USING INQUIRY BASED INSTRUCTION(IBI) IN SCHOOLS AND CLASSROOMS*

By

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**Inquiry Based Instruction, formerly called Research Based Instruction, was developed through a 1989-1990 project of the Bucks County Intermediate Unit's Social Studies Advisory Committee. The project director was Elliott Seif, at the time the Director of Curriculum/Instruction Services, and the project committee included the following people and their school districts: Gene Barclay, Pennsbury School District; Dick Burkett, Central Bucks; Lee Davis, Bensalem; Gary Fuller, Central Bucks; Ralph Rhodes, Council Rock; Thomas Rowlands, Neshaminy; Jeff Vandegraft, Palisades; Maria Williams, Pennridge. The report has been revised and adapted for a 2011 Educational World, and for all subjects, by Elliott Seif, Educational Consultant.*

What is Inquiry Based Instruction?

Inquiry Based Instruction (IBI) is a specific approach to classroom teaching, with less emphasis on direct teaching of content and facts and greater emphasis on having students become active researchers and “inquirers”. The term "inquiry" is a way of thinking about teaching and learning, a perspective, a paradigm. It can be used in all subject areas as a framework for instruction. Students “do” inquiry in order to become involved in important, relevant and interesting questions, find and process information and ideas, build reading skills and vocabulary, think critically and creatively, solve problems and examine dilemmas, write well, and communicate effectively. They find, sort, evaluate and organize information, read for understanding, form interpretations, develop and evaluate hypotheses, creatively solve problems and challenges, and summarize, synthesize and communicate results.

With inquiry-based instruction, emphasis is also placed on helping students find interest and value in their learning, and become engaged, involved, and interactive in the learning process. There is an organic quality to instruction and to learning that integrates a number of content outcomes and the learning and application of “21st century” skills, behaviors, attitudes and “habits of mind”. A teacher can use a text alone with this process, but teachers who also use outside resources — people, places, primary sources-- make learning more authentic, interesting, fun and ”real life” for students. The key to inquiry-based instruction is how instruction is thought about and organized in the classroom.

Five components of inquiry-based instruction are briefly described below -- Students:

a. *Curiosity:* Identify and clarify issues and develop questions. A key component of inquiry-based learning is the identification and clarification of issues, problems, challenges and questions for discussion and exploration. Opportunities for students to define key issues, problems, challenges and questions for inquiry and research are an important part of the process. This process enables the learner to seek relevancy in the work they are doing and for teachers to engage and involve the learner in the learning process.

b. *Information Literacy:* Search for and process information and data. Students find, closely read, process and use information related to the identified issue and question from one or more sources. As they find and read information, they organize, classify, categorize, define, and conceptualize data.

c. *Thoughtfulness:* Think deeply and flexibly. Students are provided with the opportunity to extend their thinking – to compare and contrast, interpret, apply, infer, analyze, synthesize, and think creatively.

c. *Application:* Draw conclusions/Apply to new situations. Students draw conclusions, solve problems, make decisions, answer key questions. They may be asked to apply learning to new and novel situations, problems, and issues.

d. ***Communication:* Communicate effectively.** Students communicate in a number of ways, such as through writing a persuasive essay, demonstrating how to solve a math problem, making a powerpoint presentation, designing a graphic organizer, performance in the arts.

There are some key characteristics and qualities related to inquiry based instruction that must be considered as this approach is implemented:

A Key Goal of Inquiry-Based Instruction (IBI) is to help students build ownership in what they are learning, find meaning, purpose and value, and develop interest in learning. Because learning is tied to key questions, problems or issues, students should begin to have greater ownership and interest in the learning process. The teacher stresses the value, purpose and meaning of their learning, makes it interesting to students, and enables students to feel some ownership for the questions, problems and activities they become involved in classrooms.

IBI promotes greater engagement and involvement on the part of learners. Students in a inquiry based instruction classroom are more actively involved in the learning process than in traditional classrooms. The inquiry tasks include many types of instructional strategies that nurture student involvement, such as interactive notebooks, information processing tasks, finding and using multiple resources, cooperative learning, small group tasks, discussions, writing assignments such as reaction papers, creative writing, and position papers, simulations and role plays. Thinking and problem solving are also encouraged through the use of these strategies.

IBI promotes the integration and learning of a variety of key 21st century outcomes and skills. As students go through the phases of IBI, they learn and use important and significant skills in a useful, integrated fashion. Core understandings and knowledge are emphasized. Reading, inquiry, note-taking, looking for reliable sources, conceptualizing, organizing, interpreting, logical and

creative thinking, persuasive and informational writing – all are a natural, integrated part of the IBI process.

