Scientific Research Base
Engaging Students • Supporting Teachers.
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Introduction

Classroom, Inc. was founded on the principle that students are better able to develop and strengthen academic skills when they apply them in a real-life context. We believe that every child deserves a chance to learn, to achieve in school, and to have all the skills needed to engage with the world in a productive, positive way. To facilitate such opportunities, we:

• Create industry-based computer simulations and related materials that provide students with engaging, instructionally sound, and content-rich curricula.

• Offer educators a comprehensive professional development program that guides them in effective use of our technology-enhanced tools.

Our interdisciplinary, standards-based simulations promote engagement and learning by giving students opportunities to develop, reinforce, and apply skills in literacy, numeracy, problem solving, and collaboration. Working in groups to navigate real-life situations and solve real-world problems, students develop proficiencies essential for success in school and the world of work.

Our professional development approach is one of coaching and capacity building. We use our simulations and other curricular offerings as springboards to enhance educators’ effectiveness and further develop their pedagogical skills. We guide teachers in the use of our simulations and highlight four opportunities for teaching: pre-teaching key skills to prepare students for simulation use, coaching students as they apply these skills in the simulation, assessing skill development through reflection and discussion, and re-teaching skills as needed. Our goal is to equip teachers to direct their students to think critically and apply knowledge to solve problems, rather than be mere conduits of information.

After more than a decade of operation, we continue to focus on serving young people living in communities where educational resources are often scarce, and where significant portions of the population live at or below the federal poverty line. Our goal is to help ensure that, whatever the social and economic obstacles they face, no child — or educator — is left behind.

Classroom, Inc.’s Scientific Research Base

In a comprehensive reform of the Elementary and Secondary Education Act (ESEA), the No Child Left Behind Act of 2001 was signed into law in January 2002. The core of the new law is an emphasis on using teaching strategies of proven merit. Moving forward, federal education funding will be linked to those programs for which there is credible evidence of success in enhancing student performance.
Over the last two decades, educators, researchers, and public and private organizations committed to improving the quality of K-12 education in the U.S. have worked to specify critical elements of competence in different academic subjects. For example, the Report of the National Reading Panel: Teaching Children to Read stipulated the core competencies that comprise reading. Similarly, the United States Department of Education recently launched its Mathematics and Science Initiative, designed in part to improve our knowledge of what boosts student learning in math and science.

Enhancing students’ literacy and numeracy skills through an interdisciplinary approach, using technology to engage and teach, and supporting teachers in their practice are cornerstones of Classroom, Inc.’s program. We currently have 15 simulations for use by middle and high school students. Each addresses national standards — from the McREL compendium — and is set within an industry such as banking, hospitality, manufacturing, healthcare, community development, publishing, sports media, information technology, personal finance, performing arts, and law and justice. In addition, we have developed interdisciplinary curricula around our simulations for use in summer school and after school settings; comprehensive workbooks for use during the school year; and assessment packages to track students’ performance. Our professional development program consists of intensive training sessions, workshops, a resident educator program, ongoing consultation services, as well as online, audio-visual, and printed resource materials. (Please see page 59 for details.)

In this publication, we state ways in which Classroom, Inc.’s program links with the recommendations of nationally recognized education researchers in four primary learning dimensions our program emphasizes: literacy, numeracy, problem solving, and collaborative learning.

The material for each learning dimension is organized in three sections:

- Defining the Learning Dimension identifies core competencies within each dimension.
- Excerpts from the Research presents illustrative examples of scientifically based research that establish a framework in support of the Classroom, Inc. Instructional and professional development program.
- Putting It Into Practice provides sample instructional and professional development materials that show how the Classroom, Inc. program addresses specific research-based recommendations.

When taken together, the three strands demonstrate the ways in which Classroom, Inc. has integrated key research recommendations into its instructional design and practice.

A complete bibliography of research cited, as well as an annotated listing of the curricular and professional development materials referenced, can be found at the end of the document.
Literacy

“I wrote an annual report.”

What did you do at school today?
Literacy encompasses and integrates the complex processes of reading, writing, listening, and speaking. It presumes a student’s ability to engage in a productive and dynamic relationship with a wide range of texts and serves as the foundation of a student’s ability to understand and communicate ideas through language. Success in school and the workplace is to a significant extent dependent upon students’ acquisition and application of skills in these areas.

Six strands that comprise literacy emerged from the literature:

- Reading strategically.
- Reading for meaning and purpose.
- Building vocabulary.
- Writing for a variety of purposes and audiences.
- Communicating information and ideas.
- Utilizing technology.

Sources consulted for the definitions of these strands include:


Defining The Learning Dimension

Good readers are active and aware of their reading experience and comprehension. Instruction in comprehension skills can help students understand what they read, remember what they read, and communicate with others about what they read. Research has shown that six strategies are effective for improving comprehension:

• Monitoring comprehension: an awareness of success or difficulty in comprehending allows students to resolve problems as they read.

• Using graphic and semantic organizers: utilizing and creating graphic organizers aids students in learning from informational texts in content areas.

• Answering questions: practice in responding to questions about text encourages students to learn to answer questions better and learn more as they read.

• Generating questions: asking one’s own questions improves a student’s active processing and comprehension of text.

• Recognizing story structure: recognizing the structure of stories leads to a greater appreciation, understanding, and memory of stories.

• Summarizing: summarizing helps students to identify main ideas, eliminate unnecessary or redundant information, and recall what they read.

Excerpts From The Research

“To be maximally effective, strategy instruction needs to be conducted in classroom contexts in which students have frequent, sustained, and consistent opportunities to read, write, listen, and talk about literacy.” (Englert, Garmon, Mariage, Rozendal, Tarrant, & Urba, 1995, p. 271)

“First, this study taught us the importance of establishing procedures that promote higher-level discussions among student groups. As a result, we have modified the program so that students are taught to ask higher-level questions during wrap up and to discuss key issues. We have become aware that this is more easily done when students are highly interested and engaged in what they are reading. Second, we realized that when students lack background knowledge about a topic, teachers should conduct a whole-class preview prior to small-group work. Third, we learned to place more emphasis on teaching the metacognitive aspects of certain strategies (e.g., how and why to preview) and how to monitor if strategies have been applied effectively.” (Klinger, Vaughn, & Schumm, 1998, p. 19)

“Reading engagement refers to the joint functioning of motivations, strategies, and conceptual knowledge in extended text interactions. In an attempt to increase elementary students’ reading engagement, a team of university faculty, students, and teachers collaborated to construct classrooms that could be portrayed in terms of the following seven dimensions: (1) conceptual theme, (2) real-world experience, (3) self-direction, (4) collaboration, (5) strategy instruction, (6) self-expression, and (7) coherence. The CORI [Concept-Oriented Reading Instruction] students’ ability to gain new conceptual knowledge in the new knowledge domain was higher than that of traditional students at both grades 3 and 5.” (Guthrie et al, 1999, p. 348 & 361-2)

“The results also support the process of informed strategy training for comprehension instruction, which includes comprehension-fostering strategies, an awareness of the importance and usefulness of the strategies, and metacognitive strategies to monitor strategy use.” (Stevens, Slavin, Famish, 1991, p. 15)
Putting It Into Practice

Students use active reading strategies as they follow the simulation storyline, refer to the written resources, and read supplementary books.

