Teaching the Right Skills for Lifelong Learning in a
New Age: Inquiry Based Instruction*
By
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INTRODUCTION

Let's stop believing that standardized tests, factual coverage, a focus on discrete skills, traditional multiple choice end of course tests, a teach-test-move on mentality, even AP courses, can prepare most students for this new age we are now living in. This new era, with its qualitatively different dimensions -- information overload, instant search engines, cheap worldwide communication, Netflix, Twitter, and Facebook, rapid technological innovation, job restructuring, uncertainty and change, and new, complex political, economic and social challenges -- requires a very different educational approach.

In the face of these societal changes, all students need to be prepared with critical knowledge, skills, and attitudes and behaviors that allow for continued learning and growth beyond high school, critical and creative thinking, and the skills necessary for finding and processing huge amounts of information. Even with the Common Core standards, our current educational emphases aren't adequately preparing most students for learning beyond high school – for college, career, military or other future endeavors.

While a critical knowledge/understand base and positive attitudes and behaviors are important for future living, students must also develop some key skills if they are to adapt to this new world and be prepared for lifelong learning. The five key skill areas, described in figure one, below, should be given a laser-like focus in order to prepare students for living and learning in this new age.

[Insert Figure One Here]

These five skill areas create a relatively simple approach to thinking about skills teaching. Taken together, they provide students with powerful tools for learning and living. They can be taught separately, but my thinking is that they are of a whole cloth. Together, they form an "Inquiry Based" Instruction model for teaching and learning, and provide the common threads for unit design and powerful project development. They suggest a curriculum that concentrates on working from important, essential questions, provides students with many

FIGURE ONE
FIVE KEY SKILL SETS FOR AN ERA 3 WORLD

1. Ask questions, formulate problems and challenges

It is a rare school or program that enables students to examine and develop profound questions, solve complex problems on a regular basis, or work from/develop challenges that are worthy of critical study.

Imagine studying the American Revolution by enabling students to brainstorm questions and choose (with the teacher's input) to examine some profound and critical questions, such as "Why revolution, not evolution"? "Did they really have to revolt?" or "Is war ever justified?"

2. Search for and Process information and data

Information processing enables students to learn a broad variety of skills appropriate for a world of information overload and instant access. These series of skills assure that students can search for information from many sources, sort and select for importance, evaluate information for reliability, read for understanding, analyze data, and summarize, categorize, and conceptualize information, ideas and data from texts.

3. Think deeply and flexibly

Students are provided with the opportunity to extend their thinking – for example, to compare and contrast, interpret, apply, infer, analyze, synthesize, and think creatively.

4. Draw conclusions, apply learning

Students draw conclusions, solve problems, make decisions, answer key questions. They are often asked to apply learning to new and novel situations, problems, and issues.

5. Communicate effectively.

Students communicate effectively in a number of ways, such as through writing a persuasive essay, demonstrating how to solve a math problem, or creating a powerpoint presentation in order to explain the results of a science experiment.

opportunities to frequently collect and process information and data, encourages students to extend their thinking, builds in opportunities for students to draw conclusions and apply learning, and enables students to frequently and effectively communicate. All subjects and content areas, such as literature, history, science, engineering, mathematics, health and physical education, the arts, and foreign languages, become the vehicle through which these skills are continuously taught, learned, and developed in their complexity over time.

The teaching of these skills starts in pre-school, as students are encouraged to ask questions about the world around them, observe pictures, discuss books that are read to them, play in ways that encourage analysis, use numbers and measurement to analyze problems and data, and so on. As students progress through the grades, they focus learning around critical and essential questions. Textbooks are treated as searchable texts. Research opportunities help students find and evaluate new resources, process information, read for understanding, and learn and use numbers and measurement. As appropriate, students develop their own questions for exploration, find and analyze data, brainstorm alternative solutions to problems, draw conclusions, apply learning to new and novel situations, make presentations, and write, write, write and do more writing. Discipline based and interdisciplinary thematic projects are a core part of the learning process. As they use these skills, they also learn the attitudes and behaviors they will need for future learning, such as curiosity, collaboration, perseverance, learning from failure, risk-taking, striving for accuracy, and learning how to improve their work.

This relatively simple approach to teaching and learning is what students need to be prepared for the continual learning they will have to face in an ever changing, uncertain, high skills world.

