Factors Affecting Reading Ability in School Age Children

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Purpose

This secondary research report is intended to serve as a benchmark against which existing reading enhancement programs and software can be compared. It can also serve to inform the development of new programs and software superior to those now in the marketplace.

Background

Reading failure is a serious national problem and cannot simply be attributed to poverty, immigration, or the learning of English as a second language.

A Statement to the Committee on Labor and Human Resources revealed that 44% of the nation’s fourth-grade children had little to no mastery of the knowledge and skills necessary to perform reading activities at the fourth-grade level (Lyon, 1998). By 2009, the percentage reading below grade level had gradually improved to 33% but has remained unchanged through 2012.

Two-thirds of eighth-graders do not read at grade level. Only one-third of all students entering high school are proficient in reading. Within this group, only about 15 percent of African-American students and 17 percent of Hispanic students are proficient.

Boys lag behind girls in reading proficiency in all 50 states – in some states by as many as 10 percentage points.

Between 1971 and 2004, the NAEP scores of 12th-graders showed no improvement. Further, the 2005 scores of 12th-graders were generally lower than their counterparts in 1992.

Fifty percent of reading difficulties are believed to be preventable if students are given effective language development experiences in preschool and kindergarten and effective reading instruction in the primary grades (Slavin et al., 1996).
A study by Yankelovich found most children are reading but they are not reading enough. Despite the importance placed on reading for fun, only about 3 in 10 children can be classified as high frequency readers who read books for fun every day.

- Age 8 is the critical drop-off age for reading engagement. Older children are less likely to see benefits to reading and are less engaged in reading for fun.

- Data also indicate girls are more likely than boys to have positive attitudes about reading and to regularly engage in reading for fun.

- The benefits of reading are evidenced by the attitudes of high frequency readers. Compared to others, they are more likely to have positive self-perceptions and to associate strong reading skills with future success.

- More than 40% of children ages 5 to 8 say they are high frequency readers; by ages 9 to 11 that proportion drops to 29%.

- Almost half of the 15- to 17-year olds (46%) are low frequency readers, compared with 14% of 5- to 8-year-olds.

Reader groups are defined as: High = Reads every day; Medium = Reads 4-6 times a week to once a week, Low = 2-3 times a month or less (Yankelovich).

For students to develop into effective readers, they must possess both the skill and the will to read. As noted by Guthrie and Wigfield (2000), “motivation is what activates behavior.” Children’s motivation is increasingly multidimensional in the later elementary grades.
**Barriers to reading development**

Developmental factors and students’ perceptions about their own abilities also play into their level of engagement with learning. The older students get, the less likely they are to take risks and engage themselves fully in activities at which they are not sure they will succeed. According to Lumsden (1994), young children tend to maintain high expectations for success even in the face of repeated failure, while older students do not. To older students, failure following high effort appears to carry more negative implications—especially for their self-concept of ability—than failure that results from minimal or no effort (Lumsden, 1994).

Students’ attitudes about their capabilities and their interpretation of success and failure further affect their willingness to engage themselves in learning (Anderman & Midgley, 1998). For example, students who understand poor performance as a lack of attainable skills, rather than as some innate personal deficiency, are more likely to re-engage themselves in a task and try again. Students whose self-concept is bound up in their history of failure, on the other hand, are less likely to be motivated to learn.

Motivated readers hold positive beliefs about themselves as readers (Guthrie & Wigfield, 1997). Conversely, struggling readers assume they are responsible for their reading difficulties.

MacIver and Reuman (1994) add that middle school and high school-age students’ level of engagement in school is also highly influenced by peers. As students grow older, their motivation to engage in learning may be influenced by their social group just as much as, if not more than, it is by teachers, parents, and other adults.

Recurring failures to succeed and self-concept issues often complicate a student’s ability to learn any of a variety of reading skills. Schunk and Zimmerman (1997) found that students who doubt their ability to learn give up quickly when faced with new challenges.
Berlin (1981) found that success rates had a substantial impact on student learning. His studies produced strong, consistent evidence that tasks completed with high rates of success were clearly linked to greater learning and improved student attitudes, while tasks where students were moderately successful were less consistently related to learning, and hard tasks had a negative impact on learning.

**Required competencies**

The ultimate goal in teaching reading is to have students comprehend the ideas in a piece of text as they read. Reading helps children expand their thinking skills, learn to concentrate, and enlarge their vocabulary and effectively master their environment.

Reading is a complex act that requires many years of experience and use in order to do well. Many “models” of reading have been offered, each attempting to describe the essential components of skilled reading. Reading can be described at many levels, from the neurological to the psychological to the sociological. It is useful to think of skilled *English* readers as individuals who:

- Understand and use the “*alphabetic principle,*” that is, how the sounds of spoken speech can be represented by letters in the alphabet and how letters are used to identify printed words;
- Have and use background knowledge, knowledge of words, and comprehension strategies to obtain meaning from print;
- Read fluently and effortlessly, except when they come across unfamiliar text, when they consciously use the alphabetic principle and comprehension strategies to make sense of what they are reading; and;
- Are motivated to do all of the above on a regular and sustained basis.

Although reading is often thought of as a matter relating to the first component listed above, that is, using letters in words to read or pronounce words, skilled reading involves much more. Successful readers attend to all the relevant dimensions of reading, not simply word recognition, as important as it is. Successful reading and writing also involves comprehension, fluency, mastery of essential strategies, and motivation.
Learning to read English presents particular challenges that are not seen in other languages and reading systems. English is based upon the alphabetic principle. Alphabetic systems, (as opposed to syllabic systems such as Japanese), represent sounds that are meaningless in and of themselves but which acquire meaning when the sound units are combined. Before they can begin to read or spell, children must understand that written words are made up of sounds or phonemes.

Research indicates that instruction in phonological awareness should begin in preschool and kindergarten so that children can learn that written words represent spoken sounds. This process is known as “decoding” and means breaking down a word into its separate sounds. To decode, children need to be explicitly taught how to sound out words into phonemes. As children become more adept at decoding and reading words, they are able to focus on building their comprehension.

Fluency comes when a student recognizes more and more words on sight. The more words are recognized by sight the fewer the reading errors made. If a student is struggling with decoding, or if she does not have good phonological skills, fluency and comprehension will suffer.

The problems children experience learning to read are often not related to their ability to learn but to their phonological awareness; their ability to “hear” the English language and their exposure to the English alphabet. Rhyming words and repeating lines help children develop an “ear” for language—by appreciating the sounds of words.

The more a child is exposed to reading, the more likely the child is to acquire the requisite skills for reading. Children must learn that words on a page have meaning and that reading is done from left to right and from top to bottom.

Children who have not been read to before they enter school may not have experience listening to rhythms and sounds. They may also not have developed an interest in reading; that is, they
may not be motivated to learn to read. Children who have been read to in childhood are more motivated to learn to read, and they appreciate that reading is a gateway to new ideas.

The enjoyment of reading comes from comprehension, however, and not decoding words. Skilled readers “interact” with a text, thinking about what will happen next, creating questions about the main characters and so on. Kids who love to read have good comprehension skills.