In the role of physician’s assistant trainee in The Community Clinic, students must read as they “listen” to medical professionals and write a summary of each person’s request.

Active Reading Prompt:

After Donald’s poem at the top of page 176, stop reading and place a * in your book. Next to the *, write your thoughts about Donald’s poem.

Journal Question:

Reread Donald’s poem to María on pages 175 and 176. What feelings do you think Donald is trying to express in that poem?

Students respond to questions immediately after they read sections of a supplementary novel used in our program.

The Community Clinic Literature Link for “A Night Without Stars” by James Howe.
Reading for Meaning and Purpose

Defining The Learning Dimension
Reading for meaning involves a complex, dynamic interaction linking the reader, text, and context. Students should be guided by a purpose for reading. Some important purposes for reading are to:

- Gain information from such texts as letters, memoranda, newspaper articles, summaries, and printed oral communications.
- Learn about oneself, other individuals, and society through the exploration and analysis of literary works.
- Apply what is read to perform a specific task, such as to follow directions, explain a decision or opinion, summarize ideas, or communicate with others.

Excerpts From The Research
“Strategic behaviors occur when learners have a purpose and plan carefully, when both motivation and metacognition are integral to processes of reading and learning.” (Farnan, 1996, p. 441)

“This suggests, for example, that emphasis needs to be placed…on designing learning opportunities that promote relevant and real-world learning experiences for students.” (Hosking & Teberg, 1998, p. 336)

“Our findings indicate that engaged readers use a process of sensing and making sense of situations to generate a lived-through experience with a literary text. We also found that our readers who clearly were reading in an engaged way were profoundly influenced by particular and varying concerns aroused during their reading. Generally speaking, these concerns emerged in the form of questions aimed at clarifying a particular social situation. A third factor we found to be common among our engaged readers was a tendency toward self-awareness (of processes being used) and other-awareness (author, implied author, narrator, fictional characters, and/or other readers or potential readers).” (Faust, 1997, p. 337)
Putting It Into Practice

In our simulations, students gather information from a variety of text-based resources to solve problems posed within the episodes.

The Editor-in-Chief’s office at What’s Up Magazine provides students with a variety of resources they can all upon, including their colleagues, the television, computer, telephone, fax, files, a dictionary, and industry handbooks.

In What’s Up Magazine, students use what they have read to perform tasks such as summarizing information for others and explaining decisions.
Defining The Learning Dimension
Vocabulary is strongly related to the ability to comprehend text. Vocabulary can be acquired incidentally, through reading a larger number and variety of texts, or through direct instruction. Repetition and multiple exposures are important to the learning of new words, as is a rich context for learning.

Excerpts From The Research
“The results of this study imply for educators that vocabulary can be learned through a computer software program that employs a modified mixed approach. A program that introduces the new words in a sentence context, provides additional word learning clues in conjunction with the sentence cloze activities, and enables students to practice the words by repeating all or part of the formal lesson seems to promote better word learning than do programs that expose the learner to definitional information only.” (Kolich, 1996, p. 182)

“As more students have access to computers, software that includes an automated dictionary to provide instant information about word meanings, thus overcoming the drudgery and inaccuracy associated with dictionary use, holds promise of increasing students' meaning vocabularies.” (Klesius & Searls, 1990, p. 228)

“Comprehension can be enhanced through instruction that is focused on concept and vocabulary growth and the syntax and rhetorical structures of written language, as well as through experience gained by reading both independently and interactively in dyads or groups.” (National Research Council, Snow, Burns & Griffin (eds.), 1999, p. 322)
Putting It Into Practice

Students learn new vocabulary in context while using the simulation, as seen here in examples from The Alicia Leary Progress Foundation.

The Alicia Leary Progress Foundation

Section One: Concepts & Vocabulary

1. The various activities, such as jogging and playing basketball, require areas in a park known as:

- A. Impacts
- B. Assets
- C. Enthusiasts
- D. Facilities

The Alicia Leary Progress Foundation Comprehensive Assessment Kit, Short Answer Test, Episode 4
Writing for a Variety of Purposes and Audiences

Defining The Learning Dimension

Literate students engage in varied forms of writing — including narrative, informative, and persuasive writing — and these forms establish purposes for writing. To express their views and knowledge, students should write for a variety of tasks and audiences. In addition, they should vary aspects of their writing (such as style, tone, and formality) to suit the task and intended reader. Students should also write from an assortment of stimulus materials (including images, literature, and factual materials) and should engage in the writing process (including the production of multiple drafts, making revisions, and participating in peer reviews of work).

Excerpts From The Research

“The curriculum must help children develop competence in comprehending and composing prose of many kinds...[T]eachers should provide instruction in a variety of forms as well as variations of the writing process. The differences among the types of writing should be explicitly presented, and students should be given assistance while they practice.” (Educational Research Service, Cawelti (ed.), 1999, p. 97)

“Students who were trained to generate and answer their own thought-provoking questions following a lecture and those who were trained to write summaries of the lecture performed better on lecture comprehension at immediate posttesting than students who simply took notes and reviewed their notes...”(King, 1992, p. 316)

“...any kind of written response leads to better performance than does reading without writing.” (Langer & Applebee, 1987, p. 130)

“To help students in the writing process, they may be taught how to organize their writing and how to use self-talk prompts to facilitate the revision process.” (Rosenshine & Meister, 1992, p. 26)
Putting It Into Practice

Students write while navigating through the simulation and when completing related assignments.

While performing the duties of managing director of a sports cable network, students use a variety of graphic and narrative data to prepare an outline for an editorial in The Sports Network that expresses the network’s official opinion on the salaries of professional athletes.

Follow-Up and Extension Activities

Complete the On-air Editorial on the Issues of Professional Athletes’ Salaries

- Mathematics
- Language Arts
- Life Skills

Students can use the outline they created in the episode as the basis for writing a complete editorial expressing their opinion on the topic: Are the salaries of professional athletes too high? When students have completed writing the editorial, assign students to work in pairs. Each student should act as an editor for the other, commenting on whether or not the opinion expressed is supported by specific details.

As a follow-up, students can send their editorials to a newspaper, sports magazines, or their school paper. Students may want to create their own class magazine with editorials, fact pieces, news articles, and so on.

Additionally, you may want to conduct a TV news “Our Turn” show in the classroom. Students read their editorials “on air” and are videotaped. Later, these videotapes can be analyzed for oral communication skills.

In an extension activity, teachers encourage students to build upon an outline they created earlier in their work with the simulation to write a complete editorial.
Defining The Learning Dimension

Speaking, listening, and viewing are fundamental to the expression and exploration of ideas. Students should engage in interactions that include collecting, understanding, exchanging, and analyzing information, ideas, messages, and opinions. The processes of speaking, listening, and viewing foster skills in critical thinking and persuasion.

