not enough—without fluency, comprehension is inevitably impeded (National Reading Panel Report, 2000).

Automaticity

A major breakthrough in the understanding of reading fluency and its impact on comprehension was the development of the theory of automatic information processes as articulated by LaBerge & Samuels in 1974. These researchers theorized that the reading of letters, syllables, and words must be learned to a point of automatic responding so that readers can attend to higher-level comprehension and reasoning (Fiedorowicz, 1986). Obviously, then, this concept of reading fluency incorporates automaticity—“fluent processing of information that requires little effort or attention,” as defined in *The Literacy Dictionary* (Harris & Hodges, 1995).

According to the National Reading Panel Report (2000), automaticity “involves processing complex information that ordinarily requires long periods of training before the behavior can be executed with little effort or attention.”

Ackerman (1987) emphasizes that automatic processing “may develop only through extensive practice under consistent conditions, which are typical of many skill acquisition situations.” Without a doubt, learning to read can be described as a complex undertaking that requires extensive practice. The Passport Learning™ software program was designed with this in mind.

The Passport Learning™ Subskills Module

The Reading SubSkills Module of Passport Learning™ incorporates and applies the theory of automaticity alongside a task-analytic methodology. A unique training procedure, it includes visual matching-to-sample, auditory-visual matching-to-sample, and oral reading, and is designed to improve rapid automatic responding through practice (Fiedorowicz, 1986).

Component Skill	Visual Matching	Auditory-Visual Matching	Oral Reading
Letter Names	X	X	X
Letter Sounds		X	X
CV/VC Pseudo-Words	X	X	X
CVC Pseudo-Words	X	X	X
CVC Words	X	X	X
CVCV Pseudo-Words	X	X	X
CVCV Words	X	X	X
CCVC Pseudo-Words	X	X	X
CCVC Words	X	X	X
CVCC Words	X	X	X
CVVC Group 1 Pseudo-Words	X	X	X
CVVC Group 1 Words	X	X	X
CVVC Group 2 Pseudo-Words	X	X	X
CVVC Group 2 Words	X	X	X
Level 1 to Level 10 Words	X	X	X
Phrases			X
Level 1 to Level 10 Sentences			X

Within each of its activities, the Reading SubSkills Module breaks down the complex task of learning to decode into a developmental sequence. Learners focus on individual letters as well as on common and orthographically accurate vowel-consonant combinations that form words and pseudo-words and on high-frequency words of varying complexities.

Practice with pseudo-words is essential for an effective training program in decoding. According to Shaywitz et al. (2000), the reading of pseudo-words is “perhaps the clearest indication of decoding ability because familiarity with letter patterns cannot influence the individual’s response.”

In order to achieve automaticity of letter and word recognition, learners must demonstrate an ability to respond at a high level of accuracy and at a consistent rate of speed. As students progress through this hierarchy of skills, decoding accuracy and fluency is achieved.

Phonics

Instructors should recognize the ample evidence that youngsters who are directly taught phonics become better at reading, spelling and comprehension than those who must pick up all the confusing rules of English on their own. Educators who deny this reality are neglecting decades of research. They are also neglecting the needs of their students.

—Rayner et al., 2002

Learning to read the English language is an extremely difficult process. There are, after all, more than 1,100 different ways the alphabet can be used to represent the 44 different phonemes of spoken English. Many words share the same letter combinations but are pronounced quite differently when spoken: “clove,” “love,” “pint,” “mint.”

English also has many words that use different letters to represent the same sound. Consider “cook” and “technique” (the phoneme /k/ is represented by “ch,” “k,” and “q”).

Given this complexity, it is essential for students to develop an understanding of how letters map onto sounds (phonemes) to create sound-symbol correspondences and spelling patterns. The knowledge of the relationship between letters and sounds is the alphabetic principle, which is the hallmark of successful readers (Adams, 1990). Comprehensive literature reviews consistently arrive at the same conclusion: knowledge of the alphabetic principle contributes significantly to children’s ability to read words in isolation or in connected text.