SEVEN PRINCIPLES TO GUIDE SKILL DEVELOPMENT

How can teachers support and enhance the teaching and learning of these "inquiry based" five skill areas? The following seven principles should guide instruction in every classroom and at every level of schooling and provide a natural way for these skills to be developed:

1. *Use teacher and/or student-developed "essential" questions, problems, or challenges to guide teaching and learning.*

As I visit many classrooms, I rarely see provocative, relevant, "essential" questions, problems or challenges as the starting point for information searches and processing, critical and creative thinking, application of learning, and communication skill development. Sometimes teachers have essential questions on the Board, but even then they are often not the centerpiece of teaching and learning. Student-developed essential questions, developed through such strategies as a question brainstorm around a topic, or a K-W-L (what do I know, what do I want to

know, what have I learned), are used even less frequently to provoke inquiry, research, and high level thinking.

The point is that students should regularly use teacher-developed essential questions, key problems and/or challenges as a catalyst for critical inquiry, research and skill development. Students should also be given many opportunities to develop and explore their own questions, problems, and challenges in order to learn and use these skills.

2. *Treat textbooks and other materials as inquiry-research resources.*

In my experience, texts are most often used for home reading assignments, or to read in class and then to answer questions at the end of each chapter. In other words, they are read first and then the information is summarized and highlighted through a series of questions. This approach minimizes lifelong learning skill development. But what if texts were thought of as information resources used to help students inquire into and research questions or problems that have been explicitly raised in advance? To help students search for and process useful information? To provide students with opportunities to use analysis and synthesis skills and develop creative ways to resolve challenges?

When teachers use textbooks, multiple texts and media as inquiry-research resources, they help students effectively use search tools and information processing skills to find resources, read for understanding, summarize, analyze, and synthesize information, solve complex problems, and examine significant challenges. With this approach, students, starting from essential questions or problems, actively engage with the text, take notes, and search for relevant information to find answers to the questions or solutions to the problems. Textbooks, other texts and resources become tools for inquiry and research, and for regularly practicing and learning the five critical skill areas.

One specific textbook strategy that supports a research-inquiry approach is SQ3R. In this approach, students survey a text, turn headings of texts into questions, and then read the text in order to answer the questions, recite and summarize their results, and finally review their results developed over time. A "retrieval" chart, developed by a teacher or students, helps students with the last review step – to summarize and categorize information gleaned from a text.

3. *Embed skills in content instead of teaching discrete skills apart from content.*

In many of today's schools and classrooms, skills are learned as discrete, separate entities, divorced from subject matter. Writing, spelling and grammar skills are taught through the use of separate worksheets in many classrooms. Students still

parse sentences. Reading comprehension is rarely explicitly taught through most content areas at all levels. Numbers and measurement are taught in isolation from real world problems and issues.

In my view, much of this way of teaching skills misses the mark. The goal of schooling should be to introduce and explore a broad array of key concepts, ideas, questions that arise through the study of literature, history and the social sciences, mathematics, science, the arts, language, health education, and other core subjects. I believe that the teaching of critical skills should be almost always integrated and embedded into rich and rigorous learning contexts as students explore key concepts and answer questions in all subject areas.

The teaching of the five key skill areas should naturally be incorporated into this integrated approach to teaching and learning. While teaching specific skills out of context can be helpful to students, they best understand, apply and maintain these skills when they learn them in an integrated context. For example, reading skills, comprehension, background knowledge, interpretive skills, and even spelling skills are best learned by continually reading, analyzing, interpreting, and reflecting on literature and non-fiction texts. Writing skills are best learned as students write an essay analyzing a piece of literature, or write a persuasive essay regarding a current events issue. The more that students search for answers to key questions about historical events, take apart mathematics problems, analyze and interpret mathematical data, conduct science experiments, apply learning by creating their own wellness plan, and communicate effectively as they make presentations and write papers, the more meaningful and lasting learning will occur on an everyday basis.

4. *Go for depth over breadth*

A continual problem in most schools and classrooms is the amount of content teachers are expected to teach and students are expected to learn. While there is a current movement to reduce content and create more focused learning, the standards in most states still delineate long lists and pages of content students are expected to know and learn. "Coverage" of all this content thus makes it difficult to spend the time necessary to ask questions and formulate problems, search and process information, and effectively integrate other lifelong learning, career and college ready, citizenship skill areas.