IBI can promote greater student choice. In an inquiry-based approach, students are often provided with the choice of questions or problems to explore, and/or with multiple options for short and long−range inquiry projects, which are an important part of classroom work and assessment.

Inquiry Based Instruction promotes the inclusion of outside of school experiences and application of learning to new and novel situations. What makes inquiry based learning activities and strategies even more effective is the involvement of others outside the classroom. Through interviews with experts in their field, field trips, mentoring, experiential learning, and other similar activities, teachers can make learning "come alive" for students. Emphasis is also placed on helping students apply learning to “authentic”, real life situations

The Teacher's Role

Teachers play a key role in the success of inquiry-based instruction. A teacher must provide a climate for student curiosity and questioning. Activities must be provided that enable students to ask questions and pose problems. Students are invited to ask and answer questions. The classroom climate is conducive to finding and processing information, and using higher order thinking skills. Teachers attempt to build student ownership of learning, to create a value and a purpose for learning.

In an inquiry based instructional classroom, teachers act more often like a coach, working with students to develop questions and problems, helping students to find, read, sort, and evaluate information, helping students to draw conclusions, and providing the time and the opportunity for students to communicate results.

Finally, one of the most important components of a successful inquiry−based learning program is the ability to help students understand and apply this approach in other learning settings by consistently providing students with inquiry-based opportunities for learning. Thus the classroom climate and environment continually encourage students to express their opinions, find information from a variety of sources, and use materials and text as they process information, problem solve and think at higher levels.

Classroom Processes

In inquiry-based instruction, there is a frequent interaction of the students with the content they are learning. Students carefully read texts in order to answer questions and solve problems. They process information through classification, categorization, grouping, organizing, connecting and labeling. They think deeply and flexibly by developing hypotheses, using their imaginations, and other types of activities. Active learning is encouraged through the use of a variety of instructional strategies, such as writing assignments, discussions, cooperative learning tasks, simulations and role plays. Students are encouraged to raise problems and identify issues and questions to pursue further. Often students are given a choice of inquiry topics and are taught inquiry processes. They are also encouraged to find connections between historical and current ideas, issues, problems and situations.

Student Outcomes

Significant outcomes are taught and mastered when this approach is utilized over time. Reading many different kinds of texts strengthens reading skills and builds vocabulary. Thinking skills are developed as students classify, organize, and synthesize information. “Habits of mind”, such as perseverance, curiosity, and resilience are strengthened through long-term projects. Writing skills are developed through note-taking, reflection, and many different types of writing tasks. Students feel greater ownership for their learning and the learning process, and thus develop greater self-esteem with regard to learning. There is greater interest in learning and a willingness to work harder to learn. Students are more likely to retain information longer, because it is more meaningful to them and organized in a more interesting fashion. Ultimately the goal is for students to apply this approach on their own to their own learning, as they develop the knowledge, skills, attitudes, behaviors, and values they need for lifelong learning.

Pulling it all together

The stages of inquiry based instruction, key aspects of the teacher's role, classroom processes and student outcomes are summarized in chart one, below. They are inextricably connected and linked -- without one, the others cannot exist. Teachers provide a structure

CHART ONE: HIGHLIGHTS OF INQUIRY BASED INSTRUCTION

Teacher's Role	Classroom Processes	Student Outcomes
Identify and clarify issues and questions with students.	Question Census, engaging activities to introduce key questions…	Student involvement and engagement Ownership of questions.
Help students find and process information.	Conduct inquiry, use search engines, read text as a inquiry document	Learn inquiry skills, note-taking skills, and reading for understanding and finding key information…
Help students to think deeply and flexibly.	Use activities that support interpretation, analysis, compare and contrast, think creatively…	Learn to be more creative, think outside the box, think logically, effective writing…
Help students draw conclusions/apply learning to new situations	Use activities that help students synthesize information, write summaries, solve new problems, make decisions…	Learn to synthesize and summarize, write and organize information, use problem solving skills…
Help students communicate results	Use activities that support making presentations, communicating orally, writing papers…	Learn to make presentations, communicate results orally, write and organize papers…

for inquiry based learning and classroom processes make inquiry based learning happen, and lead to significant student outcomes. These ideas go hand in hand.

Practical Hints for IBI Implementation

There are many ways to implement inquiry based learning. Implementation depends on many factors, including attitudes towards teaching and learning, specific styles of teaching, comfort with student involvement, and beliefs about important educational outcomes. Time considerations are also a factor, depending on how much material and how many topics students are expected to examine and explore.