**Elements of Reading Comprehension:**

- identifying and summarizing the main idea
- comparing and contrasting
- identifying supporting facts and details
- making inferences and drawing conclusions
- predicting outcomes
- recognizing fact and opinion
- recognizing realism versus fantasy
- identifying cause and effect
- recognizing sequence of events
- identifying story elements such as main characters, settings, plot, conflict, and resolution
- identifying the author’s purpose and point of view
- interpreting literary devices such as imagery, symbolism, and metaphors

A study of third- and fifth-graders and eighth- and 10-graders by Guthrie, Wigfield, Metsala and Cox (2009), found connections between the amount of time spent reading and comprehension and between the motivation to read and the time spent reading. After statistically controlling for reading achievement, prior topic knowledge, self-efficacy, and reading motivation, the study of third- and fifth-graders showed reading motivation significantly predicted the amount of reading. The study of older students (after similar statistical controls were imposed) found that, as with the younger group, motivation predicted both the amount of time spent reading, and the amount of time spent reading significantly predicted text comprehension (Guthrie, Wigfield, Metsala & Cox, 2009).
Importance of motivation

Student motivation “refers to a student’s willingness, need, desire and compulsion to participate in, and be successful in, the learning process” (Bomia et al., 1997).

Skinner and Belmont (1991) develop the definition further, noting that students who are motivated to engage in school “select tasks at the border of their competencies, initiate action when given the opportunity, and exert intense effort and concentration in the implementation of learning tasks; they show generally positive emotions during ongoing action, including enthusiasm, optimism, curiosity, and interest.”

Motivation is the key to developing successful readers. It also affects how students approach school in general, how they relate to teachers, how much time and effort they devote to their studies, how much support they seek when they are struggling, how they perform on tests, and many other aspects of education. If students are not motivated, it is difficult, if not impossible, to improve their academic achievement, no matter how good the teacher, curriculum or school is.

Means, Jonassen, and Dwyer (1997) cite studies that showing motivation accounts for 16% to 38% of the variations in overall student achievement.

Motivation often declines as students progress from elementary through high school. Upwards of 40% of high school students are disengaged from learning, are inattentive, exert little effort on school work, and report being bored in school, according to a 2004 analysis by the National Research Council.

Metsala, Wigfield, and McCann (1997) found that young children, who are positively motivated, have a strong sense of their personal competency and efficacy. Less motivated or disengaged students, on the other hand, “are passive, do not try hard, and give up easily in the face of challenges” (Skinner & Belmont, 1991).
Higher motivation to learn is linked not only to better academic performance but also to greater conceptual understanding, satisfaction with school, self-esteem, social adjustment, and school completion rates.

The amount of motivation that a student has for reading determines whether the learning derived will be meaningful, deep, and internalized, or if it will be trivial (Gambrell, Morrow & Pressley, 2007).

**Theories on motivation**

Theories abound on motivation. It has been defined on one extreme as the product of environmental conditioning—of deprivation and reinforcement schedules. (Skinner, 1953) On the other extreme, individuals like Carl Rogers (1951) and Abraham Maslow (1954) adopt a humanistic approach where motivation is almost entirely a byproduct of free will and an internal drive for self-actualization. Bandura’s (1969) social learning theory argued that learning and motivation were a result not just of the environment or the individual’s free will but a combination of the two. Gagné (1985) advised that both internal and external conditions existed that influenced learning and motivation.

Wigfield (1994) developed the expectancy-value model of achievement choice as a framework for understanding young children’s and adolescent’s choices and performance in mathematics. Bembenutty (2008) discusses Jacquelynne Eccles expectancy-value theory and describes how this model demonstrates that people are most likely to do things they perceive that they are good at doing and when they consider what they are doing high in value. Eccles and Wigfield (2002) believe that the expectations for an individual’s performance and the amount of value that a person places on the task is highly socialized according to cultural settings in which one grows up.

Motivation is difficult to define and measure, but scholars generally recognize two major types: intrinsic and extrinsic. *Intrinsic* motivation is the desire to do or achieve something because one truly wants to and takes pleasure or sees value in doing so.
Extrinsic motivation is the desire to do or achieve something not so much for the enjoyment of the activity itself, but because it will produce a certain result. The difference between the two is more like a spectrum than a divide; any action can be motivated by a combination of intrinsic and extrinsic factors, and the same person may be motivated differently in different contexts.

According to Dev (1997), “A student who is intrinsically motivated . . . will not need any type of reward or incentive to initiate or complete a task. This type of student is more likely to complete the chosen task and be excited by the challenging nature of an activity.” There is compelling evidence that students who are more intrinsically than extrinsically motivated fare better (Brooks et al., 1998; Lumsden, 1994).

Pachtman and Wilson (2006) found that motivation can develop from intrinsic or extrinsic stimuli. Intrinsic motivation is developed through the choice of literacy activities based on individual interest and the child’s beliefs that he/she can successfully complete the reading task. Lapp and Douglas (2009) expand on this notion, finding that peer influence and intrinsic motivation are primary factors associated with encouraging teens to want to read.

When students read for aesthetic reasons (Rosenblatt, 2005), they are motivated because the reading provokes feelings, ideas, and attitudes that are linked through private, past experiences. Therefore, when students’ readings evoke connections to individual responses, they will be more likely to want to continue to read.

Metsala, Wigfield, and McCann (1997) suggest that if children are intrinsically motivated to read and self-satisfied, they will increase the frequency with which they read.

Pachtman and Wilson (2006) discovered from their research findings that supplying ample books in the class library, allowing students to choose their own books, participating in book counts and celebrations, being able to visit the class library every day, and recording books in book logs were the top results from student questionnaires and surveys on student motivation.
Intrinsically motivated students:

- Earn higher grades and achievement test scores, on average, than extrinsically motivated students (Dev, 1997; Skinner & Belmont, 1991)
- Are better personally adjusted to school (Skinner & Belmont, 1991)
- Employ “strategies that demand more effort and that enable them to process information more deeply” (Lumsden, 1994, p. 2)
- Are more likely to feel confident about their ability to learn new material (Dev, 1997)
- Use “more logical information-gathering and decision-making strategies” than do extrinsically motivated students (Lumsden, 1994, p. 2)
- Are more likely to engage in “tasks that are moderately challenging, whereas extrinsically oriented students gravitate toward tasks that are low in degree of difficulty” (Lumsden, 1994, p.2)
- Are more likely to persist with and complete assigned tasks (Dev, 1997)
- Retain information and concepts longer, and are less likely to need remedial courses and review (Dev, 1997)
- Are more likely to be lifelong learners, continuing to educate themselves outside the formal school setting long after external motivators such as grades and diplomas are removed (Kohn, 1993)

Some research demonstrates that using extrinsic motivators to engage students in learning can both lower achievement and negatively affect student motivation (Dev, 1997; Lumsden, 1994). Students who are motivated to complete a task only to avoid consequences or to earn a certain grade rarely exert more than the minimum effort necessary to meet their goal. And when students are focused on comparing themselves with their classmates, rather than on mastering skills at their own rate, they are more easily discouraged and their intrinsic motivation to learn may actually decrease. Brooks et al. (1998) observe that while external rewards sustain productivity, they “decrease interest in the task, thereby diminishing the likelihood that the task will be continued in the future.”
It should be noted here that there are also researchers who object to describing student motivation as either intrinsic or extrinsic. Sternberg and Lubart (as cited in Strong, Silver, & Robinson, 1995) for example, argue that this division is too simple to reflect the many complex and interrelated factors that influence students’ motivation to succeed in school. They point out that most successful people are motivated by both internal and external factors.