How, then are we to deal with this problem? Many states recognize this problem and have begun to delineate "power standards" that represent a core focus for each subject. This is helpful. But if there are no state standards limitations, the best way to provide opportunities for teaching key skills is for schools and teachers to agree that a more focused, in-depth curriculum, built around a few key ideas, understandings, concepts, and essential questions, is better suited to this new age where understanding is important, it is impossible to teach all the content anyway,

and knowledge is growing by leaps and bounds and so much of it is newly and easily accessible.

Thus, with a more focused curriculum, there is more time for students to brainstorm questions and/or discuss key essential questions, research key understandings, organize, analyze, synthesize and interpret data, hold interpretive discussions, write reflective and analytical papers, and, in general, learn lifelong learning skills and "go deeper" into subject matter.

5. *Where possible, apply learning to real world situations*

Tying learning to real world issues, events, and situations, through interesting projects and performance tasks, provides many opportunities for students to learn and apply key lifelong learning skills and is also highly motivating. Applications that involve problem solving can often lead to creative thinking, alternative solutions, and new ways of solving problems. For example, a sixth grade teacher develops a major project around the design of a house, enabling students to discover and apply mathematical and science principles, ecological design, and visual, artistic ideas. A world history teacher asks students to apply their learning about war and peace to present a plan for an International organization that would preserve the peace in today's world. A science teacher asks students to develop their own science experiment, demonstrating their knowledge of scientific investigation principles and creating new experiments as part of the process.

These real world activities that apply learning to interesting and novel situations make learning meaningful, stimulate creative thinking, and give students a chance to use and apply a variety of inquiry-research skills.

6. *Use varied products and assessments to judge progress and successful achievement*

A variety of types of products and assessments give students multiple ways to demonstrate progress and successful achievement in the five skill areas. As students conduct research to answer essential questions, they find multiple sources, process information by writing summaries, and synthesize their results by developing and using graphic organizers. They analyze data and interpret novels. They demonstrate the conclusions they have reached by creating posterboards, teaching others, or conveying results through either written or visual methods, participating in discussions or writing an analysis. All of these products and assessments give teachers the opportunity to check skill development progress and understanding and to provide on-going feedback to help students improve their work. Ultimately, student products and assessments demonstrate whether they are making progress and reaching a level of skill associated with their age and grade level.

Variety also provides multiple opportunities for students to choose what products and assessments to develop, a significant way to motivate them and build on their strengths and talents. Students might be given a choice as to what questions they wish to explore to further their interest in and understanding of a topic of study. They might be given leeway in the types of sources of information to find and process. Students might be give the opportunity to choose how they demonstrate their analytical abilities, either by writing a paper or creating a visual. A choice among end products, such as posterboards, a teaching lesson, powerpoint, and/or a written paper gives students many ways to demonstrate results.

7. *Structure inquiry-research teaching and learning as much as necessary, depending on the needs of students.*

The sense that students are "not ready" for inquiry-research based learning is never an excuse not to begin the process to develop these key skills. There is a myth that inquiry learning must be done independently and in an open-ended fashion, and that students who need a structured learning environment to practice learning skills cannot function in an inquiry-research environment. The truth is that inquiry learning, like any other form of learning, can be highly structured. Students can conduct inquiry and do research under the strong tutelage of a teacher or teachers. Thus, when students begin to do inquiry-research based learning and use and practice the five skill areas, classroom activity can be highly structured and teacher-centered. Students can discuss at length essential questions developed by the teacher and examine how the teacher arrived at those questions. They can together read and discuss texts in a highly structured way, including through the use of graphic organizers that help organize data and learn how to use and analyze numbers. Papers can be written in class, with teachers giving strong guidance, provide models of excellent work, and give detailed feedback to help students improve their work. Initial presentations can follow a specific set of rules, be brief, and have very clear expectations. As students practice inquiry and research learning skills over time, they can be given more freedom and opportunity to conduct research in the school library, work together to critique each other's papers, and work independently and collaboratively.

Therefore, teachers should give themselves permission to highly structure inquiry learning if they feel that students are not ready to use these skills on their own. Teachers can be the center of inquiry learning if students need the structure. Worksheets and other tools can be developed and used where necessary. The development of key inquiry-research skills is too important not to focus on them and apply them to every school and classroom.