A simple continuum identifies different teaching emphases, leading to implementation of inquiry-based strategies at varying levels and with varying degrees.

Lecture/Recitation Teaching ---------- Inquiry Based Instruction

The teacher at the left end of the continuum uses lecture/recitation strategies for most or all of his/her teaching. Students generally take notes and/or answer questions posed by the teacher. The major objectives are for the student to learn content and low level skills and to remember a significant amount of factual information.

The teacher at the right end of the continuum continuously involves students in the learning process and acts much more like a coach, providing multiple opportunities for self-directed learning. Students raise questions and pose problems. They work in small groups, explore significant questions, interview others, and use both a text and other resource materials. Writing assignments, discussions, small group activities, simulations and role-plays, among other activities, are significant elements in the learning experience.

Our belief is that most teachers should be somewhere in the middle, balancing lecture/recitation/interactive teaching with inquiry based instruction projects. A balanced, varied approach enables students

to learn factual content and become involved with learning. While we think that the inquiry based learning approach offers significant value for student learning, especially as students learn key skills for living in a 21st century world and for future learning, we are not suggesting that the more traditional kinds of learning experiences be abandoned. The issues for classroom teachers are related to the ***degree*** and ***amount*** of inquiry based learning, rather than the opposing one against the other.

Each teacher must consider the degree to which he or she can implement inquiry based learning approaches in his/her classroom, and decide on how to adapt this approach to his or her classroom situations and experiences.

There are many ways to implement inquiry-based lessons. Below are some suggestions that can help teachers plan for inquiry based learning approaches:

1. Decide on which and how many inquiry-based activities you want to do during the year. Some teachers may want to utilize inquiry-based strategies very frequently and base their entire program or course structure on inquiry based instructional approaches. Others may utilize only certain aspects of this approach at special times during a semester. Look at the overall year of scope and sequence, activities and strategies, and plan where and how you can incorporate inquiry based strategies.

2. Examine the objectives in the curriculum and match the inquiry-based activities that most closely align themselves with this approach.

3. Adapt inquiry based activities to suit your teaching style and student needs. Use parts of activities if they seem appropriate. Try different ways of doing the same activities, based on your class and your own style of teaching.

4. Be pragmatic! If it works, use it. If not, dump it. However, remember that it might take several attempts to make the strategy work, especially if your students are not used to these kinds of activities and you are changing your teaching strategies.

5. Choose inquiry-based instruction carefully. Be selective. Avoid using the same activity too often, or using too many of these activities so that they become repetitious and boring to the students.

6. Use inquiry-based instruction activities, especially those that might be fun and motivational, early in the year. This will make for an enjoyable experience for students and help them feel comfortable with this approach. It is also useful to break apart inquiry based learning into component parts and teach each one separately to the students – for example, how to find, evaluate and organize information, how to write a persuasive essay, and so on.

7. Use inquiry-based instruction activities with classes that will be comfortable using this approach. However, remember that some classes may take some time to feel comfortable, and others may really need to learn these skills. Don't assume that students cannot or will not enjoy this approach before trying it with them. And be sure to use this approach with students at every level of skill development (this is not just for gifted students!).

8. Use short, easy to use activities when starting to use this approach -- example, start with a 20 minute activity where students ask questions about a text passage, work together to diagram information from a text, etc.

9. When using this approach, use it consistently enough and often enough so that students learn the skills for effective inquiry-based learning. Try to use it as part of an ongoing process of learning.

10. If possible, find other teachers who are interested in using this approach or are already implementing similar activities. This helps to share, clarify and discuss ideas and techniques.

11. Develop, as part of the grading system, ways to take into account inquiry-based learning. The inquiry paper evaluation format, which is outlined in the general activities section of this article, is an example of a inquiry-based evaluation format. Include note taking, questioning and participation, essays, extra credit activities, homework assignments that include inquiry-based approaches, and other components in a grading system.

12. For long-term reports and projects, analyze the tasks that students will have to do to complete the assignments, break them down into smaller steps, and develop a time line. Develop some clear expectations of due dates and formats, and, if possible, show students models of what you expect from them. This will provide excellent teaching formats for inquiry based instruction strategies.

Sample Activities

The examples below suggest general types of activities that might be incorporated into a inquiry-based model. The descriptions of these activities provide a brief overview, not a complete explanation. Most of these are adapted from a single source, *Basic Skills Connection in the Social Studies*, published by the Missouri Department of Elementary and Secondary Education, 1982 (No longer available).