As Bandura explains, “perceived efficacy is a judgment of capability; self-esteem is a judgment of self-worth” (Bandura, 2006; Mohajer & Earnest, 2009). High self-efficacy has been shown to predict better performance in academics and sports; increased happiness, job satisfaction, and persistence; improved safe sex practices; and successful smoking cessation and prevention (de Vries et al., 1988; Judge & Bono, 2001; Kalichman & Nachimson, 1999; Martin & Gill, 1991; Multon et al., 1991; Natvig et al., 2003). A meta-analysis conducted by Stajkovic and Luthans (1998) found that self-efficacy accounted for a 28% improvement in work-related performance.

Evidence suggests that high self-esteem is related to high social support and resilience (Dumont & Provost, 1999; Hoffman et al., 1988), whereas low self-esteem is related to depression, anxiety, and suicidal ideation (Newbegin & Owens, 1996; Overholser et al., 1995; Rosenberg et al., 1995). Boden and colleagues (2008) found self-esteem to be an important “risk marker variable, with low self-esteem being associated with a range of negative outcomes.”

Gambrell, Palmer, Codling, and Mazzoni (1996) found that the amount of motivation a student has to read depends on the amount of value students place on the particular reading task. These researchers discuss the expectancy component of Eccles’s theory of motivation because it extends the belief that students need to find personal value in reading. Students who believe they are capable and knowledgeable readers will have more success than students who do not have such positive thoughts.

Hidi (2001) found interest was a clear indicator of the quality of learning derived from reading. When students’ interests were activated, readers were encouraged to go beyond the surface elements of the text and focus on more elaborate, higher-order thinking skills, to help them
uncover the underlying meaning of the main ideas. Flowerday, Schraw, and Stevens (2004) emphasize that materials that students find interesting affect the application and transfer of deeper text processing. What students find interesting they consider meaningful (Fink & Samuels, 2008).

Components of reading motivation identified by Baker and Wigfield et al., (1999) include: (a) self-efficacy, (b) interest, (c) preference for challenge, and (d) social interaction (Baker & Wigfield, 1999; Wigfield & Guthrie, 1997).

Bandura et al., (1996) finds there are four dimensions that define reading motivation. These are defined below. At least one of these must be present for a student to be motivated (Bandura, 1996; Dweck, 2010; Murray, 2011; Pintrich, 2003; Ryan & Deci, 2000; Seifert, 2004)

- **Competence** — the student believes he or she has the ability to complete the task.
- **Control/autonomy** — the student feels in control by seeing a direct link between his or her actions and an outcome and retains autonomy by having some choice about whether or how to undertake the task.
- **Interest/value** — the student has some interest in the task or sees the value of completing it.
- **Relatedness** — completing the task brings the student social rewards, such as a sense of belonging to a classroom or other desired social group or approval from a person of social importance to the student.

Christensen, Horn, and Johnson (2010) believe efforts to motivate students often founder because the incentives are defined from the educator's point of view and not the student's. They hypothesize that there are two core goals most students try to achieve every day: To feel successful and make progress, and to have fun with friends. They note that educators operate as if the delivery of education – their product — is the objective. As a result, the activities in schools generally are not integrated in ways to help students be successful every day. The key events embedded within typical curricula that might help students feel successful— examinations
and grades—are not sufficiently related in time to the performance they measure to reinforce the desired behaviors (Christensen, Horn, & Johnson, 2010).

The researchers posit that all students are equally motivated to feel successful. For some, school is a viable means for achieving this goal. This group likely includes those whose parents provide a clear link between academic achievement and career success; those whose intellectual capacities were honed through repeated, sophisticated verbal interaction with adults before the age of three; and those whose way of learning or interests match that of their particular teachers.

Students who do not obtain feelings of success from school are not unmotivated to feel successful. They simply do not or cannot feel successful at school, which often makes them feel like failures. Correctly integrating activities in ways that would help students feel successful every day might include a “project-based” learning strategy, in which students are organized into teams and then undertake meaningful projects that require them to master the reading, writing, math, science, and social science skills that the school wants them to learn. This method integrates the delivery of curriculum with experiences that enable students to feel successful and have fun with their friends every day (Christensen, Horn, & Johnson, 2010).

Computer-based learning can also be an important mechanism for achieving student-centric learning and is discussed later in this report. By its very nature, software allows achievement to be integrated with the delivery of content in ways that help students feel successful while they learn. Achievement comes from completing reviews or examinations that are built into the software. These require students to demonstrate mastery before they can move to the next body of material. Feedback can be delivered frequently and in bite-sized pieces, as necessary, to help each student feel successful.
Factors for change

An ample body of research suggests that reading motivation and consequently performance can be changed for the better (Brooks, Freiburger & Grotheer, 1998; Dev, 1997; Skinner & Belmont, 1991).

Focusing on student interests in selecting reading materials may be more beneficial in promoting reading success than a focus on reading level. It turns out that interest is far more significant than readability. When students have strong interest in what they read, they can frequently transcend their reading level (Worthy, 1996). Many educators and researchers consider interest to be an essential factor in all learning (Hidi, 1990; Schiefele, 1991).

Hidi (2001) found that all types of interests – topic and situational – serve as powerful determinants that contributed to students’ increased recognition, comprehension, and recall. Interest was a clear indicator of the quality of learning derived.

Under the right circumstances, a challenging task can be motivating. It often requires students to use prior knowledge and construct an understanding of a topic. This practice increases the personal meaning that students attach to an activity, therefore, increasing the likelihood of becoming engaged in an activity (Miller, 2003).

Vygotsky (1978) argues that one internalizes the higher cognitive abilities applicable to reading through social interaction. He perceived learning as a profoundly social process, suggesting that individuals master their surroundings when immersed in dialogue and engaged in the social construction of meaning.

Brooks et al., (1988) outline the following steps toward changing students’ motivation:

1. Ensure course materials relate to students’ lives and highlight ways learning can be applied in real-life situations (Lumsden, 1994; Skinner & Belmont, 1991).

Schoolwork should be meaningful to students outside the school building, as well as within. Students are more engaged in activities when they can build on prior knowledge and draw clear connections between what they are learning and the world.
in which they live. They also need to feel that “school work is significant, valuable, and worthy of their efforts” (Policy Studies Associates, 1995).

2. Allow students to have some degree of control over learning (Brooks, et al., 1998). This can be done in any number of ways, from giving students choices between different assignments, to minimizing adult supervision over group projects, to letting students monitor and evaluate their own progress (Anderman & Midgley, 1998; Dev, 1997; Policy Studies Associates, 1995). “Even small opportunities for choice, such as whether to work with a partner or independently” give students a greater sense of autonomy (Anderman & Midgley, 1998).

3. Assign challenging but achievable tasks for all students. Tasks that seem impossible easily discourage learners as do those tasks that are rote and repetitive (Dev, 1997; Policy Studies Associates, 1995). Remedial programs that limit students to repetitive basic skills activities actually “prompt students’ lack of engagement in their school-work and frequently result in limited achievement.”

4. Arouse students’ curiosity about the topic being studied. Strong, Silver, and Robinson (1995) suggest using the “mystery” approach, in which students are presented with fragmentary or contradictory information about a subject and are then asked to examine available evidence to develop their own hypotheses. Give students an opportunity to direct inquiry and “discover for themselves.”