In their meta-analysis of phonics instruction research, the National Reading Panel determined that explicit, systematic phonics instruction was a crucial component in an effective reading program (National Reading Panel, 2000). This conclusion echoed the findings of at least two other major reviews of classroom studies that compared pho-

nic instruction to more holistic approaches to reading instruction. Both Marilyn Adams’s 1990 review and Jeanne Chall’s 1996 review determined that systematic phonics instruction produced significantly higher achievement among emergent readers, particularly those considered to be “at risk” of reading failure.

This conclusion does not suggest, however, that phonics instruction is a complete reading curriculum. It does suggest that explicitly and systematically teaching beginning readers to link letters to sounds is an essential part of a balanced reading program.

Passport Learning™ offers a number of opportunities to develop and strengthen the alphabetic principle or grapho-phonemic knowledge. In the Auditory-Visual Match exercises of the SubSkills section of Passport Learning™, students practice matching what they hear with one of three on-screen options. Training begins with individual letter names and follows a developmental sequence from letter sounds to multi-letter words and pseudo-words. The use of pseudo-words ensures that students are actually decoding text and not relying on sight-word reading strategies. The words and pseudo-words (actually syllables since they follow the “rule” of English orthography) in the Passport Learning™ SubSkills training follow correct pronunciation. The letter sounds are presented in isolation (e.g., “q” = /k/) to reinforce an understanding of the nature of sound-symbol relationships in the English language.

Another opportunity to develop grapho-phonemic knowledge is found in Series II of the Phonemic-Awareness Training section of the program. Having focused on isolated phonemes in Series I, Series II of Phonemic-Awareness Training repeats exercises of Series I but with the added instructional feature of Target Text. Students hear the word pronounced by the computer and have an

Grapho-Phonemic Awareness (Phonics)

To deal with the complexity of the sound-symbol relationships of the English language, many teachers incorporate phonics rules into their instruction. This can be problematic, however, due to the inconsistency of the rules themselves—the rationale behind much of the criticism of phonics instruction.

The pronunciation of phonemes is dependent upon the phonemes around them. Phonics rules should not be considered as “rule” but rather as weak generalization. Reading vowels in words cannot be held to a consciously applied set of rules. Instead, it must be guided by a more general, implicit knowledge of letter-sound relationships and English orthography.

Passport Learning™ suggests that teachers make students aware of how phoneme pronunciation is dependent upon the phonemes around them and not tied to a specific phonics rule.

alphabetic representation of the spoken word. Students who work through these exercises not only reinforce their phonological awareness but also develop their grapho-phonemic knowledge.

Once students have completed these Passport Learning™ training exercises, they have developed an implicit understanding of the alphabetic principle.

Comprehension Training—Putting Skills into Practice

Passport Learning™ has recognized that to become successful readers, students must not only receive instruction in component skills but also practice the use of those skills in comprehension exercises.

Stanovich (1986) explains that there is a powerful “bootstrapping” effect caused by increased reading practice. A reader who is able to employ effective reading strategies in a confident manner tends to read more often, enabling accelerated vocabulary development, orthographic awareness, and word recognition skills.

Passport Learning™ includes a set of oral and silent reading paragraphs to help students strengthen their comprehension abilities. Both the silent and oral comprehension exercises help learners acquire strategies for better comprehension. These include the development of a reading vocabulary; the ability to identify the main idea; the ability to understand relationships, make inferences, and note specific facts and details; and the capacity for retaining information.

The paragraph content for Passport Learning™ was designed to appeal to specific groups of readers. For children, the paragraphs deal with engaging topics related to common childhood experiences. For adults, paragraphs were selected from a variety of real-world sources. All paragraphs were graded using several criteria including the Fry Readability Formula, sentence structure and syntax analysis, as well as an alignment to the Dolch leveled word list.

Additional opportunities to practice with extended text can be found in the Passport Learning™ library of age-appropriate, level-focused short stories. These stories, adapted from timeless classics, offer students the chance to practice their newly developed reading skills. They are of a manageable length but challenging enough to ensure that students have a sense of accomplishment and pride when they finish reading them.