1. Ask Questions That Promote Interpretation. The teacher asks questions that help students frequently go beyond literal comprehension of text material. These questions should help students explore cause- effect relationships, anticipate what is to follow, propose a main theme or idea that is not directly stated, make comparisons or contrasts, and so on. These types of questions involve students in using materials as inquiry tools in order to develop hypotheses and understandings.

A variation of this strategy is to have **students** develop/brainstorm questions that go beyond literal comprehension of material. (**Basic Skills Connection, Strategy 11, pp. 30-32)**

2. Provide a Purpose for Assignments Related to Inquiry Based Learning. This strategy helps students understand the purpose of a reading and what they are expected to do. The emphasis is on using the reading assignments in order to find something out, be creative, develop cause and effect, and any number of "inquiry based" goals. (Adapted from **Basic Skills Connection, Strategy #6, pp. 17-18).**

3. Systematically help students to learn the skills for writing reports, research papers, persuasive essays, narratives. Conducting inquiry often involves writing research reports. Students need help in learning how to do this effectively. The skills include: structuring the topic, selecting a topic (example: idea explosion), planning how to carry out an investigation, and carrying out an investigation (inquiry). In a inquiry based learning approach, report and other types of writing are explored regularly and consistently with students. **(Basic Skills Connection, Strategy #16, pp. 42-46).**

4. Classify and make associations between facts and ideas in order to develop concepts and vocabulary. Students sort information into groups and label them in order to develop key concepts and ideas. Charts are especially appropriate for this approach. Students can develop their own groups and labels and

formulate their own charts, or pre-determined charts can be used by a teacher. (From **Basic Skills Connection, Strategy #7, pp. 18-20).**

5. Develop evidence for judgments. This strategy is used to help students develop generalizations from a reading, and then support their generalizations with evidence. Ask students what conclusions they can draw from a reading, and what evidence there is to support their conclusions. The generalizations and evidence are discussed with the entire class.

Variation: Provide students with a multiple-choice test at the beginning of a unit, and ask students to find the answer with supporting evidence from readings and/or a text (From **Basic Skills Connection, Strategy #18, pp. 48-49).**

6. Who, what, when, where, how, why, what's the difference? Reading passages about incidents and events can be analyzed using all of the above questions, put into chart form. The questions "why?" (Why did the events occur? Why did people act as they did?) and "What's the difference?" (What difference did this event make? To whom does it make a difference?) adds inferential thinking to this more typical exercise (From **Basic Skills Connection, Strategy #30, pp. 65-67)**

7. Judge Sources of Information. A series of questions are developed about the writer of a text or article, an observer of an event, etc. in order to judge the reliability of a report. The strategy also suggests a series of continua related to the reliability of a report. (From **Basic Skills Connection, Strategy #12, pp. 32-34).**

8. Use graphic organizers and other visual representations. Students can use a variety of visual organizers, such as Venn Diagrams, to organize information and make connections. Time line organizers, cause/effect charts, flow charts, and other organizers are very useful devices for organizing and understanding large amounts of information.

9. Long term projects. Projects are a natural outgrowth of Inquiry Based Instruction. Students are provided with the opportunity to develop projects in many formats (books, reports, skits, arts and crafts projects, even poems and fiction) by working cooperatively in small groups. For example, in history, students can be grouped to work on different decades in American History (the 20's, 30's, 40's, etc.) and develop books on these time periods that incorporate many formats (poems, collages, photos, essays, etc.).

10. Develop Retrieval Charts. Students group information they have learned according to predetermined categories. Example- students who study a time period in history may group their information according to the following:

Dress
Tools
Climate
Government
Religion
Economics

Students can then use these charts for comparisons with other time periods.

11. Use mystery activities. A puzzle or a problem is posed to students. Students ask 20 questions, with yes or no answers, to find the solution to the puzzle.

Planning for Inquiry Based Instruction

In planning for Inquiry Based Instruction, teachers identify how each component of IBI will be incorporated into a "unit of study" or project. A unit of study may not actually be a specific unit within a given period of time, but may be spread out over the course of a semester or an entire year. A project may incorporate all or part of a unit structure. The following questions should be addressed as the unit or project is planned:

How will students identify and clarify issues and questions? Many avenues exist to implement this component. Through an initial discussion, teachers can develop and introduce key, essential questions based on critical unit understandings. A complex problem is sometimes a powerful way to introduce IBI. Through a brainstorm strategy, students themselves may be able to develop key questions or issues and then select the most powerful and interesting for study.

How will students find and process information? In IBI, textbooks are treated as a "inquiry" resource, used to search for key information to deal with an issue or challenge, answer essential questions, or find information to help solve a complex problem. Reading skill development are integral to this process as students read for understanding, build key vocabulary, and ask questions. Search engines, the Internet, or traditional library resources can be used to help students find and process information and learn inquiry skills. Experts, interviews, and other outside of school experiences may be another way to collect and process data.