5. Design projects that allow students to share new knowledge with others. Strong, Silver and Robinson (1995) observe that when students do assignments that only the teacher will read, they are entering into a non-reciprocal relationship. Projects are more engaging when students share what they are learning in reciprocal relationships where each student’s knowledge is needed by others in the group to complete an assignment.
Importance of knowledge to reading and comprehension

Awareness about the world is needed to give context and meaning to words. More serious than skill deficiencies are knowledge deficiencies that arise for children who have limited access to the informal informational lessons that can be transmitted through day-to-day interactions with the world around them.

Indications are that limited content knowledge might ultimately account for what appear to be comprehension difficulties (Vellutino et al., 1996) or higher-order thinking difficulties in older children.

Real leverage may be found in the continual, systematic, everyday ways children are engaged in learning new knowledge and information, starting in the early years. Frede (1998) reported children who had a broad base of experience in domain-specific knowledge were likely to move more rapidly in acquiring complex skills. Basic skills must be used to develop coherent understandings of knowledge and concepts, which are the very basic foundations for later learning.

According to a recent literature review, there is a scarcity of informational text in primary-grade classrooms (and, to some extent, throughout elementary school) (Palincsar & Duke, 2004). Low income first-grade students were given extensive exposure to informational genres in an experiment. By the end of the year, the experimental group of children was better writers of informational text than children in the control groups, had progressed more quickly in reading level, and had shown less decline in attitudes toward recreational reading (Palincsar & Duke, 2004).

Flowerday, Schraw, and Stevens (2004) identify differences and similarities between the importance of topic interest and situational interest. They find that these variables correlate with one another and result in positive outcomes. The researchers define topic interest as something that students have prior knowledge about, personal experiences with, and that evokes some sort
of emotion. Situational interest is defined as something that depends on the present context and tends to be informational in content.

Situational interest often precedes and facilitates an individual’s development of personal interest. When combined these are an excellent way to activate students’ attention, increase effort, engagement, and maintain deeper mental processing levels.

The enjoyment of reading comes from comprehension, not decoding words. Skilled readers ‘interact’ with a text, thinking about what will happen next, creating questions about the main characters and so on. Children who love to read have good comprehension skills.

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Hidi (2001) found that all types of interests (topic and situational) served as powerful determinants that contributed to students’ increased recognition, comprehension and recall. Interest was a clear indicator for the quality of learning derived. Students’ interests were activated, which influenced readers to go beyond the surface elements of the text and focus on more elaborate, higher-order thinking skills, to help them uncover the underlying meaning of the main ideas.
Flowerday, Schraw, and Stevens (2004) emphasize materials that interest students affect the application and transfer of deeper text processing.

**Effects of individual temperament on reading motivation**

Temperament is a broad, multidimensional construct that can be defined as an individual’s style of response to stimuli in the environment (Rothbart & Bates, 1998). Attributes such as intensity and activity levels, persistence, affect, and behavioral inhibition are temperamentally based child characteristics that may contribute to teacher-child relationship quality. Certain attributes ease children’s adjustment into student roles (Entwisle & Alexander, 1998).

People can be categorized into behaviorally inhibited and uninhibited styles. These characteristics are highly salient and fairly stable over time. People who are apprehensive toward new people, events, and things are categorically different from others who approach novelty with ease (Caspi & Silva, 1995; Kagan, Snidman, & Arcus, 1992). They have a biologically based predisposition to be inhibited.

In the general population, approximately 15% to 20% of people are inhibited, about 30% to 35% of people are uninhibited, and the remainder of the population falls somewhere in between (Kagan, 1997; Kagan et al., 1992; Kagan, Snidman, & Arcus, 1998). These classifications remain fairly stable for 60% of children through at least age 9 (Kagan et al., 1998).

Children’s school experiences vary in part because of their temperamentally based individual differences. Children who are inhibited are highly reactive; that is, they show fear in new situations (Kagan, 1994). Kagan and colleagues (1992) reported that children who are uninhibited are low reactive and approach-oriented in new situations, and display fewer fears at 9 and 14 months than their high reactive counterparts. Therefore, high reactivity and fear together predict social inhibition in school.
Research shows that bold or uninhibited children are more socially competent and therefore have more interactions with teachers than their less-bold counterparts (Lerner et al., 1985; Patrick, Yoon, & Murphy, 1995; Rimm-Kaufman et al., 2002; Rimm–Kaufman & Kagan, 2005; Skarpness & Carson, 1986). In addition, they are viewed by their teachers as more verbal and academically competent compared to their shy counterparts (Lerner et al.).

On the other hand, inhibited children appear to fit well into student roles because they are likely to be more compliant and refrain from speaking out of turn (Keogh, 2003). However, because of their quiet style, they may elicit less attention from their teachers than uninhibited children; additionally, they may receive less conversation and verbal feedback from their teachers, both of which contribute to children’s early learning in the preschool classroom.

Uninhibited children appear to be more affected than other children by the sensitivity of their teachers, with teacher sensitivity predicting more self-reliance, more positive affect and fewer negative and off-task behaviors among socially bold children, but not for their wary counterparts (Rimm-Kaufman et al., 2002). These findings suggest that bold children receive more exposure to the teacher than inhibited children.

**Average and gifted students**

There is notable variability among average students. Both inter-individual and intra-individual differences are observed. Treating the class as a homogeneous group and providing the same lesson at the same time to all the students favors only a small fraction of the students (Blancas et al., 1985).

The goal is to enhance the fit between the students’ personal needs and ways of learning and the pedagogical activities. If each student operates in his or her “zone of proximal development,” a concept proposed by the Russian psychologist and educator Lev Vygotsky (Vygotsky, 1978; Wozniak, 1980), then quality education will be achieved. The speed with which students
progress can vary between students (inter-individual differences) but can also vary across learning domains for a particular student (intra-individual variability).

**Average students**

University of South Carolina researchers found that average students believe that their effort, more than their innate abilities, helps them to get ahead (Holland, 2000). In one experiment, teachers told the students what their reading levels were and shared specific strategies for improving their understanding of text. Included among these strategies were frequent quizzes so students could break difficult material into smaller chunks. Early in the semester, teachers’ first tests were designed to help every student score well. After two tests, teachers sent home notes to boost students’ self confidence by congratulating them for having A averages. The difficulty of subsequent tests was gradually increased. Threats of bad grades were ineffective with average students but success motivated them (Holland, 2000).

Stevens (2001) described interest as a motivational device to encourage reading growth among students. If a gifted student has an interest in a particular topic, he/she tends to apply a significant amount of effort to reading about it using superior reading skills. This application of effort in turn resulted in improved reading comprehension overall.

While personal interest in the subject matter is important to motivate reading for all ability levels, the average or below average students are generally not sufficiently motivated by personal interests alone to apply the significant effort required to tackle material above or beyond their level or ability which hinders further progress. In part this may be due to lack of the topical or general knowledge of the world around them that forms the framework for comprehending information related to those interests. Flowerday, Schraw, and Stevens (2004)

However, as the USC researchers discovered average and below average readers are motivated to exert effort to read what they believe they can succeed in comprehending. That is, when they are given strategies for improving their understanding of text and when material is initially at or
below their reading level to build confidence. The USC researchers found this method of coupling technique with initial successes to be an effective way of increasing students’ motivation to read and their comprehension of progressively more difficult material.