These seven principles suggest the following teaching and learning beliefs to support learning in the five key skill areas:

- *Teacher and/or student-developed essential questions, problems and challenges should guide teaching and learning;*
- *Textbooks and other materials are best thought of as resources for inquiry and research;*
- *Inquiry-research skills are best taught when they are embedded in content, rather than taught as discrete skills apart from content;*
- *Depth is more important than breadth for teaching inquiry-research skills;*
- *Applying learning to real world situations enhances the learning of inquiry-research skills;*
- *A variety of products and assessments provide multiple ways to assess inquiry-research skill progress and achievement and motivate student learning;*
- *Inquiry-research skills teaching can be highly structured as well as student-centered.*

These beliefs should help to build school programs and individual teaching that foster the learning of the five sets of inquiry-research skills, developing key lifelong learning/career and college/citizenship skills over time. Together they create a new vision for teaching and learning, suggest new types of teaching behaviors, and suggest ways to engage students in critical inquiry-research skill development. Commitment to and application of these seven broad teaching principles and beliefs in districts, schools, and individual teaching situations provide a framework for changing instruction and a direction for teacher growth and change. Instructional changes based on these principles and beliefs will help students prepare for the continuous learning they will need for living in the constantly changing, information rich, technologically advanced, uncertain world of the future.

INQUIRY-RESEARCH PROJECTS

The general principles and beliefs cited above are important indicators that these five skill areas are being taught and learned. But, in addition, the use of one specific strategy – project based instruction – indicates that schools and classrooms are highly focused on the development of these skills. In a 21st century curriculum, powerful inquiry-research projects should be implemented at every grade level because of the project's importance in developing these five skill areas. Beginning with kindergarten (perhaps even pre-school) and ending in the senior high school year, students should complete at least one "inquiry/research" project at each grade level that incorporates these five skill areas. In other words, districts, schools,

and teachers should make a commitment to include at least one inquiry/research project at every grade level.

For example, in kindergarten, a teacher might suggest a number of different areas for students to explore and inquire about, such as "animals and pets". Students could then choose a specific animal to research, or pick a number of animals to study together (e.g. lions and tigers).

Let's say that one student picked "dogs" as a topic to study. What questions about dogs might students research? Examples include "What are the different types of dogs?" "What foods do dogs eat?" "How do you keep dogs healthy?" and "Where do different dogs live?" Then a teacher might take a trip with students to the local library (a good way of introducing the library to kindergarten students) to find books that have information about their topic and that answer their questions, such as books about dogs. The books are charged out to the students, and then read to and discussed with students by volunteers, parents, and/or teachers. Some materials for young children could even be found on the Internet if computers are available (a good introduction to search tools). Once books or other materials are found, and information is processed by students, they can then write or dictate their questions on posterboard and also show what they have learned that answer their questions through drawings, dictations, or by other means. These can be shared orally with other students and posted around the classroom or in the hallways to show and demonstrate what they have learned to others in the school.

As projects are conducted and developed at every grade level, the five skill areas are taught and learned with ever more complexity and sophistication. Search criteria and the collection and processing of information can become more and more complex, with greater emphasis on information reliability, priority, note-taking, reading for understanding, and connections to questions. Science and math, history, literature, health, and arts projects, can be developed at each grade level, or alternated among the grades. Specific projects can emphasize different skills – to identify ways to help students read for understanding, create surveys and collect and analyze data, conduct experiments, interpret results, write persuasive arguments, and create and make powerpoint and other types of presentations.

At critical points in a student's schooling, "cornerstone" projects[2] might be developed, designed to fundamentally assess student growth and development in the five skill areas. Cornerstone projects typically occur at transition points, such as at the end of second or third grade (primary grades) fifth or sixth grade (before entering middle school), eighth or ninth grade (before entering high school), and a senior project, often completed at the end of the eleventh or twelfth grade. The results of the cornerstone projects may also be presented before panels of teachers and/or outside community representatives, depending on the school or the nature of the project. These projects become "keepers" – that is, they become a major part of a student's portfolio of work, demonstrating on-going growth of student learning in the five skill areas, along with habits of mind and knowledge learning.

Cornerstone projects can take many forms. In one suburban school district, the sixth grade cornerstone project was developed as an open-ended research project. Students were given the opportunity to develop a question or formulate a problem in an area of greatest interest, and then to search for, find and process information, collect and analyze data, and so on.