Objectives for Oral and Silent Reading Comprehension Exercises

Relationship	Detail	Inference
Main Idea	Sequence	Vocabulary

Educational Principles at Work

One easily realizes that the most impressive findings have been registered in intervention studies where children received a combination training program that emphasized the integration of phonological skills with letter knowledge.

—E. Roth & W. Schneider

“Training of Phonological Awareness and Letter Knowledge in Children-at-Risk,” 1998

Integrated Instruction—Balanced Skills Training

The reciprocal relationship between phonological awareness and the acquisition of literacy skills—for example, understanding the correspondence between sounds and symbols—has been well documented. Studies indicate a relationship in which one ability assists the development of another, and vice versa.

According to Byrne and Fielding-Barnsley (1989), “Neither phonemic-awareness nor letter-sound knowledge was sufficient for acquisition of the alphabetic principle. They were needed in combination.” Similarly, Ball and Blachman (1991) determined that when phonemic segmentation skills are taught in conjunction with letter-name and letter-sound instruction, there can be an immediate and beneficial impact on reading and spelling skills.

Given the wealth of support for integrated instruction, it seems reasonable to expect an effective reading program to offer this type of approach. Passport Learning™ offers an implementation option that supports just such an approach.

Through assignments made by the instructor during student registration, the program sets in motion a sequence of training exercises that alternates between phonemic-awareness training activities and visual matching activities. With appropriate support from the instructor, students practice essential sound-symbol correspondence and decoding training while developing phonemic-awareness during each instructional section.

Motivation

As in every domain of learning, motivation is crucial. Although most children begin school with positive attitudes and expectations for success, at the end of the primary grades and increasingly thereafter, some children become disaffected.

—Snow, Burns, & Griffin, 1998

There is significant evidence to suggest that students who experience early reading difficulty run a serious risk of falling further and further behind. Reading becomes more awkward as students spend more time with increasingly difficult texts (Stanovich, 1986).

One method of breaking this downward spiral is by motivating these underachieving students to read and succeed. Effective strategies for motivating struggling readers include focusing on individualized instruction built upon students’ current issues (Brophy, 1998; McIntyre, 1989).

Another strategy is known as Mastery Learning. Brophy (1998) describes this as a system in which students, once certified as mastering a unit of study, are not required to do further work on it. Students who do not meet mastery criteria receive corrective feedback and continue in their practice until mastery is achieved. This method is believed to be effective in building the confidence of struggling students, increasing their willingness to take necessary risks and achieve challenging goals (Grabe, 1985).

The Passport Learning™ Mastery Learning Approach

Taking a Mastery Learning Approach, the Passport Learning™ program acknowledges students who successfully complete a component of training with an award and printable certificate of success. Once a skill has been mastered, the student moves on to the next: his or her progress is abundantly clear, represented graphically for the student to provide an image of how his or her efforts are yielding results.

This positive reinforcement has a tremendous impact on building self-esteem and motivation. What is more, the short but intense training periods allow the student to stay focused without placing a heavy burden on his or her attention span.

Feedback, of course, is an important part of the learning process. Without it, learners cannot know whether they have performed a task adequately or inadequately. Certain kinds of feedback, however, can be counterproductive. For struggling students with a history of poor academic performance, negative feedback can be detrimental to perceptions of students’ abilities.

Positive and corrective feedback can motivate struggling readers as they receive confirmation on their abilities or acquire the information necessary to complete a task successfully in the next trial. Corrective feedback of this sort supports a student’s learning needs without being negative or discouraging.

Passport Learning™ has therefore been designed to employ only corrective and positive feedback. For example, when a student makes an error in the Reading SubSkills Module, the correct answer is simply underlined in blue. A green check mark appears when the student is correct. Congratulatory messages let students know when they have mastered each skill. This type of feedback cultivates a positive atmosphere of learning and achievement.