<table>
<thead>
<tr>
<th>Characteristics of Average Students</th>
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<tr>
<td>Generally hard workers</td>
<td>Positive self-concept</td>
</tr>
<tr>
<td>Lack independent work habits</td>
<td>Believe their academic success is due to effort, not talent</td>
</tr>
<tr>
<td>Cooperative, well-behaved</td>
<td>Blend into classrooms by fitting in or staying in the background</td>
</tr>
<tr>
<td>Like to please</td>
<td>Wide variation in academic performance; inconsistent</td>
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<table>
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<tr>
<th>What Motivates Average Students</th>
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<tbody>
<tr>
<td>Material that is interesting and important more than difficult</td>
<td>Discussions, cooperative learning, research projects, opportunities to move beyond standard “seat work”</td>
</tr>
<tr>
<td>Teachers who care about them and communicate their high expectations</td>
<td>Success, not the threat of bad grades. They need to know their hard work matters.</td>
</tr>
<tr>
<td>Realistic targets; teachers must tell them in advance of an assignment what standards they need to reach and how they can earn good grades</td>
<td>The chance to earn effort grades as well as achievement grades</td>
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**Gifted students**

Contrary to popularly held conceptions, research suggests that gifted children are not gifted across all domains. They tend to have heterogeneous ability profiles, where abilities are expressed especially strongly in one domain (such as mathematics) and average in others. Thus an individualized educational program that allows gifted students to remain in their regular class for certain subjects and to be in enriched or advanced classes for other subjects may be the best overall solution given these pupils' cognitive and social needs.
Motivating behaviors and interventions

Of the several theoretical perspectives most often used in motivation research, achievement goal theory is, as the name indicates, most directly applicable to goal-setting. Achievement goal theory posits that students’ academic motivation can be understood as attempts to achieve goals (Seifert, 2004, p. 142). To feel competent, students need to see their goals as realistic and achievable, which may require altering the goals or altering students’ perceptions of their own abilities. To feel in control, students must be able to see a clear path to achieving the goal, through means they can control rather than through luck or chance. Control is also maximized when students set goals themselves, or at least agree with and internalize goals set for them by someone else.

Goal theorists generally break education goals into two groups: “mastery” (or “learning”) goals and “performance” goals. Mastery goals involve increased understanding, skills, and content knowledge. Performance goals, on the other hand, involve reaching a pre-defined performance level or outperforming others. Researchers have consistently found that students who have a mastery goal in mind exhibit deeper cognitive processes, strategize more effectively, and are more adaptable to challenges.

Performance-oriented students show more adverse reactions to failure, see less of a link between effort and outcome, and focus more on their performance relative to the performance of others (Pintrich, 2003; Seifert, 2004). The same student can have different mindsets and goals in different contexts.

To implement motivational strategies, Hunter states it is often necessary to begin with extrinsic motivation and outline a path that lets students see that they can generate intrinsic motivation themselves—that they can set their own best effort and operate at the top of their potential.

Initially, when the focus is on extrinsic motivation, the students are doing the work to please their teachers, or because they are told the result is going to be good. But as they continue to
work, they can develop greater intrinsic motivation. Students can be motivated by showing them methods for visualizing and making concrete their own progress. Charts or reading logs can help students keep track of the number of books they have read, the new words they have learned, or the amount of time they have spent (e.g., Braunger & Lewis, 1998). Students need to know what to expect. If they know something about what is coming up, they can get excited about it. Children like to know what their peers think. They also like knowing their opinion is valued.

Students’ learning can be optimized by developing a sense of autonomy through reading instruction that cultivates their abilities to make their own choices and to take responsibility for their own actions. This freedom leads to the development of intrinsic motivation (Fink & Samuels, 2008). When this occurs, students develop an inherent satisfaction with learning because they believe they are in control, rather than being controlled (Stroudt, 2010).

Wigfield and McCann (1997) find autonomy to be a crucial element in fostering children’s confidence that they can read. Building upon students’ own interests and curiosity about different topics and immersing them in a variety of books is a proven way to do so. Students who believe that they have ownership over their leaning are motivated, self-determining, and self-regulated.

Research shows that letting students select their own books helps to increase interest value and boosts motivation (e.g., Wigfield, 1994). A wide variety of texts should be provided that are interesting and appropriate for students’ age range and personally relevant to individuals. Students should be matched to “just right” texts on their reading level that are challenging enough to maintain interest and foster a sense of achievement but not so difficult that they are discouraged. The teacher pushes the student to grow, while still making sure that it is possible for the student to succeed (e.g., Gambrell, Palmer, & Codling, 1993; Morrow, 1996).

Flowerday, Schraw, and Stevens (2004) examined the effects of choice, topic interest, and situational interest on reading engagement, attitude, and learning and discovered that when students are able to select their own reading materials they tend to report that they enjoyed the task much more. Therefore, their attitude improves and they find the task to be more valuable.
Rich (2009) finds that students will value reading if they are able to choose their own books. Students who chose a novel for class became engaged with it because they were interacting with it, not just reading to find answers.

**The collecting instinct**

G. Stanley Hall, one of America’s first students of the “child mind,” proposed instruction should be a kind of collecting game where students are encouraged to gather scraps of information on literature, geology, and so on (Folsom, 1915; Bernstein, 2011). Others, including educator Elizabeth Howe, thought the method would work best if it took as its starting point the collecting interests of each individual child (Howe, 1906).

There may be a relationship between motivation, book selection and personal library-building or book logging activity and children’s behavioral proclivity to build collections.

Following a study of 90 first through fifth-grade students, Baker and Gentry suggest that children are naturally motivated to collect because they (1) enjoy the process of collecting as it allows them to escape boredom and sometimes reality, (2) learn or satisfy curiosity about their collecting domain, (3) satiate a passion for the objects which are desired, (4) want to differentiate themselves from others, and (5) desire to associate with others, especially family and friends. Children often have multiple motives for collecting (Baker & Gentry, 1996).

The motives with which the collecting process is approached and the tasks associated with it aid children in their developmental process and in their search for identity. In an exploration of collecting in consumer research, Belk et al. (1991) suggest that two basic motivations can be used to explain collecting: legitimization and self-extension. Legitimization motives are characterized by collectors behaving within boundaries that the social world will accept. Behavior which is done for “rational” purposes (e.g., creating, investing, building history) is not considered to be self-indulgent if one labels it as “collecting.” Self-extension motives are characterized by a desire to enhance or improve the self.
What you really collect is always yourself. Whether your collection serves as a public display or as a private preserve, it is a form of expression where you materialize that abstract thing called the self, where you can thus see and handle yourself, even talk to yourself, taking comfort in the way objects stabilize you as a subject.

Fifth-grade participants in the Baker and Gentry study appreciated collecting because it made them unique. None of the first-graders talked about this value of collecting.

The role of family appears to be central to the collecting process, especially in a modeling sense. There was modeling evident; for example, a few of the children mentioned that their collections were started because of their parents’ or grandparents’ influence or interest. The involvement of adults in the collections also results in longer term expectations for collecting. The major role played by family in the collecting by the child is in its facilitation, by easing the child’s entry into the process (Baker & Gentry, 1996).

Most mentions were of gifts that started the collection or of continuing additions on birthdays and other holidays. Friends were also important motivators for children’s collecting behaviors. For example, modeling of friends’ collecting behaviors was evident. Many children, especially the first-graders, compared their material possessions to those of others. They suggested that collecting was a way of getting “more” of something than others have. The facilitating role played by parents diminishes as the child gains access to resources (Baker & Gentry, 1996).