Excerpts From The Research

“In classes of the higher performing schools, students not only worked together in physical proximity, but they gained skill in sharing ideas, reacting to each other, testing out ideas and arguments, and contributing to the intellectual tenor of the class.” (Langer, 1999, p. 42)

“In schools that beat the odds, English learning and high literacy (the content as well as the skills) are treated as social activity, with depth and complexity of understanding and proficiency with conventions growing from interaction with present and imagined others.” (Langer, 1999, p. 41)

“The results of this study show the significant impact of direct instruction and cooperative learning on teaching students specific reading-comprehension strategies…. When compared to the control group, the positive effects for cooperative learning were large…. During the cooperative practice, students evaluate, explain, and elaborate the strategies to one another. Through this process students gradually take on more responsibility as they successfully internalize and master the complex and cognitive processes.” (Stevens, Slavin, Famish, 1991, p. 15)
Putting It Into Practice

Students have many opportunities to communicate information and ideas in the Classroom, Inc. program, both on and off the computer. To solve problems posed in the simulations students need to explain their views and listen to the opinions of others. They also need to communicate effectively with their teammates to make decisions for the company.

Teachers need to “debrief” with students after the computer experience. They should have students share their decisions, discuss how they arrived at those decisions, explore unanswered questions, identify issues that they have overlooked, and relate the computer experience to their own lives.

Students share views and opinions while using the simulation.

A teacher debriefs with students after an episode.
Utilizing Technology

Defining The Learning Dimension

Proficiency with technology is rapidly becoming part of being literate. Students should use technological tools and resources to collect, evaluate, and synthesize data from a variety of sources, and to create and communicate knowledge.

Excerpts From The Research

“In concert with the third and fourth generalizations, integrating computers and technology into reading and writing activities has the potential to promote purposeful communication and foster collaborative learning experiences.” (Nichols, Wood, and Rickelman, 2001, p. 46)

“At one of the ACOT sites, computers were used successfully in a deliberate attempt to raise student test scores in vocabulary, reading comprehension, language mechanics, math computation, and math concept/application. As with the CHILD study, increases in test scores were not the real objective of the project, and observations showing increases in how students employed inquiry, collaborative, technological, and problem-solving skills were considered to be the most important findings. The technology was described as a ‘conceptual environment’ in which students acquired, explored, and expressed ideas.” (Wellburn, 1996, p. X)

“Advice seems to restrict the performance in controlling the simulated system (functional knowledge), but it facilitates the acquisition of more general verbal knowledge beyond the scope of the specific simulation game (domain knowledge).” (Leutner, 1993, p. 121)
Putting It Into Practice

Students access technology in multiple ways while using our program: they navigate simulation software; use the Internet to access important information; and employ other application software to complete assignments (e.g., word processing, database, and presentation software).

We also help teachers incorporate an array of technology tools into instruction in our professional development.

While acting as project directors in RioTech Solutions, students use the Internet to visit telecommunications company Web sites, to see which of them offers the services RioTech Solutions desires.

Adapting Applications Software to Classroom, Inc. Simulations

An Advanced Workshop for Teachers

What is the Purpose of this Workshop?

- To discuss how software applications programs can be used in extended activities for the simulations.
- To provide an introduction and overview of some commonly used programs.
- To demonstrate how the programs can be utilized as extension activities to any Classroom, Inc. simulation.
- To provide teachers with the opportunity to participate in an activity using applications software.

In one of our advanced workshops, we focus on how teachers can integrate other software applications into their Classroom, Inc. work.
Numeracy

“I signed a multi-million dollar contract.”

What did you do at school today?
Numeracy entails an understanding of and facility with numbers. Students who are numerically literate recognize relationships between numbers and are skilled at performing operations between numbers; they are also able to apply, consciously and creatively, such mathematical thinking within problem-solving processes. Most forms of employment demand such competency with numbers and numeracy provides a foundation for advanced mathematics.

This document identifies seven strands that comprise the learning dimension of numeracy:

- Having number sense and understanding operations.
- Using, representing, and explaining algebraic concepts and functions.
- Developing and applying mathematical problem-solving skills.
- Understanding concepts and procedures.
- Communicating mathematical ideas.
- Recognizing the nature of mathematics and its practical applications.
- Utilizing mathematical tools and technology.

Sources consulted for the definitions of these strands include:


Having Number Sense and Understanding Operations

Defining The Learning Dimension
At the foundation of numeracy is a solid understanding of numbers and relationships among numbers; this includes counting and arithmetic. Students should know ways to represent numbers, number systems, and relationships among numbers. In addition, students should:

- Understand properties of numbers.
- Understand meanings of operations and how they relate to one another.
- Compute fluently.
- Make reasonable estimates.

Excerpts From The Research

"A major impression left by this study is that, while the mathematics curriculum is still heavily weighted toward the development of computational algorithms and procedures, students’ number sense does not develop hand in hand with their computational growth." (Reys, Reys, Emanuelsson, Johansson, McIntosh, & Yang, 1998, p. 68)

"[C]onversations with the teacher and with students indicated that the students were dependent on memorized procedures, such as annexing zeros to decimal numbers before comparing and ordering, and finding a least common denominator and then comparing only numerators. These methods are not only procedural and tedious, they depend only on whole-number knowledge and can be performed with little or no understanding of how the decimal and fractional numbers are related to one another." (Markovits & Sowder, 1994, p. 23)

"These interviews revealed that both high- and middle-level students tended to rely heavily on computational techniques that had been taught in school. Although high-ability students were more likely to break away from rule-based methods, these breakaways were observed only when prompted by such questions as ‘Can you do it another way?’ There was little evidence to suggest that identifiable components of number sense, such as use of benchmarks and understanding of number magnitude, were initially used by Taiwanese students in their decision making." (Reys & Yang, 1998, p. 236)
Putting It Into Practice

In the simulations and related materials, students have numerous opportunities to compute and demonstrate their number sense and understanding.

As bank tellers — and, later, customer service representatives — in The Chelsea Bank, students must count the cash provided by the customer, record the information on a tally sheet, and compare the total to that written on the deposit slip. The tally sheet, an actual document used by many banks to count cash by denomination, reinforces basic addition and multiplication skills.

The Chelsea Bank, Episodes 2 and 7
Using, Representing, and Explaining Algebraic Concepts and Functions

Defining The Learning Dimension
An early understanding of algebra provides preparation for work in geometry, data analysis, and other advanced areas of mathematics. Indeed, algebra is commonly viewed as the gateway to higher education and professional opportunities. Students who do not enroll in algebra courses in high school generally face limited options for study and employment beyond graduation. As the world becomes increasingly dynamic, careers in many fields demand a solid background in algebraic thinking — specifically in the study of patterns, relations, and change. Students who are algebraically proficient are able to:

- Represent and analyze mathematical structures and situations symbolically.
- Use mathematical models to understand and demonstrate qualitative relationships.