The Passport Learning™ Records Management System

Passport Learning™ provides a complete records management system that constantly and consistently tracks student testing and training results, including

- Time on task
- Speed of trial completion
- Number of attempts required for mastery
- Percentage of items correct
- Words read per minute

More specifically, the system records each individual error made. This provides a powerful diagnostic tool, allowing teachers to identify precisely the strengths and weaknesses of each student. These results are fully printable, allowing teachers to demonstrate progress to concerned parents and principals. What is more, students can be supplied with concrete, quantifiable evidence of their own progress. Teachers must know the reading levels of their students for individualized instruction to be appropriate and possible. Otherwise, instruction tends to occupy a middle ground in which advanced students are not sufficiently challenged and struggling students are left behind. Armed with the detailed knowledge provided by Passport Learning™, teachers can accurately adjust their approach to classroom instruction.

Passport Learning™ comes with a battery of six reading-level assessment tests. Testing options include the following:

- Phonemic-Awareness
- Reading SubSkills
- Reading Word Recognition
- Oral Reading Comprehension
- Silent Reading Comprehension
- Cloze Paragraph Comprehension

One, all, or a combination of these assessments can be used as pre- and post-tests to determine reading-level gains.

For teachers with a background in reading instruction, the Oral Reading Comprehension test can be a powerful tool for determining a student's specific reading difficulty. As the student reads the paragraph of text, the teacher notes mispronunciations, omissions, grapho-phonemic errors, context errors, and insertion errors.

Daily Schedule

In the case of Passport Learning™, students will ideally train for 15 to 40 minutes per day, three to five times per week, depending on the age of the student. Furthermore, a commitment of 15 to 40 minutes does not require a major realignment of schedules, nor does it demand a significant change in teacher or student routines.

Professional Development/Training

Passport Learning™ recognizes that professional development is the cornerstone of successful program implementation. Different schools will have different professional development requirements. Passport Learning™ works closely with each facility to meet their particular training needs.

Passport Learning™ generally offers a two-day introductory course for the *Academy of Reading*® program. Teachers learn the underlying principles of the program and its mechanics as well as how to get started and how to approach a successful implementation.

This training helps teachers and program administrators build their knowledge and expertise of reading theory. It also helps them develop reading strategies and devise effective methods for implementing reading programs and their associated technologies.

Follow-up training is held two to six weeks after the program has started. Teachers review what they have learned so far and gain a deeper understanding of how to use the program.

They also acquire techniques for motivating students with monitoring their progress. Troubleshooting is also discussed.

This review is helpful because the material becomes more meaningful to teachers once they have had some experience using Passport Learning™ to work with students.

Teacher Support

Any advanced software-based solution requires responsive technical support: Passport Learning™ maintains a team of experts to resolve client issues quickly. Access to this support is available via the Passport Learning™ website and through a toll-free telephone support hotline.

The Science of Selection

It is by no means a simple decision for educators today to adopt a reading program. Many factors enter into the equation—but first among them is proof of effectiveness. No teacher or administrator is likely to commit financial or professional resources to a reading initiative without scientific validation of its methodology and its results.

The value of scientific research is called out clearly in a recently published document of the United States Department of Education. The piece, which offers guidance for applicants to the competitive grant program of the Reading Excellence Act, stresses the importance of scientifically based reading research that

- Employs rigorous, systematic, and empirical methods
- Is able to justify the conclusions drawn
- Indicates replicability by multiple investigators in various locations
- Has been objectively peer reviewed

The Passport Learning™ Story— A Revolution in Reading-Skills Development

Working from an understanding that reading is a whole-brain activity and that reading instruction demands a balanced approach, neuropsychologists Christina Fiedorowicz and Ronald Trites developed the concept of subtypes.

The concept of subtypes is actually quite simple. It suggests that even though individuals with reading difficulties have many similar characteristics, they have different strengths and weaknesses in component reading skills.

Traditional methods of remediation tend to use one single method for teaching disabled readers. In the subtype/subskill approach, the strategy is to apply teaching methods that correspond to each individual's own pattern of strengths and weaknesses in order to develop decoding and word-attack skills. Three specific subtypes of reading disabilities have been identified and validated: Type O, Type A, and Type S (see Fiedorowicz & Trites, 1987, for review of this literature).