Formanek (1991) found that collectors were motivated by investment, obsession, preservation, and legitimization of the personal and social self. One thing all collectors have in common is their passion for the items that they collect. Ease of entry is an important component of the type of collection children pursue, as evidenced by the prominence of items that can be picked up without cost or received as a small gift. Gender norms seem to affect what is collected. The influence of movies, cartoons, and advertising on collections is also apparent. Children are able to express the goals they have in their collecting and enjoy talking about it. However, they are more likely to do things rather than to ponder why they do them.
Collecting is a kind of play that results in something to play with. These intrinsic satisfactions have much to do with the “playability” of free choice collectibles, with how readily they inspire an absorbing make-believe. Single function items or objects overly tied to pre-existing narratives, for instance, often do not allow for the free rein of imagination. Things amenable to symbolic transformation by the child best inspire play.

Collecting, like all forms of playing, exercises critical imaginative and cognitive skills. The items collected served as repositories of distributed intelligence - handling, arranging and classifying concrete objects, animating and empathizing in make believe adventures. Children explore an embodied feel for the logical, narrative and social relationships of abstract knowledge. For a time, the objects that are collected store both the “what” and the “how” of inner life as the child learns to think, to imagine and to reflect. Sometimes a collection is not just a collection, but a spur to the imagination, to learning and creating (Bernstein, 2011).

First-graders displayed vivid imaginations about what collecting means. Older children had both more traditional collections and more traditional perspectives of what collecting entails. Further, they were able in many cases to take a more active role in the acquisition of their collections due to their access to more resources.

Although children have different definitions for collecting, they seem to have some expectations as to what collecting will provide to them. Collecting was seen by many respondents as something to do. Many said they collected because collecting is “fun” and because they enjoy doing it. Not only is collecting enjoyable for children, but it also helps them to relieve their boredom or put order in their lives. Besides using collecting as an escape from boredom, children also use collecting as something to do to escape from reality. Some children suggested they collected just because they enjoyed looking at their things. First-graders were much more likely to acquire collections that served a functional purpose. Many informants saw their collection as a way of “doing” something for the future. Gender and age differences were noted in this
“collecting as investment” perspective. Males mentioned expectations concerning their collection growing in value.

Several of the children, boys in particular, talked about how they used their collections to learn about features or phenomena related to them. The study found clear evidence of curiosity, at least as conceptualized by Loewenstein’s (1994) information gap model. The children talked about how they learn about their collections, which included talking to friends or reading books; however, they also often mentioned catalogs, magazines, and stores as important sources of information. One motive for most children in collecting was to find something that they like. The intense passion for collecting evident in adult collectors (Baker & Mittelstaedt, 1995; Smith & Lee, 1994) was not as clearly evident among pre-adolescents. Similar to adults, the interviews with children show evidence of high enduring involvement both in the frequent maintenance activities observed and the description of their “learning” activities related to their collections.

Rewards as motivation

On the whole, research shows that reward programs can have positive effects if they are implemented thoughtfully, carefully, and within a set of guidelines, and if they address the four dimensions of motivation: competence, autonomy, interest, relatedness. Rewarding students for mastery of a discrete task, skill, or subject, such as reading a book or solving a problem, works better than rewarding them for performance, such as reaching a certain benchmark on a test. Rewards that are too large can be counterproductive because students may feel pressured into taking part. At the same time, poorly designed reward programs can actually decrease motivation if they are targeted at the wrong students, do not build on the four dimensions of motivation, or are implemented ineffectively (Lepper, 1973).

Parents who are actively involved in their children’s education and provide a stimulating learning environment at home help their children develop feelings of competence, control, curiosity, and positive attitudes about academics, according to various studies. Reading to children, talking with children about what they read, interacting with children about academics,
and celebrating moments of intellectual discovery are among the activities that promote achievement and motivation. Parents’ beliefs and expectations also appear to strongly influence children’s motivation.

**Triarchic instruction**

A series of studies with elementary and middle-school students showed that triarchically based instruction involving a combination of analytic, creative and practical activities led to better quality learning than traditional memory-oriented lessons or lessons based on only analytic, critical thinking. Multiple angles are offered on each topic, and these approaches reinforce learning through the multiple exposures—analytic, creative and practical—to a topic.

The triarchic approach is implicitly child-centered because there is something for each child in the program that all children receive. Individual differences are taken into account when the program is constructed because the program responds to a diversity of pupils. This approach does not advocate individualized academic standards nor individualized ways of reaching a common goal.

Analytic instruction emphasizes comparisons, contrasts, evaluation, and judgment. Creative instruction focuses on inventing, discovering. Traditional memory-based instruction focuses on straightforward knowledge acquisition (when, where, who, how). Practical instruction concerns real-world applications and implications. This last component directly concerns the development of the knowledge needed to build society and more generally social intelligence and cultural knowledge.

In general, students who received triarchic instruction both (a) outperformed students receiving analytic-critical thinking or traditional, memory-based instruction, and (b) reported that they liked their lessons more than the analytic and traditional instruction groups (Sternberg, Torff, & Grigorenko, 1998). The group receiving triarchic instruction outperformed other groups.
on analytic, creative and practical, performance measures but also on traditional memory-based measures of learning.

A study of 708 fifth-grade students showed that triarchic methods were more powerful than traditional methods for reading instruction (Grigorenko, Jarvin, & Sternberg, 2002). The research included a pre-test of reading skills (with no difference between the instructional groups), instruction via triarchic or traditional methods. A post-test showed significantly better performance for students in the triarchic instructional condition. Nearly eighty-one percent of students (80.8%) reported that they liked the program; teachers also liked it, and found that it addressed a wide range of students’ needs.

Motivating factors reported by students

Edmunds and Bauserman (2006) conducted a series of interviews with school children. Six factors, or categories, were identified that appeared to get children excited about reading expository and narrative text and about reading in general.

Category 1: Reading narrative text

The most popular factors leading to enthusiasm for reading were personal interests, book characteristics, and choice.

Characteristics of the books included exciting book covers, action packed plots, and humor. The importance of choice was revealed throughout the interviews as children shared the books they were reading or had recently read: 84% of the children discussed books they had selected themselves.

Category 2: Reading expository text

Children’s responses focused on the influence of the knowledge gained by reading the book, on the relationship between the book and their personal interests, and on choice.
Category 3: Reading in general
This category included characteristics of books and the opportunity to gain knowledge. Children enjoyed books that were funny or scary or had great illustrations. The children also placed a great deal of importance on the information they could learn from reading books.

Category 4: Sources of book referrals
Access to books is critical to the amount of reading children do and to their reading achievement (Gambrell & Marinak, 1997). Children overwhelmingly reported that they found out about their books from the school library. Other libraries such as the classroom library and the local or county library were also mentioned but not as frequently. When discussing the narrative text they were reading, the children often identified their teacher as the person who introduced books to them. In terms of influence on their reading choices, children most frequently responded that their mother had the greatest influence, followed by other family members and peers.

Category 5: Sources of motivation:
Children’s interest in and excitement about reading was sparked by various individuals including family members (especially mothers), teachers, and themselves.

Category 6: Actions of family members, teachers, and peers
After discovering who motivated the children to read, the actions of these individuals were examined. Three themes emerged: buying or giving children books, reading to them, and sharing books with them. The two most (and equally) frequent responses were: buying or giving books to the children and reading to them.

**Technology’s motivational role**

There is a need to offer students a variety of educational tools, such as interactive exercises and games that may promote motivation to learn and thereby enhance learning (Gee, 2003; Mayer, 2011; Mintz & Nachmias, 1998).
Students in online environments may choose their own learning path based on their preferences and needs. Their choice is exercised, for example, by the type or amount of content they consume, the time they dedicate to learning, and the effort they are willing to make (Sims & Hedberg, 1995). Motivated students consume more content and use more tools, dedicate more time to thinking, and make an effort to answer questions correctly (e.g., Cocea & Weibelzahl, 2007).