Excerpts From The Research
"As was observed, performing actions on a physical model enabled students to get hands-on experience with quantitative relationships among measurements of the rectangle. In other words, through suggested activities, students first constructed iconic representations of related problems from which mathematical relationships that structure the original problem could be conceptualized." (Abramovich & Nabors, 1999, p. 17)

"…middle school instruction needs to push students’ understandings beyond routine situations. Students seem able to generalize arithmetic that they know well, but they have difficulty generalizing the arithmetic with which they are less familiar. In particular, middle school students would benefit from more experiences with a rich variety of multiplicative situations, including proportionality, inverse variation, and exponentiation." (Swafford & Langrall, 2000, p. 108)

"We also found that the rate of growth differed for middle school and high school. High rates of growth in middle school tended to taper off in high school. This pattern of ‘deceleration’ was found for all three content areas [statistics, algebra, and geometry]." (Wilkens & Ma, 2002, p. 296)

Acting as finance counselors in The Finance Center, students calculate the cost for each of three car-financing options available to a client. They must correctly calculate the car’s price, interest rate of the loan, term of the loan, total interest, total cost, monthly loan payment, monthly auto insurance payment, and total monthly expense.
Putting It Into Practice

Students have opportunities in some simulations and related materials to use, represent, and explain algebraic concepts.

In RioTech Solutions, students use the Equationeer to assign variables and numbers to construct an equation.

RioTech Solutions, Episodes 3, 4, 7, 9
Developing and Applying Mathematical Problem-Solving Skills

Defining The Learning Dimension
Students should develop and apply their knowledge and skills in number sense, algebra, geometry, data analysis, and other areas, in mathematics and other contexts. Complex problem solving that requires students to apply and adapt a variety of strategies fosters a deeper mathematical understanding. Students should also be given opportunities to reflect on their problem-solving experiences.

Excerpts From The Research
“The results of this study support the practice of situating problems in a meaningful context for improving the math problem-solving skills of low- and average-achieving students. Statistically significant differences were found on the contextualized problem test and on the transfer task for CP [contextualized problem] students in both the remedial and pre-algebra classes.” (Bottge, 1999, p. 90)

“We need to expose children to a range of problem structures, help them recognize the important mathematical ideas, and encourage them to talk about what they like and dislike about these structures. This will not only enhance children’s understanding and perceptions of mathematical problem situations but also provide a sound basis for their generation of new problems.” (English, 1997, p. 209)
Putting It Into Practice

Each simulation episode requires students to solve at least one problem. In some cases, students solve complex problems by applying their mathematical skills and knowledge.

In The Sports Network, students decide whether various amounts are income or expenses (1), enter the data into a profit and loss report form and calculate net income (2 & 3), and propose solutions that significantly increase net income over existing levels (4).
Understanding Concepts and Procedures

Defining The Learning Dimension
Two essential components of mathematical literacy are conceptual understanding and procedural proficiency. Many students complete their schooling with only a factual knowledge of mathematics. Memorizing facts or procedures without understanding leads to a mathematical ability that is tenuous and uncertain.

Excerpts From The Research
“Students construct their own meaning in given situations and an awareness of this should accompany decisions about the nature and variety of contexts used and about the openness of tasks. For if students determine their own direction and resolution in an activity then they will be able to determine their own goals. This formation of goals means that students bring their own ‘context’ to a task and this must, ultimately, have personal meaning for them. Importantly, the use of contexts must be accompanied by a reflection that the context of the task is capable of transforming students’ perceptions, goals, and subsequent choices of mathematical procedure.” (Boaler, 1993, p. 370–371)

“The writing samples show that students were able to provide clear reasons for their steps. It was revealed that when students wrote, they broke down the problem as they explained what they were doing and why…. This study supports the use of open-ended problems as a way to develop mathematical thinking. But it also implied that the format used to approach a problem is as important as the problem itself. Mathematical thinking is developed not only by choosing good problems, but also from encouraging students to think about how choosing an approach is rooted in understanding the problem.” (Johanning, 2000, p. 156)
Putting It Into Practice

The Classroom, Inc. simulation approach facilitates students’ conceptual understanding of mathematical procedures.

Before students begin an episode in The Sports Network, they learn the definitions of range, mean, median, and mode and practice procedures for solving data-based problems.

The Sports Network, Episode 4
Communicating Mathematical Ideas

Defining The Learning Dimension

When students engage in tasks that enable them to connect prior learning to new learning and to evaluate their thinking, they are more likely to develop a deeper understanding of mathematics. Classroom interactions can provide opportunities for students to propose, connect, build, and support mathematical ideas through discussion, reasoning, and argumentation.

Excerpts From The Research

“Given the opportunity, students will construct much of the mathematics they are expected to learn as they attempt to make sense of concepts and ideas either through writing or interactions with teachers or their peers.... This study supports the notion that writing assists in the development of students’ individual thought processes and helps students construct knowledge about mathematical ideas and concepts. This study illustrates a connection between students’ oral thought processes within the zone of proximal development (‘outside-in’), and written thought processes within the zone of proximal development (‘inside-out’)..... As suggested by this study, learning to express mathematical understandings and concepts via writing is not an isolated process. Its expression depends upon being involved in active learning situations, as actualized by the ZPD [zone of proximal development].” (Albert, 2000, pp. 136–137)

“Writing, as used in this study, provided a way to activate students in their learning of mathematics as they communicated their ideas on paper and then to their peers.... The use of writing in this study provided a way to develop mathematical thinking and help students become more efficient problem solvers.” (Johanning, 2000, pp. 156)
Putting It Into Practice

Students are encouraged to communicate mathematical ideas in writing. Classroom, Inc. teachers also create activities that require students to write about their mathematical reasoning and problem solving.

In The Sports Network, students analyze flight data and fare information, and communicate the reasons for their decisions in writing.

In an article from Classroom, Inc’s teacher newsletter, we provide a math worksheet for use with RioTech Solutions, along with ways to ensure a deeper understanding of mathematics through writing.

Suggestions for extending the worksheet activity include: a warm-up during which students write what they know about salaries and bonuses; a freewriting assignment where they write about their results; a learning log in which they explain in writing the procedures they used to calculate total salaries for the employees; and a math journal where they reflect on the assignment and make connections to their own lives.
Recognizing the Nature of Mathematics and its Practical Applications

Defining The Learning Dimension
Students need to understand that mathematics is used to represent real things using abstract ideas. Students should also appreciate the practical applications of mathematics, and be able to apply their math skills to describe and predict things in the real world. Providing such a context and helping students establish connections between their classroom and the world outside it enhances students’ interest and motivation.

Excerpts From The Research
“Quality of experience in mathematics was mainly related to interest in mathematics and, to a lesser extent, achievement motivation….. The positive relation between interest and achievement is corroborated by the analysis of course level. Our results suggest that interest in mathematics, measured at the beginning of high school, is a significant and independent predictor of how far a student has progressed by the end of school.” (Schiefele & Csikszentmihalyi, 1995, pp. 176–177)

“[M]athematics is widely thought of as certain and probably the most important school subject with respect to real world demand. Yet when students are faced with problems in the real world they find that the certainty they have learned is not applicable; this leads them to perceive themselves as mathematical failures and perceive mathematics as ultimately difficult. This discontinuity is not caused by misunderstanding but by students learning techniques without knowing what they mean, what they are for, when they can be used, how they may be derived and most importantly, where they fit in the overall mathematical picture.” (Boaler, 1993, p. 31)

“The data indicated local students in elementary and middle grades had surprisingly low levels of interest in mathematics, science, and mathematics- and science-related careers…. The results revealed that while students’ interests seemed fairly low (59.7% of all students said they think that mathematics is fun), they did seem to believe that mathematics would be important for future work.” (Conwell & Prichard, 1992, p. 267–271)
Putting It Into Practice

Classroom, Inc. simulations use "real-world" settings to help students see the relevance of mathematics skills in applied settings.