The Three Subtypes of Reading Disabilities

Type O: Oral

Type A: Auditory/Visual

Type S: Sequencing

In the Beginning

The origins of Passport Learning and the *Academy of Reading*® software lie with Dr. Christina Fiedorowicz and Dr. Ronald Trites.

Dr. Fiedorowicz's study of training component reading skills for students with reading disabilities ultimately led to the development of the Component Reading SubSkills Program, one of the central programs within the *Academy of Reading*®.

As Dr. Fiedorowicz's study development partner, Dr. Ronald Trites was instrumental in turning the vision of Passport Learning and its *Academy of Reading*® software program into reality.

Through research, Drs. Fiedorowicz and Trites demonstrated the effectiveness of using subtype classifications to develop reading programs that directly answer the unique needs of individual learners. Their findings led to the development of the original AutoSkill Component Reading SubSkills (CRS) program—forerunner to today's Passport Learning™.

Confronting Complexity

Reading is a highly complex process, but through task analysis it can be broken down into component parts. Once the simpler component skills are learned well, a reader is better prepared to focus on the more difficult aspects of the process.

It is for these reasons that, in Passport Learning™, letters, letter combinations, syllables progressing to words of different phonetic patterns, sentences, and finally paragraphs are learned to ensure that the student has mastered the key component skills required to be an effective reader. This allows students to comprehend the greater meaning of the text they are reading, rather than concentrating on decoding individual words.

Another important aspect of the process of learning to read is automaticity, which suggests that the basic component skills of reading must not only be learned but also learned to such a degree that processing them becomes automatic (Fiedorowicz, 1986; LaBerge & Samuels, 1974). This automaticity of response then facilitates the attainment of higher-level reading skills, such as comprehension.

Behavior is a further consideration. It has long been recognized that learning is enhanced through immediate positive reinforcement of correct responses and through the presentation of correct answers when errors have been made. Part of the reinforcement process is progressive learning; training exercises are presented in sequence from simple to complex, building a strong foundation step by step in a hierarchy of skills.

Passport Learning™ was therefore built on a combination of these elements; each was integrated into a unique instructional approach. Could it actually help improve the skills of children with dyslexia? Drs. Fiedorowicz and Trites conducted three clinical research studies to find the answer to this essential question.

Put to the Test

Research Study I

The first study to examine the effectiveness of the *Academy of Reading*® program with reading-disabled children was conducted by Dr. Fiedorowicz in 1986. It included 15 boys, all of whom had serious reading disabilities. Each had failed to acquire normal reading proficiency, despite average intelligence, socio-cultural opportunity, conventional instruction, and freedom from gross sensory, emotional, or neurological handicaps.

Research Study I: Test Group

15 boys

Average Age: 11 years (range of 8.1 to 13.8 years)

Average projected reading-grade delay per Wide Range Achievement Test: 2.3 grades (range of 1.5 to 4.3 grades)

5 Type O

5 Type A

5 Type S

Each student in the test group was given 30-minute sessions on the *Academy of Reading*® program four to five times per week over an 11-week period. This amounted to an average of 21.5 hours of training.

Training was tailored to each subtype classification. Type O participants were trained on the oral-reading procedure; Type A participants on the auditory-visual matching procedure; and Type S participants on the visual-matching procedure. Eight of the boys were trained during the first half of the academic year and seven during the second half of the academic year.

Pre-training and post-training assessments measured accuracy and latency response (i.e., speed) for the component reading subskills. The Gallistel-Ellis Test of Coding Skills was used to assess phonetic knowledge, the Qualitative Analysis of Silent and Oral Reading was used to assess the reading of cloze paragraphs, and the Student Problem Individual Reading Evaluation was used to assess reading word recognition and paragraph-reading fluency, retention, and comprehension.

Outcomes

By training part of the test group in one half of the school year and part in the other, researchers were able to compare the two groups midway through the year when one had received instruction and one had not. The boys who received the training improved more than the untrained participants in their phonetic knowledge of words and reading word recognition (1.1 grade-level gain versus a 0.1 grade-level gain).