Online learning environments contain a variety of educational tools to enhance students’ knowledge and skills in a specific subject domain. These tools are often rich in media such as simulations, games, and other interactive tools (Mayer, 2011). The most prevalent tool for students are the drills in which they get immediate feedback regarding the accuracy of their answers (Egenfeldt-Nielsen, 2005; Weiss & Muller, 2008). It helps students to assess their knowledge and competence and to focus on their learning process (Chickering & Gamson, 1987; Gibbs & Simpson, 2004).

In some studies, it was found that these tools have achieved only limited success in helping students develop advanced knowledge and skills. The reasons mentioned in this regard are that such tools have been poorly designed and are simplistic, boring, and repetitious, and they do not allow users any possibilities for active exploration (Kirriemuir & McFarlane, 2004; Schank, 2005).

Games are another common tool in online environments. A growing volume of research indicates that games have promising potential as learning tools. Alongside their ability to improve students’ knowledge and skills, they generate motivation for learning by means of components such as competition, fun, and creativity (Gee, 2003; Gredler, 2004; Mintz & Nachmias, 1998). Some studies even point out the link between playing games and learning outcomes (Klopfer, Osterweil, & Salen, 2009; Mor, Winters, Cerulli, & Björk, 2006; Sandford, Ulicsak, Facer, & Rudd, 2006).

There is a problem in integrating games into formal education (Jantke, 2006; Weiss & Muller, 2008). Research has found that there is a lack of acceptance of games as an educational tool among the majority of teachers as well as among many students. The reason for this is that
games tend to be perceived as a leisure time activity with no pedagogic value (de Freitas, 2006; Egenfeldt-Nielsen, 2005; Schrader, Zheng, & Young, 2006).

Assessment of learners’ motivation in online environments has been a challenge for researchers as well as developers due to the fact that it is a difficult factor to evaluate without physically observing the students in the learning process. Extracting students’ actions from well prepared log files can help to achieve this goal for a large population of students (Castro, Vellido, Nebot, & Mugica, 2007; Merceron & Yacef, 2005; Pahl, 2004; Srivastava, Cooley, Deshpande, & Tan, 2000).

Motivation usually impacts on the behavior of students in the learning environment and determines the amount of content and tools they consume, the way they consume them, and the effort they are willing to make on a specific assignment (Cocea & Weibelzahl, 2007; Dweck, 1986; Hershkovitz & Nachmias, 2008). In addition, in some cases, motivation influences the learning outcomes (Martinez, 2003).

Current research places special emphasis on the features of games, such as the challenge, control, and competition that can generate internal motivation (Gee, 2003; Gredler, 2004; Mayer, 2011).

Tracing the students’ actions in the learning environment makes it possible to assess students’ actions. Beck (2004), in his study, built a model to predict students’ engagement by measuring the difficulty of the questions, the student’s response time, and the accuracy of his answer. Cocea and Weibelzahl (2007) tested the students’ engagement by variables such as the number of pages read, the number of tests taken, and the time spent on the assignment. Hershkovitz and Nachmias (2009) developed a measuring tool for motivation which focuses on: the extent of engagement and its energization and source based on variables such as time on task percentage, average session duration, and average pace of activity within sessions.

Greater motivation to learn was found in the drills and the self-test than in the learning game. An unexpected finding in both units was that students played the learning games the least and
focused on drills and self-tests, although, chronologically, the games appeared before the self-tests, and the self-tests were located on different web pages.

These findings reveal the need to explore in greater length under which conditions learning activities, in general, and games, in particular, should be integrated into online learning environments (Ben-Zadok, Leiba, & Nachmias, 2011)

E-books

E-books provide students with many options to improve their literacy development. De Jong, (2004); De Jong and Bus, (2003); Doty, Popplewell, and Byers, (2001); Shamir and Korat, (2007) discuss the various e-book components they determined to be of benefit. Features include multimedia and interactive components and the promotion of reading independence and enjoyment.

Multimedia additions such as dynamic, film-like visuals, story sound effects, printed, and spoken text invite children to interact with textual displays on the computer. De Jong and Bus believe these dynamic visuals help to evoke feelings, moods, and attitudes that help to improve children’s ability to make inferences about story events.

Shamir and Korat (2007) report that highlighting written phrases as the text is read orally by an actor has the potential to advance children’s literacy development through the exposure to the connection between oral and written language. It improves word recognition skills and enriches vocabulary. Closely following the written words allows students to focus on the entire word and make connections between its features and its parts. Post assessment results by Shamir and Korat (2007) show that the activation of hot spots within the text that offered certain types of assistance affected children’s recall of the story better than when the complete story had just been read aloud to them several times. These interactive features contribute to the advancement of emergent phonological awareness and word recognition. Doty, Popplewell, and Byers (2001) researched the differences between young readers’ reading comprehension when one group read
an interactive CD-ROM storybook and the other group read from a conventionally printed book. The mean scores for comprehension questions were much higher for the group reading the interactive CD-ROM storybook suggesting the interactive exchange of information between the reader and the text lessens the decoding burden allowing the focus to be placed on meaning. De Jong and Bus (2004) and Robinson (2003) have found that e-books are not only good for teaching and learning important literacy skills but they are also a tool for promoting reading independence and enjoyment.

E-book features also provide distractions that can hinder literacy development. De Jong and Bus (2004) report that the multimedia and interactive elements within e-books have drawbacks that detract from literacy development. Oral narrations of the text frequently do not relate to the interactive animations. Sound effects create interruptions that interfere with the oral narration and the visual effects encourage children to think of the stories more as games. All of these tend to diminish the reader's comprehension.

**Gaming**

In recent years, there has been rapidly increasing interest in educational games. Some of this interest has been based on the hypothesis that games will lead to better affect than existing learning environments.

There is evidence that educational games may not have entirely positive effects on learners’ affect and motivation. Bragg (2007) found that students exhibited negative attitudes toward the use of games as the main instructional method for learning mathematics. Vogel (2006) argues that games and simulations that fail to make seamless connections between the subject matter and the game play will also inhibit learners’ engagement and motivation.

In the research reported here, we have found that a traditional intelligent tutoring system can produce equally good—or better—effect as an award-winning educational game. The key question, therefore, appears not to be which type of learning environment is better, but how we
can leverage the best practices developed by each of these design communities in order to
develop a new generation of engaging and educationally effective learning environments.

While factors such as fantasy may make games more fun (Cordova & Lepper, 2006), the
interactivity and challenge common to both games and intelligent tutors may play a larger role in
making games affectively positive learning environments.

It has been found that intelligent tutoring systems lead to significantly improved Affect and
motivation as compared to traditional, non-computerized learning contexts (Schofield, 1995),
though not necessarily to expert human tutors. Intelligent tutors generally lack game-like features
like competition and fantasy, but share in common with games features such as instant
feedback and measures of continual progress.

**Online collaboration**

In a learner-centered online collaborative environment, students work together to construct
knowledge and negotiate meanings through group-based collaborative learning activities.

Online collaborative learning is supported by socio-cultural theory positing that an individual’s
cultural development appears twice and on two levels; first on the social, and later on the
psychological level, that is, first between people as an inter-psychological experience, and later
as an intra-psychological experience (Vygotsky, 1998; Bonk & King, 1998; Ge, Yamashiro, &
Lee, 2000).