As plant manager in a paper manufacturing firm in The Green Mountain Paper Company, students need to recommend which parcel of harvestable forest land the company should buy. In order to do this, they:

- measure the harvestable acreage in each of three available parcels
- calculate the cost per harvestable acre for each parcel
- consider the distance from the plant to the parcel
- consider the environmental and community impact
- document their decision and describe their reasoning

The Green Mountain Paper Company, Episode 2

Recognizing the Nature of Mathematics and its Practical Applications
Utilizing Mathematical Tools and Technology

Defining The Learning Dimension
Proficiency in the use of computers, calculators, and other technologies has become a part of being mathematically literate.

Excerpts From The Research
"The fact that the content-only alternative treatment group out-performed the Mission to Pluto group on problem solving provides insight on the importance of conceptual understanding for successfully engaging problem solving. In conclusion, the results of this study indicate that effective uses of technology in the classroom will leverage the interactivity of technology to engage students in the development of conceptual understanding through inquiry activities." (Dimitrov, McGee, & Howard, 2002, p. 21)

"[W]hen computers are used to perform certain tasks, namely applying higher order concepts, and when teachers are proficient enough in computer use to direct students toward productive uses more generally, computers do seem to be associated with significant gains in mathematics achievement, as well as an improved social environment in the school." (Wenglinsky, 1998, p. 32)

"Three ideas were prominent in solutions that related to this problem: (a) technology can improve research and communication skills; (b) math, science, and technology should be integrated when doing real experience problem-solving; and (c) middle school students learn best when they are able to work with concrete scientific data from real experiences." (Schreiner, 1995, pp. 30–31)
Putting It Into Practice

In order to make decisions and solve problems, students use mathematical tools and other technologies embedded within the simulations.

In RioTech Solutions, students learn about databases and choose appropriate data categories for a school database.

In The Finance Center, students use an Interest Calculator to calculate “total interest” for three financing options.

In each of our simulations, students use the built-in calculator to help solve mathematical problems.
Problem Solving

“I took a bold new approach to management.”

What did you do at school today?
Problem solving is the process of engaging in a task for which the solution is not known in advance. Problems that encourage learners to explore, take risks, share failures and successes, and question one another stimulate new learning and give students the chance to develop their problem-solving skills by solidifying and extending their knowledge. In problem-based learning, students work in small groups to find solutions for real-life problems. Problem-based learning encourages students to use active learning strategies and eventually become self-directed learners. Using problems that are meaningful and engaging for students is the key attribute in developing students’ problem-solving skills.

This document focuses on four strands that comprise the learning dimension of problem solving:

• Understanding problem solving as a process.

• Becoming self-directed through problem-based learning.

• Applying problem-solving skills across the curriculum.

• Utilizing technology in problem solving

Sources consulted for the definitions of these strands include:


Understanding Problem Solving as a Process

Defining The Learning Dimension
The process of solving a problem is as important as its outcome. Active engagement in a problem-solving model helps students both to understand problem solving as a process and to apply those steps to problems encountered. Problem-solving models typically include: devising a plan; conducting research; considering all appropriate factors and variables; determining an order in which tasks need to be completed; and identifying the resources, people, and time available and necessary for putting the plan into action.

Excerpts From The Research
“Study One computer simulation students were actively processing information to solve problems nearly the entire time they were being taped (i.e., 95% of the time). During any given sequence of time, students were reading information from the screen, discussing meanings and choices, making decisions, and composing written speculations about consequences of actions upon customers, the bank and upon themselves.” (Mikulecky, Lloyd & Conner, 1997, p. 367)

“At the beginning of the experiment (during the traditional instruction) the students seemed unsure about the steps of problem solving, and they were stuck with the idea that there is only one way to solve a math problem. By the end of the experiment, especially during the units with the extra word problem at the beginning, the students were looking for different ways to solve problems and their answers were more detailed. The students could tell another person exactly how they got the problem, and they had developed a true understanding of why their method worked as well as one or two other methods in the class.” (Coy, 2001, p. 26)
Putting It Into Practice

Classroom, Inc. simulations are built around problem situations that students must solve, and we emphasize the problem-solving process in our professional development.

Our simulations foster students' problem-solving skills by encouraging them to use resources and by showing them the consequences of their decisions.

Worksheets and handouts given to teachers in our initial trainings help to establish a problem-solving environment in the classroom.

Look for the following behaviors in students who are practicing good problem-solving skills:

- Students are able to restate the problem in their own words.
- Students have a plan for attacking the problem rather than gathering information haphazardly.
- Students have more than one plan and method for solving problems.
- Students draw on their own prior experiences and the simulation to help them solve new problems.
- Students are able to hypothesize outcomes and consider possible consequences before they occur.
- Students delegate tasks among themselves, drawing on each other's strengths to solve the problem at hand.
- Students struggle with problems before seeking help from their teacher or giving up.

BENCHMARK 3:

Teachers create an environment that encourages students to problem solve productively.

Our simulations place students in a problem-solving situation and provide them with a number of resources to help them solve problems. Students are free to explore and struggle with problems in a way that makes sense to them. Students will not necessarily engage in a productive problem-solving process, however, unless the teacher makes this expectation clear, and helps students learn what such a process entails.
Defining The Learning Dimension
At the core of problem-based learning (PBL) are ill-structured, “real-world” problems with no one correct solution. The process of devising a solution develops problem-solving skills and fosters self-directed learning. Students become more adept learners, able to apply their knowledge and skills to future problems.

Excerpts From The Research
“These findings demonstrate the problem-solving steps and audience roles are one way of increasing both student talk and substantive student engagement (in elementary civics classrooms). With remarkably little training, the students in these classrooms adopted a willingness to negotiate understanding through questioning and challenging one another.” (Beck, 2000, p. 27)

“PBL is an effective tool for learning as well as a pedagogy that promotes habits of mind that support higher order thinking.” (Dods, 1997, p. 436)

“PBL was an effective vehicle for addressing varied learning styles. All projects required products resulting from research, communication skills, and applied knowledge.... Student groups had some autonomy over these decisions; teachers were not sole controllers.” (Achilles & Hoover, 1996, p. 14)

“When students were exposed to the PBL environment, they increased their achievement scores more than those students who learned the same content in the traditional classroom. Consistent to the literature on PBL, the results of the study provide some evidence in supporting the use of PBL.” (Williams, Hemstreet, Liu & Smith, 1998, p. )
Putting It Into Practice

All Classroom, Inc. simulations present students with illustrative “real-world” problems that have no one correct answer. We also encourage teachers to allow students to be self-directed when attempting to solve the problems.