In another example, a fifth grade project asked students to:

> *Research and design a dream house, including floor plans, a description of the interior of the houses, materials to be used to build the house. Students also create a model of their homes and a cost analysis for the interior of at least one room in the house. Students also are required to make a presentation summarizing the results of their work.* [3]

One district's ninth grade cornerstone project asks students to:

> *Select an important local, state, National, or world issue...and...in cooperation with a few of your classmates, research it, explain its impact, explain opposing viewpoints, and take a position on the issue based on your findings. [After you have completed your research and drawn conclusions], you will submit a project folder that includes written descriptions of the research process you used and the way you and others worked together to complete this task. You will present your position and defense of it to a panel of people in a manner chosen by you and/or your group mates. This argument will be presented in a form that you choose: you may stage an interview, perform a play, write a position paper, have a debate, give a speech, create a newspaper, teach a class, or come up with an idea of your own that allows you to present the issue and defend your position.*

There are many permutations and combinations of using inquiry-research projects to develop skills in these five areas. More than one project might be developed every year. Key interdisciplinary projects might be developed by school committees. Design, literary, science, social issues, arts, and mathematics projects can support subject areas. Projects built around student-developed questions can help students reflect on and extend their interests and talents. Senior projects might be tied to a student's talents and interests, community issues and problems, or a general research project or science experiment.

But, whatever the model used by a school district or school, the systematic use of inquiry based research projects, focusing around the five key skill areas, should be a major component of a 21st century school curriculum. Focusing on teacher-

developed questions or challenges, or developing questions around student interests, stimulates student curiosity. Searching for and processing information builds reading, analysis and information search skills. Data conceptualization, organization and analysis strengthens study, math, and critical thinking skills. Developing and sharing presentations and written analyses builds oral and written communication skills. Self-reflections build self-understanding. Taken together, the projects not only develop these five skill areas, but also strengthen habits of mind, attitudes and behaviors important both for the next levels of learning and for life – curiosity, persistence, dealing with frustrations and failures, initiative and responsibility, precision, accuracy, clarity, and excellence.

This relatively simple, consistent addition to schooling at all levels, on a regular basis, is one way to prepare students for the post high school, continual learning they will have to face in an ever changing, uncertain, high skills world. Let's hope that today's schools and classrooms begin to regularly integrate inquiry-research projects at every grade level, and intentionally and systematically move in this direction in the near future.

EIGHT TYPES OF INSTRUCTIONAL STRATEGIES

It is the premise of this author that competency in all five skill areas, along with a fundamental knowledge base and knowledge of one's own skills, talents and interests, will significantly increase the probably that a student will be successful in college, career, citizenship, and the ability to adapt to change. In addition to the seven beliefs and principles described above, along with a focus on project-based instruction, eight types of strategies are extremely useful for developing these skills. They also have the advantage of engaging students in the learning process.

Activators and Summarizers

Activators and summarizers are what we do immediately before and after a formal learning experience. Activators are designed "to engage students' thinking before instruction". They focus students on a goal, problem, challenge or essential question, surface student misconceptions, help students to feel some ownership in what they are learning, and enable teachers gather data from students and adapt lessons and units to their prior knowledge. Summarizers are designed "to support integration and retention of new learning." They help students to draw conclusions and summarize for themselves what was important, what they have learned, how it is important, and/or how it fits with what they already know.

Multiple types of activities can be used for both activators and summarizers, such as words that come to mind, human treasure hunt, interviews, learning logs, ticket out the door, and "the most important thing about…". A "question-categorization brainstorm" activator also helps students build their question development skills and enables teachers to use student-developed questions to stimulate inquiry.

The above quotes and information (except for the question brainstorm) come from two books that overview and suggest strategies for both activators and summarizers:

Jon Saphier and Mary Ann Haley, *Activators* , and Jon Saphier and Mary Ann Haley, *Summarizers.* Acton, MA: Research for Better Teaching, 1993. Both of these books can be purchased from the Research for Teaching website or through Amazon.

An Internet search using the terms "activators" and "summarizers" suggests additional resources.

Information Literacy

Information literacy is "the ability to identify what information is needed, understand how the information is organized, identify the best sources of information for a given need, locate those sources, evaluate the sources critically, and share that information. It is the knowledge of commonly used research techniques."[4] Although the term "information literacy" is most often used by librarians, the skills associated with it are critical for living in today's information rich world. Information literacy activities help students to identify a topic for research, formulate questions and problems, search for and find information, evaluate, organize, analyze and synthesize information sources, and share results.