It was also found that the trained participants improved more than the untrained participants in oral-reading accuracy, oral-reading speed, auditory-visual matching accuracy, and visual-matching speed.

Once both groups had been trained, the results of the total sample indicated the same significant effects. Improvements were registered in auditory-visual matching speed, phonetic knowledge of syllables, and instructional level of paragraph-reading fluency and comprehension.

The results demonstrated that the *Academy of Reading*® program was an effective tool for improving the specific component-reading skills and the general-reading skills of reading-disabled children. An additional comparison revealed that those reading gains were maintained over a four-month follow-up period.

Research Study II

The results of the first study were promising, but before the *Academy of Reading*® program was made available to teachers, a second, more comprehensive study was conducted (Fiedorowicz & Trites, 1987).

The participants in this study included 115 students who met the same rigorous criteria for reading disability that were employed in the first study.

The *Academy of Reading*®-trained participants (Types O, A, and S) were given 30-minute sessions on the AutoSkill software three times per week over a 38-week period. This totaled an average of 56.4 hours of training. As before, each participant was trained according to his or her subtype classification.

Research Study II: Test Group

115 students (82 males, 33 females)

Average Age: 11.2 years (range of 7.9 to 14.6 years)

Average projected reading-grade delay per Wide Range Achievement Test: 2.9 grades (range of 1.2 to 6.2 grades)

26 Type O

22 Type A

26 Type S

17 Untrained Control Participants

24 Alternate Computer-Trained Control Participants

The untrained control participants were pre- and post-tested at the same time of the academic year as the *Academy of Reading*[®]-trained participants, but in the interim period, the untrained control participants proceeded normally within the school system. The purpose of this control group was to define sample reading-disabled participants and to follow their progress in whatever programming the school districts typically provided for them.

The alternate computer-trained control participants were provided with computer-assisted programs concerned with some aspect of language arts development. They engaged in three half-hour sessions per week for a total of 30 hours. They were compared with a matched subsample of *Academy of Reading*[®]-trained participants who were trained for 30 hours. The purpose of this group was to provide a control group for the effect of working on computer-assisted programs related to language-arts development. The programs were selected following consultation with specialists within each school district; teachers were permitted to use their choice of programs.

The pre- and post-test assessment battery included

- The *Academy of Reading*[®] Program Test Battery to evaluate component reading subskills
- The Wide Range Achievement Test—revised to assess reading word recognition
- The Gallistel-Ellis Test of Coding Skills to assess phonetic knowledge
- The Qualitative Analysis of Silent and Oral Reading to assess the reading of cloze paragraphs
- The Student Problem Individual Reading Evaluation to assess paragraph-reading fluency, retention, and comprehension

Outcomes

The *Academy of Reading*[®]-trained participants improved more than the untrained control participants in reading word recognition, phonetic knowledge of letters, phonetic knowledge of syllables, paragraph-reading accuracy, paragraph-reading speed, paragraph-reading retention, and paragraph-reading comprehension. As well, they exhibited better results for graphic representation and meaning of inserted words in cloze passages.

The comparison of the *Academy of Reading*[®]-trained participants and the alternate computer-trained control participants revealed that the AutoSkill-trained participants showed greater improvement in word reading recognition, paragraph-reading accuracy, and paragraph-reading speed.

Overall, the results of this investigation indicated significant gains for the *Academy of Reading*[®]-trained reading-disabled students. Not only were the findings of the first study replicated, but also further benefits of training were exposed—most importantly, the transfer of training to paragraph-reading fluency and comprehension.

Research Study III

The results of the first two studies provided evidence of the effectiveness of the *Academy of Reading*[®] program with reading-disabled children. The participants in both made significant gains completing component-reading tasks and standardized-reading tests that measured different aspects of the reading process. These gains were due to the needs-specific training administered by the *Academy of Reading*[®] and were assessed upon immediate completion of the intervention phase. In the first study (Fiedorowicz, 1986), it was demonstrated that the gains were maintained after a fairly short four-month interval.