In What’s Up Magazine, students have to “hire a writer.” They perform a variety of tasks, including reviewing job requirements and resumes, conducting interviews, and considering staff input. There is no obvious “best choice,” and students receive positive and negative feedback from their colleagues, depending on their choices.
Applying Problem-Solving Skills Across the Curriculum

Defining The Learning Dimension

Students who learn across the artificial barriers dividing subject areas are provided with a rich and expansive context for solving problems in the real world. Students should be encouraged to use problem-solving skills in all disciplines, and should engage in problem-based learning that draws from a number of academic disciplines.

Excerpts From The Research

“Connecting language arts and mathematics can be successfully accomplished in the middle grades. Such coordinated lessons provide opportunities for language arts and mathematical problem solving to build on one another, thereby strengthening each lesson.” (Melser & Leitze, 1999, p.54)

“An instructional methodology with characteristics like problem-based learning has promise as an affective methodology for integrating the disciplines in elementary school. With training in such a method, teachers will have an instructional tool they can use to integrate the disciplines and produce positive changes in their students’ achievement, social skills and motivation.” (Bartels, 1998, p.14)

“As the faculty and curriculum coordinators developed the material, they evolved from creating a good idea to interest students with parallel development in science, mathematics, and humanities to teaming in one classroom and integrating content through the actions of problem solving process…. While this study focused on teachers’ development and implementation of curriculum materials, significant student gains were documented on a study skills and content pre/post test. Students better understood the final projects and were more self-directed than in the 1st year of the program.” (McGehee, 2001, p. 387, 388)

“The results of this study also provide evidence of successful PSCAI [Problem Solving Based Computer Assisted Instruction] effects on students’ knowledge level of Bloom’s cognitive domain. That finding suggests that the PSCAI might enhance students’ ability to acquire knowledge in earth science. One may infer that the PSCAI approach encourages students to actively search for information and solve problem at their own pace, therefore helping them to vigorously construct their own meaningful learning.” (Chang, 2002, p.148)
Putting It Into Practice

Our problem-solving simulations, which incorporate a variety of subject areas, and our professional development both foster an interdisciplinary approach to instruction.

By completing Exit Projects, students demonstrate their competence in oral, written, and graphic presentations across the four content areas.

Our PD includes an emphasis on team teaching, and shows how a team of three teachers — math, science and language arts — use The Green Mountain Paper Company in an interdisciplinary way to:

• Prepare students for the mathematics concepts — linear scales and area — addressed in the simulation.

• Teach environmental issues.

• Build vocabulary.
Defining The Learning Dimension
Technology increases students’ capacity to solve problems and helps them develop strategies for solving problems. Students can use technology resources to gather information needed to problem solve. Students can also use technology to develop and structure ideas, and to communicate ideas and solutions with peers, teachers, and other audiences.

Excerpts From The Research
“Those results suggest that technology can be used to enhance social problem-solving skills and, potentially, increase social competence.” (Goldsworthy, Barab, & Goldsworthy, 2000, p. 22)

“The problem-based learning process was designed to cultivate higher order thinking skills and a flexible knowledge base. Working on complex, real-world problems helps learners construct more flexible ways of knowing and more productive ways of thinking that allow the learners to understand how and when knowledge can be applied.” (Hmelo & Ferrari, 1997, p. 417)

By providing the contextualization for meaningful inquiry meaning-making thrives and re-application of that meaning to new problematic situations increases.” (Parker, 1999, p. 5)
Putting It Into Practice

Students navigate the simulations — using office technology and technology skills — to solve problems.

While in the role of managing editor in River City News, students use simulated e-mails to develop and structure ideas for an editorial about River City News’ publication of a hostage report.

The River City News, Episode 11

Students write a statement promoting RioTech’s business and use their technology skills to add HTML tags to the statement so it appears a particular way on the company’s Web site.

RioTech HTML Editor

- Technology solutions with a human touch.
- RioTech is a proud member of the River City Chamber of Commerce.
- About RioTech
- RioTech Solutions is a technology solution company dedicated to helping clients use technology to solve problems.
- The RioTech Difference
- RioTech makes a difference by designing solutions that can work for businesses of all sizes, designing technology that looks good on a computer and can be easy for a person to interact with, sticking a staff of experts, and using the latest technology.

Show Preview  Edit HTML  Start Over
Collaborative Learning

“I choreographed a three-part dance.”

What did you do at school today?
Collaborative learning is an instructional method in which learners are paired or grouped for the purpose of accomplishing a task that is based on shared learning goals and outcomes. In collaborative learning, team support is essential. Each learner is responsible for team members’ learning as well as their own. However, merely putting learners in groups does not ensure collaborative learning. Group tasks must be designed to describe precisely what students are expected to do, in what order, and with what materials; and students should be held accountable at both a group and individual level. Collaborative learning strategies help to enhance reading comprehension, promote intellectual discussion, and foster the development of positive interdependence and trust among learners.

This document identifies four strands that comprise the learning dimension of collaborative learning:

• Becoming an active or self-directed learner.
• Taking responsibility while working with others.
• Learning to work within diverse groups.
• Working together to strengthen academic skills.

Sources consulted for the definitions of these strands include:

Defining the Learning Dimension

Collaborative activities should allow students to raise questions, investigate issues, and solve problems. Groups should be organized so that both independence and collaboration is maximized, requiring individuals within the groups to make important contributions. Students should be encouraged to take on increasing responsibility for their learning. This will help students to gain confidence in their abilities to locate data, express ideas and opinions, and make decisions.

Excerpts from the Research

“As a result of the implementation of cooperative learning, multiple intelligences, and positive discipline, students listen, react, and respond with greater insight than the teacher/researchers would expect from other students of this same age. The students demonstrated more academic growth because their motivation increased.” (Baldes, Cahill, & Moretto, 2000, p. 51)

“Cooperative learning encourages them to seek help from other sources such as fellow students, texts, or outside resources before looking for the answer from the teacher.” (Holliday, 2001, p. 24)

“Peer collaboration encourages maximum student participation at the idea level, resulting in more flexible thinking, multiple solutions, and a clearer understanding of the steps leading up to these solutions. This enhanced knowledge of the processes involved in problem solving allows the student to more easily adapt and generalize the learning to novel situations.” (Kewley, 1998, p. 31)

“Students in the cooperative condition evaluated their goal structure significantly higher than did the students in the competitive or individualistic conditions.” (Humphreys, Johnson, & Johnson, 1982, p. 356)

“The results of this study corroborate previous research that indicated cooperative peer interaction promoted higher cognitive reasoning in solving conservation and concept-attainment tasks.” (Skon, Johnson & Johnson, 1981, p. 91)
Putting It Into Practice

The Classroom, Inc. program provides numerous opportunities for students to work collaboratively, both on and off the computer.

The Teacher’s Guide that accompanies each simulation provides strategies for helping student groups reach consensus and fulfill their roles while working through an episode. The guide helps teachers elicit from students norms for individual behavior in small groups such as:

- Listening attentively to one another.
- Being polite to each other.
- Doing their share of the work.
- Helping each other.
- Taking turns.
- Encouraging others to do their part.
- Not “taking over” the group.
- Sharing.

BENCHMARK 2:

Teachers develop strategies to get their students to work collaboratively on the simulation.