How will students think deeply and flexibly? Once students find and process information, how will they manipulate it? Use it to promote critical and creative thinking? Compare and contrast data? Analyze? Invent? Interpret? Create? A focus on ways to think deeply and flexibly helps to expand and extend learning.

How will students draw conclusions/apply their knowledge and skills to new situations? How will students "pull things together" to synthesize, solve problems, or answer core questions? Will they have a chance to apply their learning and skills to a new situation, so they learn to adapt and be flexible.

How will students communicate? Will students develop and share their writing? Develop and conduct a presentation to share their learning? Write self-reflections that summarize their learning? Create graphic organizers and other visual displays to communicate their work?

Inquiry Based Instruction Resources

Many resources exist that can help support this process, including those that focus on inquiry, research skills, project and problem based learning, inquiry based strategies, writing resources, and so on. The following is a partial list of resources that may be useful for implementing this approach:

Barell, John. (1998). ***Problem Based Learning: An Inquiry Approach.*** Arlington Heights, Illinois: Skylight Publishing.

Beers, Sue and Howell, Lou. (2003). ***Reading Strategies for the Content Areas.*** Alexandria, VA: Association for Supervision and Curriculum Development.

Brooks, Jacqueline Grennon and Brooks, Martin G. (1999). ***In Search of Understanding: The Case For Constructivist Classrooms.*** Alexandria, Virginia: Association for Supervision and Curriculum Development.

Delisle, Robert. (1997). ***How to Use Problem-Based Learning in the Classroom.*** Alexandria, VA: Association for Supervision and Curriculum Development.

Eisenberg, Michael and Berkowitz, Robert. (2003). ***The Definitive Big6 Workshop Handbook.*** Worthington, Ohio: Linworth Publishing, Inc.

Eisenberg, Michael and Berkowitz, Robert. (2000). ***Teaching information and Technology Skills: The Big 6 in Secondary Schools.*** Worthington, Ohio: Linworth Publishing, Inc.

Gallagher, Kelly (2004). ***Deeper Reading: Comprehending Challenging Texts, 4-12.*** Portland, Maine: Stenhouse Publishers.

Green, Phyllis, Editor. (1999, 2000). ***Graphic Organizer Collection.*** San Antonio, TX 78279: Novel Units, Inc.

Harvey, Stephanie. (1998). ***Nonfiction Matters: Reading, Writing, and Inquiry in Grades 3-8.*** York, Maine: Stenhouse Publishers.

Jacobs Krieger, Melanie. (1999). ***How to Create an Independent Research Program.*** Alexandria, VA: Association for Supervision and Curriculum Development.

Marzano, Robert J., Pickering, Debra J. and Pollock, Jane E. (2001). ***Classroom Instruction that Works: Research-Based Strategies for Increasing Student Achievement.*** Alexandria, VA: Association for Supervision and Curriculum Development.

Marzano, Robert J., Norford, Jennifer S., Paynter, Diane, Pickering, Debra J. and Gaddy, Barbara B. (2001). ***A Handbook for Classroom Instruction that Works.*** Alexandria, VA: Association for Supervision and Curriculum Development.

Saphier, Jon and Haley, Mary Ann. (1993). ***Activators: Activity Structures to Engage Students' Thinking Before Instruction.*** Carlisle, Massachusetts: Research for Better Teaching, Inc.

Saphier, Jon and Haley, Mary Ann. (1993). ***Summarizers: Activity Structures to Support Integration and Retention of New Learning.*** Carlisle, Massachusetts: Research for Better Teaching.

Schoenbach, Ruth, Greenleaf, Cynthia et. al. (1999). ***Reading for Understanding: A Guide to Improving Reading in Middle and High School Classrooms (The Reading Apprenticeship Guide).*** San Francisco, CA: Jossey-Bass Publishers.

Wiggins, Grant and McTighe, Jay. (2005). ***Understanding by Design (Expanded Second Edition). Alexandria***, Virginia: Association for Supervision and Curriculum Development.

Zemelman, Steven, Daniels, Harvey and Hyde, Arthur. (1998). ***Best Practice: New Standards for Teaching and Learning in America's Schools, 2nd Edition.*** Portsmouth, New Hampshire:

Heinemann.

Zorfass, Judith with Copel, Harriet (1998) ***Teaching Middle School Students to be Active Researchers.*** Alexandria, VA: Association for Supervision and Curriculum Development.