A search of information literacy websites highlight a number of web resources that can be used to help implement information literacy strategies, such as http://www.noodletools.com/debbie/literacies/; and http://www.webs.uidaho.edu/info_literacy/

Reading for Understanding

Once a child learns basic reading skills, how can he or she be helped to build comprehension and understanding. In this respect, every teacher is a teacher of reading. Kelly Gallagher gives a good description of Reading for Understanding**:**

> *"...we can assign reading in our*
> *classrooms, give students shallow*
> *reading assignments, and have students*
> *pass them. On the surface, everything looks*
> *fine: the students read the text and are*
> *able to answer the questions. But in reality*
> *do they really understand what they have*

read? They can answer surface level questions,
but once you ask them to evaluate, to analyze,
to synthesize, they can't do it. Unfortunately, I
think a lot of…[this kind of surface level]…reading
is going on in our schools."[5]

Reading for Understanding strategies help students go below the surface and find the deeper meaning behind what is being read. They have been developed to improve reading comprehension and the understanding of what is being read for all students in all subject areas. They include Before-During-After reading strategies, SQ3R strategies (if you don't know this, look it up), first and second draft reading, interpretive discussions of text, reflective logs, and many other similar strategies.

A number of resources can be helpful for learning reading for understanding strategies, including:
Ruth Schoelbach, Cynthia Greenleaf, and others. ***Reading for Understanding.*** San Francisco, CA: Jossey-Bass, 1999
Kelly Gallagher. ***Deeper Reading.*** Portland, ME: Stenhouse Publishers, 2004.
The ASCD series of books on Reading in the Content Areas, especially Sue Beers and Lou Howell, ***Reading Strategies in the Content Areas.*** Alexandria, VA; An ASCD Action Tool, 2003.

Visual Learning Tools

Visual learning tools, also called graphic organizers, "assist learners…[in how to visually]…organize and find patterns among the overwhelming amount of information available today, as well as to make sense out of it and evaluate it". [6] Another definition states that visual learning tools "help students collect information, make interpretations, solve problems, devise plans, and become aware of how they think."[7] Multiple types of visual tools have been developed – mind maps, webs, decision trees, analysis charts, before and after reading charts, story maps, and many more.

These two books provide extensive information about visual tools and graphic organizers:
David Hylerle. ***Visual Tools for Constructing Knowledge.*** Alexandria, VA:Association for Supervision and Curriculum Development (ASCD), 1996;
Phyllis Green, editor. ***Graphic Organizer Collection.*** San Antonio, TX: Novel Units, 1999.

Other resources include software tools such as Inspiration, and "graphic organizers" searches provide a number of sources of information for finding and using visual tools.

"Deep and Flexible Thinking"

Thinking Deeply and Flexibly goes beyond memorization and low level inference making, and involves numerous habits and strategies, among them open-mindedness to new thoughts and ideas, explanation, classifying, comparing and contrasting, argumentation and debate, interpretation, problem solving, creativity, decision making, planning, and the use of logic and reasoning. Strategies range from the types of questions asked of students to strategies that promote specific types of thinking, such as interpretive discussions. In general, teachers should be familiar with a broad array of thinking strategies that promote different types of thinking, and how to employ them in the classroom with their students. Many resources are available for helping teachers learn to teach thinking. Among what I consider the best, collected over the years, are the following:

Louis Raths, Selma Wasserman, et. al. *Teaching for Thinking, New Edition.* New York: Teacher's College Press, 1986 (A classic book about how to teach for thinking).
Arthur Costa, editor. *Developing Minds: A Resource Book for Teaching Thinking, Third Edition.* Alexandria, VA; ASCD, 2001 (another classic).

An Internet search using the words "teaching for thinking" yields many other valuable resources. Socratic discussion principles for classroom use can be found through Shared Inquiry discussion procedures at the *Great Books Foundation*, and the *Touchstones Discussion Project*.

Interactive Notebooks

With interactive notebooks, students are taught how to record, collect, and organize information in traditional formats from a teacher, text, or additional resources, and also are given creative, deep thinking assignments that help them to see connections, dig more deeply into learning, do analyses, synthesize data in interesting ways, and become independent, creative thinkers and writers. This approach is a terrific way for students to organize a notebook so that they collect, organize, synthesize, explore, and apply information in meaningful ways.

Practically, many teachers have students organize their interactive notebooks by using either the left or right side of the page for recording and collecting information in traditional ways, and the opposite side of the page for creative activities. Some teachers have students keep one section of a notebook for notes and another for creative, higher order thinking activities.