Research Study III: Test Group

59 students

Average Age: 11.1 years (range of 7.3 to 14.6 years)

Average projected reading-grade delay per Wide Range Achievement Test: 3.3 grades (range of 1.2 to 6.2 grades)

15 Type O

15 Type A

15 Type S

14 Untrained Control Participants

A third study was conducted (Fiedorowicz & Trites, 1990) to determine if the gains made in the second study were maintained over a one-year period. The participants consisted of a randomly selected sub-sample of reading-disabled participants from the Type O, Type A, Type S, and untrained control groups of the second study.

These follow-up participants were evaluated one year after their final post-test assessment in the second study (i.e., Fiedorowicz & Trites, 1987). The assessment battery included all of the same tests applied previously.

Outcomes

The results showed that participants trained through the *Academy of Reading*® program maintained their gains not only in component reading skills but also in general reading skills. In fact, there was a continued improvement in some of the reading skills. Phonetic knowledge of letter sounds and phonetic knowledge of words improved from post-test to follow-up. In contrast, the participants who did not receive the *Academy of Reading*® training continued to show a relatively low level of performance in most of the general-reading skills.

The *Academy of Reading*® was honored with awards for the excellence of the original study and this follow-up, including a research award from the Ottawa Council for Exceptional Children (September 1988) and the Sam Rabinovitch Evaluation for Research Award of the Canadian Council for Exceptional Children (October 1988).

The research conducted on AutoSkill was well conceived and implemented, and it showed convincing results of a reading technology's ability to increase student reading achievement on a variety of measures.

—Dr. John Schacter
“Reading Programs That Work,” 2000

The *Academy of Reading*[®] in Action

Elementary and High-School Education

Overall, this intervention was successful for our students.

—Howard M. Brown
TIIAP, District of Columbia Public Schools

The Academy of Reading[®], which has not only impacted our students' achievement, but it also has affected behavior in positive ways. Office referrals and suspensions have decreased dramatically because students are more confident of their academic abilities.

—Dr. Gene Rizzo
Calvert Elementary School

Washington, D.C., Public Schools

An independent study prepared by Dr. L'Tanya Sloan, President of the ED-TECH Group, for the Washington, D.C., Public Schools TIIAP Evaluation, Linking to Learn, demonstrates marked gains in students' reading proficiency and attitude toward learning through the *Academy of Reading*[®].

A total of 28 schools participated in the study throughout the 1998–1999 school year on over 600 workstations. Students between grades 2 and 9 were tracked in the program, and their results were evaluated, using the Stanford 9 achievement test. Their proficiencies were rated at the start of the program, and based on initial scores, they were identified as belonging to one of the following categorizations: below basic, basic, proficient, or advanced.

Students worked on the program 3 to 5 times per week in 20–30 minute intervals, utilizing the *Academy of Reading*[®] urban implementation model for training. Students within the program were compared to a control group of peers that did not receive the training.

Post-program results showed that students who participated in the *Academy of Reading*[®] outperformed the control group in all four categories of reading-skills assessment. Notably, of the below-basic group that completed the program, 68 percent scored higher than the control group in post-program testing.

Additionally, 50 percent of basic and proficient students also achieved gains over their control group. Students' behavior and attitudes also improved.

Calvert Elementary School

At Calvert Elementary School in Calvert County, Maryland, the *Academy of Reading*[®] software was used as a reading-intervention program for grades 3 to 5. Students worked on the program 3 to 5 times per week in 20-minute intervals, with progress being tracked from October 1999 to April 2000.

The Houghton Mifflin assessment was given to all students who completed the program and revealed an average gain of approximately 31 percent and two grade levels in students' reading skills.

Based on these results, the Calvert County School Board approved a plan to implement *Academy of Reading*[®] in all of its elementary schools.