Collaboration is a hallmark of our simulations because it is a skill needed in most work environments. For the simulation to be implemented effectively, we recommend that teachers have three or four students work collaboratively on the computer and assume, as a group, the role of one person. Getting students to collaborate requires sustained effort and attention from the teacher.
Defining The Learning Dimension

Responsibility and accountability are essential to successful collaborative learning experiences. Students should:

• Reach consensus with team members on tasks that need to be completed and how tasks will be completed.

• Assume responsibility for fulfilling specific tasks, roles, or products of the project and follow through on all steps necessary to meet the responsibility.

• Be held accountable as part of the group and as an individual.

Excerpts From The Research

“The students felt that they were learning more in the cooperative learning classes, thus the students were more attentive, worked better, and stayed on task longer in direct support of the intellectual and exploratory nature of adolescent students.” (Holliday, 2001, p. 24)

“The researcher also observed that students who normally remain reserved during whole-class instruction tended to become the leaders within the cooperative learning groups.” (Hoxworth, 1999, p. 28)

“Research on cooperative learning in the middle grades consistently shows positive effects of these methods if they incorporate two major elements: group goals and individual accountability.” (Slavin, 1993, p. 546)
We encourage teachers to help students develop a variety of group process and collaboration skills while using our program. In the “Preparing to Go to Work” section of our Level I Institute, we provide teachers with some “pre-teaching” activities designed to foster collaboration.

Have a “Whole Class Discussion” to get students thinking about groups with questions such as:

- Do you think one person could have built the great Pyramids of Egypt or the Empire State Building?
- Why don’t astronauts travel through space alone?
- How did the great Pyramids of Egypt or the Empire State Building get built? How do the astronauts travel through space alone?

Divide students into groups of three or four and have them create their own list of:

- Traits that make up a good team.
- Characteristics that might hinder a group’s performance.

Finally, have students work in teams to solve a few challenging puzzles together. Debrief with students using the following questions:

- Did you follow the guidelines?
- Did anyone feel left out?
- Did one person assume leadership?
- Did anyone block the consensus?
- How did you resolve these disputes?
- Was organization necessary?
- Was there a feeling of group think?
- Was there confusion?
- What will help in future group problem solving?
- Does consensus feel like a necessary tool?

Level I Institute Handbook, “Preparing to Go to Work”
Learning to Work Within Diverse Groups

Defining The Learning Dimension
Students benefit from regular interaction with students of different abilities, experiences, beliefs, ethnicities, and interests. Collaborative work within diverse groups promotes learning and encourages positive attitudes toward others.

Excerpts From The Research
“Cooperative learning allows students to work with members of other races as well as members of the opposite gender.” (Holliday, 2001, p. 24)

“The cooperative learning strategies that were used improved the classroom climate. Working together was perceived as less threatening and asking other students for help became a normal part of class. Tardiness decreased and classroom discipline measures dissipated.” (Goldberg, Foster, Maki, Emde, & O’Kelly, 2001, p. 49)
Putting It Into Practice

Classroom, Inc. advises teachers to set up “mixed ability” groups of students to work on the simulations.

During our initial training, teachers engage in a role play to demonstrate some of the issues that arise when students of mixed abilities use the simulation.

Role Play Card

Group C: Mixed Ability Muddle

- One member of the group is a high level reader and is clicking through the episode without waiting for the others to discuss (or even read) all of the choices.

- The other two group members elicit the teacher’s help to deal with this intergroup situation.

Role Play Card

Group A: The Model Mixture

- The group is quite comfortable with technology.

- The group collaborates very well. The students read all of the choices before making a decision and are engaged in the decision-making process.

- Each person in the group has assumed a role, i.e., one person takes notes, another controls the mouse, while a third acts as keyboarder.

- Since no problems arise in this group, students do not interact with the teacher frequently.

Students of different skill levels working together on a Classroom, Inc. simulation.
Defining The Learning Dimension
Compared to working alone, working cooperatively to achieve a shared goal yields higher achievement and enhanced cognitive functioning. In particular, cooperative learning is an effective way to increase reading comprehension and promote intellectual discussion. Peer instruction and modeling in the use of reading strategies and group interaction that encourages practice in using reading strategies are effective. Overall, collaborative learning saves teachers’ time and gives students more control over their learning and social interactions.

Excerpts From The Research
“...two high school general mathematics classrooms were differentially taught a unit on percentages with two pedagogical strategies: (a) a cooperative and (b) an individualistic goal structure. While neither group significantly differed from the other on a pretest, the cooperative group demonstrated significantly higher achievement on the posttest than the individualistic group.” (Sherman & Thomas, 1986, p. 172)

“The results of the study indicate that in both mastering and retaining the information being taught, having students work cooperatively has more positive impact than does having students work competitively or individualistically.” (Humphreys, Johnson, & Johnson, 1982, p. 355)

“Cooperative peer interaction was found to generate higher quality cognitive reasoning strategies than did working alone in competition with peers or individually. Of the eight measures taken for the three learning tasks, cooperation promoted higher achievement than competition on six of them; cooperation promoted higher achievement than did individualistic efforts on seven of them.” (Skon, Johnson & Johnson, 1981, p. 90)

“Regardless of how the problem-solving efforts were distributed, on average, students benefited from working in a group. Students who had first worked on the problem in triads earned higher scores than students who had solved the problem individually when asked to solve the master and transfer problems on their own.” (Barron, 2000, p. 397)

“The research clearly showed that cooperative learning groups could be used to teach language arts effectively. It also showed that working in such groups promotes active participation in class. By looking at the test and quiz scores and the field journal one can see a direct correlation between the increase in test scores and the increase in the active class participation. Student interviews and class survey sheets show that overwhelming majority of the students feel they learn more when working in cooperative learning groups.” (Dale, 2000, p. 10)

“We drew upon research examining cooperative learning and collaborative learning and have cited the terminology used in the original studies.”
Putting It Into Practice

To facilitate academic improvements, Classroom, Inc. helps teachers ensure that students work productively in their collaborative groups.

In our Summer School program, before using a simulation episode, students make a group drawing, reflect on the process, write about their experiences in groups, and plan a group activity.

It was very easy working on the computer in our group. We all did our jobs. When there was a question to be answered, we discussed our answers and chose the best one. Everyone got along the whole time. We only had one problem when working on the computer. It took us forever to answer a couple of the questions. We looked through the reference books on the computer and we finally managed to answer the questions. We all cooperated and we got a lot of the questions right. — I.S. 51 students

I think having a group is easy because when you make a mistake your friend can help you. Before Christopher joined our group, Sydella and I were always asking the teacher to help us. After Christopher came, he started helping us and we did not really need help from the teacher. But that is also when the trouble started. Christopher started to take over. I got mad and then we divided the jobs. I had to do the tally and add the money. We are still working on this. — I.S. 218 student, New York

Working in a group is easy for me because two heads are better than one. If I have a good idea and my partner has a good idea, it makes a great idea. If I am wrong, he can correct me. My team works well. We take our time. My partner does the mouse while I type. When he types, I work the mouse. My partner is always there to help me. — I.S. 218 student, New York

In their own words, students respond to their experiences working in collaborative groups before and while using the simulation.
Bibliography


Bibliography


Simulations
The Alicia Leary Progress Foundation introduces students to specific issues around citizenship, community responsibility, neighborhood safety, town politics, and the justice system. Taking on the role of executive director of a small foundation, students work towards national standards in civics, language arts, math, and life skills as they strive to better the River City community in which they live.