For more information, search "interactive notebook" on the web, and go to:
http://www.slideshare.net/elonahartjes/introducing-interactive-notebooks

Writing Process/Writer's Workshop

Writing Process and Writer's Workshop are two ways to significantly increase skills in communicating through all types of writing, and at the same time use writing to enhance the development of the five skill areas. Writing process encourages students to improve writing gradually, over time, like professional writers do, rather than writing all at once and just once. The writing process consists of five stages -- pre-writing activities, initial writing, revising, editing, and "publishing" (sharing writing with others). The writing process encourages students to ask good questions and formulate problems in the pre-write stage, process information in the initial writing phase, and so on.

In writer's workshop, specific class time is dedicated solely to writing and students are treated as budding authors. "As in professional writing workshops, emphasis is placed on sharing work with the class, on peer conferencing and editing, and on the collection of a wide variety of work in a writing folder, and eventually in a portfolio. Teachers write with their students and share their own work as well. The workshop setting encourages students to think of themselves as writers, and to take their writing seriously." [8]

Among the many sources of information about writing process is the website:
http://www.angelfire.com/wi/writingprocess/
An overview of writer's workshop by Steven Peha, **Welcome to Writer's Workshop,** can be downloaded at:
http://www.ttms.org/PDFs/05%20Writers%20Workshop%20v001%20(Full).pdf

Think-Pair-Share and Wait Time

One of the dangers of traditional discussions and question-answer sessions in the classroom is that certain students who think quickly dominate. Think-Pair-Share and Wait Time strategies enable many more students to speak their thoughts out loud, develop answers to questions, participate in discussions, think at higher levels, and become much more involved and engaged in the learning process. Both Think-Pair-Share and Wait Time slow the discussion and question session down and give all students time to think through their answers, search for appropriate information, and in general become better learners.

Search for think-pair-share and wait time on the Internet for more information; or
Go to:
http://olc.spsd.sk.ca/de/pd/instr/categ.html (there are also many other interesting strategies at this site)

Other strategies could be selected, but I believe every teacher should be familiar with these eight and decide on when and whether they are worth using in their classrooms.

CONCLUSION

The five inquiry-research based skill areas, described above, form the heart of a 21st century approach to preparing students for lifelong learning. The five skill areas are "naturally" integrated into the curriculum as students examine essential questions, search for and process information, think deeply and flexibly about what they are learning, draw conclusions/apply learning to new and novel situations, and communicate effectively. By instituting the seven principles/beliefs about teaching, incorporating project based instruction into teaching and learning, and using instructional strategies that support five skills learning, teachers can find many ways to develop and apply these skills at all levels, from pre-school projects to high school interpretive literature discussions.

It is the premise of this author that competency in all five skill areas, along with a fundamental knowledge base and knowledge of one's own skills, talents and interests, will significantly increase the probably that a student will be successful in college, career, citizenship, and the ability to adapt to change. Let's hope that our National and state laws, curriculum frameworks, teacher preparation institutions, educational leaders, and classroom teachers can move in this direction in the near future.

ENDNOTES

[1] Elliott Seif, PhD is an educational consultant, member of the ASCD Understanding by Design cadre and a regular contributor to Educational Leadership and other publications. He has a PhD in education from Washington University, St. Louis and was a social studies teacher, a Professor of Education at Temple University and the Director, Curriculum/Instruction Services for the Bucks County Intermediate Unit, an educational service agency in Bucks County, PA. His website, with more insights into this approach to 21st century education, can be found at www.era3learning.org.
[2] For further information about cornerstone projects/assessments, see Wiggins, Grant and McTighe, Jay, Schooling By Design (2007). Alexandria, VA: Association for Supervision and Curriculum Development, pp. 79-87.
[3] This cornerstone project example is adapted from a sixth grade class project outlined more fully in ENC Focus, Volume 9, November 2, 2002. Washington, D.C.: Eisenhower National Clearinghouse, pp. 16-18.
[4] From the following website: http://www.webs.uidaho.edu/info_literacy/
[5] Kelly Gallagher, *Deeper Reading.* Portland, ME: Stenhouse Publishers, 2004.
[6] David Hylerle. *Visual Tools for Constructing Knowledge.* Alexandria, VA:Association for Supervision and Curriculum Development (ASCD), 1996.

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