Based on this theory, assumptions can be drawn about collaborative learning and knowledge
building, which require communication, collaboration and negotiation on the common ground of
shared ideas, values and beliefs (Johnson & Johnson, 1996).

Recent practices have contributed to the growing body of knowledge on collaborative learning;
for example, the use of online asynchronous environments for project and inquiry based learning
(Collis, 1998). Harasim (1990) also emphasizes that teamwork enhances connectivity and socio-
emotional engagement in the learning process as well as creates an intellectual climate that encourages participation. In other words, a well designed online environment is conducive to both learners’ affective and cognitive development.

The literature also acknowledges that cognitive achievement and metacognitive strategies are not sufficient to promote student achievement and that students must also be motivated to learn intentionally and in a self-regulated manner (Pintrich, 1989).

Student motivation is underpinned by a number of theoretical models and theories. The most commonly applied is the expectancy value model of motivation (Schunk, 1994). According to Pintrich & De Groot (1990), there are three motivational components that may be linked to the different models of self-regulated learning:

1. An expectancy component: Students’ beliefs about their ability to perform a task;
2. A value component: Students’ goals and belief about the importance of the task; and
3. An affective component: Students’ emotional reactions to the task.

A review of the literature on self and peer assessment indicates that in order to promote the development of these skills, the environment should be designed to encourage participants to:

- Have a clear understanding of the objectives (Orsmond, Merry, & Reiling, 1996; Stefani, 1994);
- Identify valid assessment criteria (Falchikov, 1995; Ford, 1997; Klenowski, 1995; Sluijsmans, Dochy, & Moekerke, 1999; Sullivan & Hall, 1997; Topping, Smith, & Swanson, 2000);
- Accurately and objectively judge success or failure (Oldfield & MacAlpine, 1995; Woolhouse, 1999); and
- Become self-regulated and self-motivated.

Self-assessment refers to people being involved in making judgments about their own learning and progress, which contributes to the development of autonomous, responsible and reflective individuals (Sambell, McDowell, & Brown, 1998; Schon, 1987). This is also supported by Boud
(1992), who has expressed the defining characteristics of self-assessment as: the involvement of students in identifying standards and/or criteria to apply to their work and making judgments about the extent to which they have met these criteria.

E-mail as a motivational tool

It appears that simple, cost-effective, and easy-to-design mass e-mail messages show potential for addressing some of the motivational needs and retention concerns associated with students using electronic learning devices. With their simplicity and ease of use, motivational e-mails represent another tool that distance educators can employ to complement other motivational efforts.

Numerous scholars highlight the general lack of research concerning the motivational needs of online learners (Astleitner & Keller, 1995; Gabrielle, 2003; Huett et al., 2007; Means, Jonassen, & Dwyer 1997; Shellnut, Knowlton, & Savage 1999; J. Visser & Keller, 1990). According to Song and Keller (2001), instructional designers often ignore motivational design concerns in web- or site-based, computer-assisted instruction (CAI) and incorrectly assume that the novelty effect of the technology is enough to stimulate learner motivation.

A need exists for simpler approaches to motivating and retaining online learners that are appropriate for the audience, the delivery system, and the course. Such methods should be cost-effective, fit within the time restraints of the class, and be easily integrated into the instruction. One such approach that shows promise is the creation of simple, systematically designed mass e-mail messages based on established ARCS (Attention, Relevance, Confidence, and Satisfaction) model principles (Gabrielle, 2003; Huett et al., 2008; Keller & Suzuki, 2004; L. Visser et al., 2002; L. Visser, Plomp, & Kuiper, 1999).

Keller and Burkman (1993) acknowledge that motivation is often thought of as solely a product of learner personality and perceptions—much of which is assumed beyond the control of the instructional designer. However, they believe that providing for motivation is largely the
responsibility of the designer. Additionally, they feel that motivation is a systematic process that must be considered during all stages of design.

Many learners initially find web-based environments like distance education and other CAI programs novel or fun. This often translates into a temporary increase in learner motivation. Unfortunately, if the CAI is poorly designed or lacks continuing motivational appeal beyond that of an initial novelty level, learners will eventually lose interest, and motivation and confidence will wane (Keller & Suzuki, 1988).

To stimulate and manage student motivation to learn, Keller (1987a, 1987b, 1987c) created the ARCS model of motivation. ARCS is short for (A)tention, (R)elevance, (C)onfidence, and (S)atisfaction and serves as the overall framework for the motivational mass e-mail messages. The ARCS model is an attempt to synthesize behavioral, cognitive, and affective learning theories and demonstrates that learner motivation can be influenced through external conditions.

The attention, relevance, confidence, and satisfaction categories serve as a framework for developing instructional strategies for capturing and maintaining learner attention, establishing relevance of the material being taught, improving and sustaining learner confidence, and providing a sense of learner satisfaction through intrinsic and extrinsic rewards.

Keller’s ARCS model more neatly parallels Bean and Eaton’s (2000) retention model, which emphasizes the key concepts of locus of control, self-efficacy, and approach-avoidance theory as integral to the student’s commitment to persist. Additionally, established research into general retention theory often makes a connection between learner persistence and core ARCS principles such as motivation, relevance, confidence, and satisfaction (Andreu, 2002; Dille & Mezack, 1991; Tinto, 1975, 1993, 2007).
Keller’s ARCS model enjoys support in the literature, and researchers have applied its guidelines to different learning and design environments. For example, ARCS research can be found concerning the traditional classroom (Bickford, 1989; Klein & Freitag, 1992; Means, Jonassen, & Dwyer, 1997; Moller, 1993; Naime-Diefenbach, 1991; Small & Gluck, 1994; J. Visser & Keller, 1990); computer-assisted instruction (Astleitner & Keller, 1995; Bohlin & Milheim, 1994; ChanLin, 1994; Lee & Boling, 1996; Shellnut, Knowlton, & Savage, 1999; Song, 1998; Song & Keller, 1999; Suzuki & Keller, 1996); blended learning environments (Gabrielle, 2003); and online, distant, and web-based classrooms (Chyung, 2001; Huett, 2006; Song, 2000; L. Visser, 1998).

There is some limited research directly applicable to ARCS-based motivational messages. For instance, Keller and Suzuki (2004) cited a 1998 report by L. Visser outlining a 70% to 80% improvement in retention rates of distance learners when motivational messages based on the ARCS model were used. Additionally, with their ARCS-based motivational communications, L. Visser, Plomp, and Kuiper (1999) and L. Visser et al. (2002) found that motivational messages “considerably increased the completion rates of students.”

Of the research available, J. Visser (1990) showed an increase in learner motivation through the use of motivational messages in a conventional classroom. L. Visser, Plomp, and Kuiper (1999) and L. Visser et al. (2002) used the ARCS model as a guide for developing motivational communications with international distance education students. They found positive outcomes for learner motivation. They also found no statistically significant difference between the use of mass messages versus personalized messages and recommended using mass messages to increase “the chance of successful implementation” (1999, 410). Additionally, L. Visser (1998) conducted a pilot study and a main study using the Motivational Messages Support System (MMSS), upon which the e-mails in this study were partly based. In both studies, she found that the messages increased the confidence levels of students. Also, she found no statistically significant difference in the use of mass messages versus personalized messages in terms of effectiveness.
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