The Chelsea Bank introduces students to commercial banking and the business economy. Taking on the role of a bank teller, and later a customer service representative, students work towards national standards in mathematics, financial literacy, life skills, and language arts as they work with customers and learn about the banking industry.

The Community Clinic introduces students to the systems of the human body. Taking on the role of a physician assistant-in-training in a small community clinic, students work towards national standards in science, health, mathematics, and language arts as they collect data about patients’ ailments, analyze this information to determine which body systems are affected and prepare patient care plans based on their findings.

The Court Square Community Bank introduces students to the broad range of services in the commercial banking world and the role that commercial banks play in the community. Taking on the role of vice president, students work towards national standards in mathematics, financial literacy, language arts, and life skills.

The Finance Center introduces students to the world of personal finance. Taking on the role of a financial counselor, students work towards national standards in mathematics, social studies, and language arts as they work with clients and learn about personal finance.

The Green Mountain Paper Company introduces students to four broad environmental topics: land use and conservation, water use and pollution, air quality, and recycling. Taking on the role of plant manager in a paper mill, students work towards national standards in science, mathematics, social studies, and language arts as they balance business, community, and employee concerns.
The Kalliope Performing Arts Center introduces students to the day-to-day management issues associated with running a performing arts festival. Taking on the role of general manager of a performing arts company, students work toward national standards in language arts and performing arts as they produce a festival encompassing theater, music, dance, and the visual arts.

RioTech Solutions introduces students to the general management and operations involved in managing a technology solutions operation. Taking on the role of project director, students work toward national standards in mathematics and language arts as they explore issues and themes related to the field of information and technology.

The Riverview Hotel introduces students to the day-to-day management issues inherent in running a hotel. Taking on the role of hotel manager, students work towards national standards in mathematics, language arts, and life skills.

The River City News introduces students to the day-to-day management issues inherent in running a daily newspaper. Taking on the role of managing editor, students work toward national standards in language arts, social studies, media literacy, and life skills as they address issues facing newspapers everywhere.

The Starr Medical Center, Part I introduces students to a variety of issues related to health including asthma, depression, eating disorders, and trauma. Taking on the role of a nurse in a medical unit and an intensive care unit, students work towards national standards in science, health, mathematics, and language arts.

The Starr Medical Center, Part II introduces students to a variety of issues related to hospital administration, finance, human resources, and community relations. Taking on the role of hospital administrator and nurse practitioner in a community clinic attached to the medical center, students work towards national standards in science, health, mathematics, and language arts.

The Sports Network introduces students to the day-to-day management issues inherent in running a sports entertainment network. Taking on the role of managing director, students work toward national standards in mathematics and language arts as they explore issues in sports entertainment along with various facets of the cable television business.

West End Law introduces students to the issues faced by a lawyer in a small general practice firm. Taking on the role of associate partner, students work toward national standards in language arts and civics as they explore a variety of civil and criminal situations, in addition to considering ideas about civic life, politics, and government.

What’s Up Magazine introduces students to the day-to-day management issues inherent in running a magazine. Taking on the role of editor-in-chief, students work toward national standards in language arts, social studies, and civics as they address issues facing magazines everywhere.
Instructional Materials

For Students:
Computer Simulations - Each simulation is a virtual workplace in which the student plays a central role. As managers in this active learning environment, students learn by doing. This reinforces the idea that what a student learns in school has a practical application in the real world. Simulations and supporting curriculum strengthen basic skills in literacy and math. In addition, they help students become proficient in acquiring and using information, thinking critically, problem-solving, and decision-making. Each simulation is divided into episodes designed to be worked through sequentially.

Workbook - Each student is given a 150-page workbook, created specifically for that simulation. The workbooks are designed to enhance students’ learning experience while they use the simulation. Students learn and practice literacy skills such as identifying main idea, building vocabulary, and informative writing as well as math skills such as computation, data analysis, and problem-solving.

Independent Reading - The reading component of Classroom, Inc’s program includes a nonfiction classroom library, specially selected for each simulation.

Projects - Students work on two collaborative research projects, one in science and one in social studies. By completing these projects, students demonstrate their competence in oral, written, and graphic presentations.

Math - The math curriculum provides students with opportunities to learn, practice, and apply mathematics in the computer simulations, in their workbooks, and in the Math Link component. The five major topics addressed are: Review of Basic Skills; Numbers and Operations; Geometry and Measurement; Data Analysis, Probability and Statistics; and Algebra.

Assessments - Students are tested at the beginning of the simulation and at the end of each episode to assess their acquisition of knowledge and skills.

Journal - Students are given a journal in which they apply what they have learned through their independent reading, and where they can also demonstrate their acquisition of math skills.

For Teachers:
Professional Development Teachers attend a full day training session to learn how to use the program and review ways in which Classroom, Inc’s curriculum is aligned to state and local standards.

Teacher Handbook - Teachers are provided with a comprehensive guide that includes:
Teacher Planner - A suggested schedule for using all the program components.

Literacy Lesson Plans - Two sets of lessons that target key reading skills, one set focusing on the skills addressed in the simulations and one set targeting reading skills and strategies to guide students in independent skills and reading.

Math Lessons - A series of lessons designed to teach five major math topics.

Teacher Version of Student Workbook - Provides all correct or suggested answers, as well as an overall skills chart.

Assessment Guide - Administrative information and scoring guides for student assessments.

Web Resources - A list of suggested Web sites to be used as additional resources.

Ongoing Support - Teachers are given ongoing and follow-up support through phone, email, and follow-up site visits by our instructional support staff.
For Administrators:

Each time Classroom, Inc. implements its program at a new school, we work extensively with school administrators to plan for a successful program that will meet the needs of their school. In addition, we prepare a customized correlation of our program to each district’s state and local standards.

Technical Support:

To resolve any issues in installing and running the program on any computer platform, Classroom, Inc. provides technical support through a toll-free hotline.

How We Work

A. Extensive Teacher Training and Support - The finest educational program will not succeed without a trained educator to implement it. Classroom, Inc. provides extensive professional development and site support.

B. Student Engagement - Computer simulations are at the core of our learning environments. In using them, students interact with one another, their teachers, and the program. The simulations bring the challenges and excitement of the real world into the classroom. Students are intellectually challenged and encouraged to take control of their learning in multiple content areas, especially reading, writing and math.

C. Fully Integrated Curriculum - We provide an extensive array of student and teacher materials that support Classroom, Inc’s Learning Environments and have been carefully keyed to standards-based assessments.

D. A Complete Learning Environment - Classroom, Inc’s workplace simulations are highly engaging, but they are not games. Students use critical thinking and problem solving skills to navigate the simulations, make decisions, and develop written answers. With the right support, and with an engaging curriculum, it has been demonstrated that students can succeed.