“Because our children come from such diverse backgrounds, we need a diversity of programs to meet their needs,” said Dr. Gene Rizzo of Calvert Elementary. “One such program is the *Academy of Reading*[®], which has not only impacted our students' achievements, but it also has affected behavior in positive ways. Office referrals and suspensions have decreased dramatically because students are more confident of their academic abilities. Children believe they are ‘good readers,’ and they are able to participate in classroom activities as opposed to acting out. Additionally, the number of students qualifying for Special Education services in grades 3, 4, and 5 decreased significantly from 1998–1999 to 1999–2000. Teachers, parents and students agree that these results are due in large part to the *Academy of Reading*[®].”

The implementation of the Academy of Reading[®] in our school system has been most successful.

—Daniel Clement, Supervisor of Instruction, Prince George's County, Maryland, Public Schools

Prince George's School District

Prince George's School District in Maryland began piloting *Academy of Reading*® in 1997. Results of longitudinal study between 1997 and 1999 demonstrated an average gain of 2.1 grade levels in reading comprehension for students from six middle schools: Shugart, Stoddert, Walker Mill, Drew Freeman, Goddard, and Burroughs. These results were based on pre- and post-test scores, using the Sucher-Allred Group placement test.

“The implementation of the *Academy of Reading*® in our school system has been most successful. The growth in reading skills is positive when the *Academy of Reading*® program is implemented correctly,” said Daniel Clement, Supervisor of Instruction at Prince George's County, Maryland, Public Schools.

According to the results, regular-education students achieved reading-comprehension gains ranging from 1.13 to 1.45 grades, while the gains of special-education students were three times the rate reported in previous years.

—P. Vladyka, 1994

Humble Middle School

With a mobility rate approaching 35 percent, Humble Middle School in Humble, Texas, needed a program that would quickly diagnose the academic skills of new students and improve retention for those leaving the district.

Administrators at the school stressed that any reading program they would have should include all students in the regular classroom. A study was established, involving 300 students from regular-education students, ESL students, and those classified as having special needs, learning difficulties, or emotional difficulties.

All 300 students received 20-minutes of training every other day using *Academy of Reading*®. Students were tested using two forms of the Gates-MacGintie reading test in August 1993 and March 1994. According to the results, regular-education students achieved reading-comprehension gains ranging from 1.13 to 1.45 grades (where previous gains averaged 0.41 to 0.45), while the gains of special education students were three times the rate reported in previous years.

Following the success of this study, state grants were secured to open *Academy of Reading*® labs on five elementary school campuses in the 1994–1995 school year.

Diversity

Diversity has become one of the chief characteristics of today's educational environment. Students and schools are multi-racial and multi-lingual; pupils come from a vast array of social and economic backgrounds. The result is a rich and complex teaching environment in which some students approach English as a second language while others perhaps lack the advantage at home of parents who have completed their education successfully. Passport Learning™, by focusing on students' reading challenges at the subtype level, is an excellent tool for such environments.

The *Academy of Reading*® program has been successful in numerous schools that reflect this diversity. For an evaluation or an effectiveness study that more closely resembles your school's environment and demographics, including ESL, special education, and adult learners, please contact

Passport Learning

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By virtually guaranteeing success, this [Mastery Learning] approach builds confidence and increases discouraged students' willingness to take risks involved in seriously committing themselves to challenging goals.

—M. Grabe

“Attributions in a Mastery Instructional System,” 1985

Conclusion: A Solid Program

The *Academy of Reading*® has earned recognition for its effectiveness in building the reading skills of learners at all stages of their academic careers—learners facing the broadest spectrum of education-related challenges. As this document has attempted to demonstrate, that success is due to many factors:

- 1. A solid foundation of scientific research into the complex process of learning to read*
- 2. A comprehensive approach to skill-building that concentrates on the essential subskills required for reading success*
- 3. A focus on establishing the automaticity of readers' responses to text*
- 4. An incremental mastery approach that bolsters students' confidence and increases their motivation to learn*

All of these have been incorporated into the program after careful assessments of their value and validity. The development of the *Academy of Reading*® and its core modules has involved extensive testing and evaluation—a process that has ultimately validated the program's pedagogical approach.

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