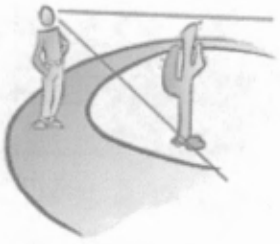


Welcome to **Inquiry-based Learning**. Start here in the "Explanation" section, which is all about the CONCEPT. Then go on to "Demonstration" and the following sections, where we move from CONCEPT TO CLASSROOM!

- **What is inquiry-based learning?**
- **How does it differ from the traditional approach?**
- **What does it have to do with my classroom?**
- **What are the benefits of inquiry-based learning?**
- **How has inquiry-based learning developed since it first became popular?**
- **Another perspective**
- **What are some critical perspectives?**
- **How can I use inquiry-based learning in conjunction with other educational techniques?**

What is inquiry-based learning?

An old adage states: "Tell me and I forget, show me and I remember, involve me and I understand." The last part of this statement is the essence of inquiry-based learning, says our workshop author **Joe Exline** [1]. Inquiry implies involvement that leads to understanding. Furthermore, involvement in learning implies possessing skills and attitudes that permit you to seek resolutions to questions and issues while you construct new knowledge.

1. Buzzwords

"Inquiry" is defined as "a seeking for truth, information, or knowledge -- seeking information by questioning." Individuals carry on the process of inquiry from the time they are born until they die. This is true even though they might not reflect upon the process. Infants begin to make sense of the world by inquiring. From birth, babies observe faces that come near, they grasp objects, they put things in their mouths, and they turn toward voices. The process of inquiring begins with gathering information

Part 1 of 2

Part 2 of 2

Transcript

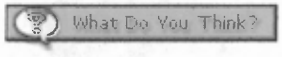
and data through applying the human senses -- seeing, hearing, touching, tasting, and smelling.

Tim O'Keefe, a teacher at the Center for Inquiry elementary school in Columbia, South Carolina, explains why he thinks inquiry is a much more effective teaching strategy than traditional chalk-and-talk.

A Context for Inquiry

Unfortunately, our traditional educational system has worked in a way that discourages the natural process of inquiry. Students become less prone to ask questions as they move through the grade levels. In traditional schools, students learn not to ask too many questions, instead to listen and repeat the expected answers.

Some of the discouragement of our natural inquiry process may come from a lack of understanding about the deeper nature of inquiry-based learning. There is even a tendency to view it as "fluff" learning. Effective inquiry is more than just asking questions. A complex process is involved when individuals attempt to convert information and data into useful knowledge. Useful application of inquiry learning involves several factors: a context for questions, a framework for questions, a focus for questions, and different levels of questions. Well-designed inquiry learning produces knowledge formation that can be widely applied.



Importance of Inquiry

Memorizing facts and information is not the most important skill in today's world. Facts change, and information is readily available -- what's needed is an understanding of how to get and make sense of the mass of data.

Educators must understand that schools need to go beyond data and information accumulation and move toward the generation of useful and applicable knowledge . . . a process supported by inquiry learning. In the past, our country's success depended on our supply of natural resources. Today, it depends upon a workforce that "works smarter."

Through the process of inquiry, individuals construct much of their understanding of the natural and human-designed worlds. Inquiry implies a "need or want to know" premise. Inquiry is not so much seeking the right answer -- because often there is none -- but rather seeking appropriate resolutions to questions and issues. For educators, inquiry implies emphasis on the development of inquiry skills and the nurturing of inquiring attitudes or habits of mind that will enable individuals to continue the quest for knowledge throughout life.

Content of disciplines is very important, but as a means to an end, not as an end in itself. The knowledge base for disciplines is constantly expanding and changing. No one can ever learn everything, but everyone can better develop their skills and nurture the inquiring attitudes necessary to continue the generation and examination of knowledge throughout their lives. For modern education, the skills and the ability to continue learning should be the most important outcomes. The rationale for why this is necessary is explained in the following diagrams.

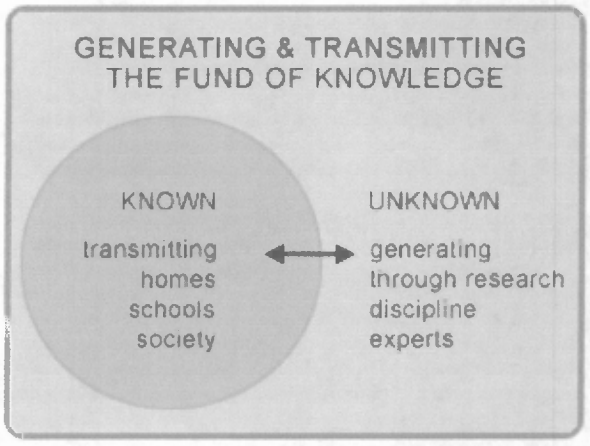


Illustration developed by Joe Exline

This figure illustrates how human society and individuals within society constantly generate and transmit the **fund of knowledge** [2].

2. Buzzwords

Human society and individuals within society constantly generate and transmit this fund of knowledge. Experts, working at the boundary between the known and the unknown, constantly add to the fund of knowledge.

It is very important that knowledge be transmitted to all the members of society. This transmission takes place through structures like schools, families, and training courses.

Certain attributes are necessary for both generating and effectively transmitting the fund of knowledge. The attributes that experts use to generate new knowledge are very similar to the qualities essential for the effective transmission of knowledge within the learners' environment. These are the essential elements of effective inquiry learning:

1. Experts see patterns and meanings not apparent to novices.
2. Experts have in-depth knowledge of their fields, structured so that it is most useful.
3. Experts' knowledge is not just a set of facts -- it is structured to be accessible, transferable, and applicable to a variety of situations.
4. Experts can easily retrieve their knowledge and learn new information in their fields with little effort.

(The list above was adapted from "How People Learn," published by the National Research Council in 1999.)

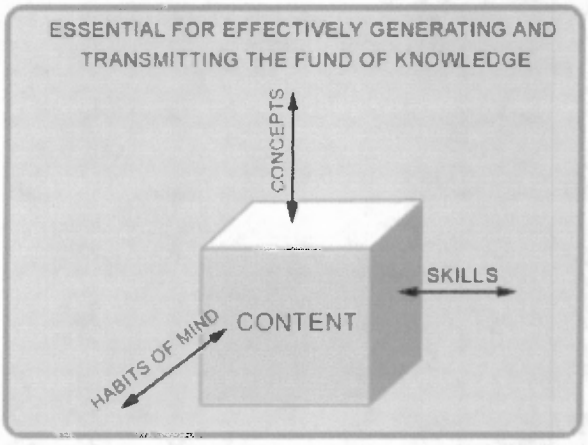


Illustration developed by Joe Exline

This figure illustrates the attributes necessary for both generating and effectively transmitting the fund of knowledge.

We propose that the attributes experts use to generate new knowledge are very similar to the attributes essential for the effective transmission of knowledge within the learner's environment -- the essentials of effective inquiry learning.

Inquiry is important in the generation and transmission of knowledge. It is also an essential for education, because the fund of knowledge is constantly increasing. The figure below illustrates why trying to transmit "what we know," even if it were possible, is counterproductive in the long run. This is why schools must change from a focus on "what we know" to an emphasis on "how we come to know."

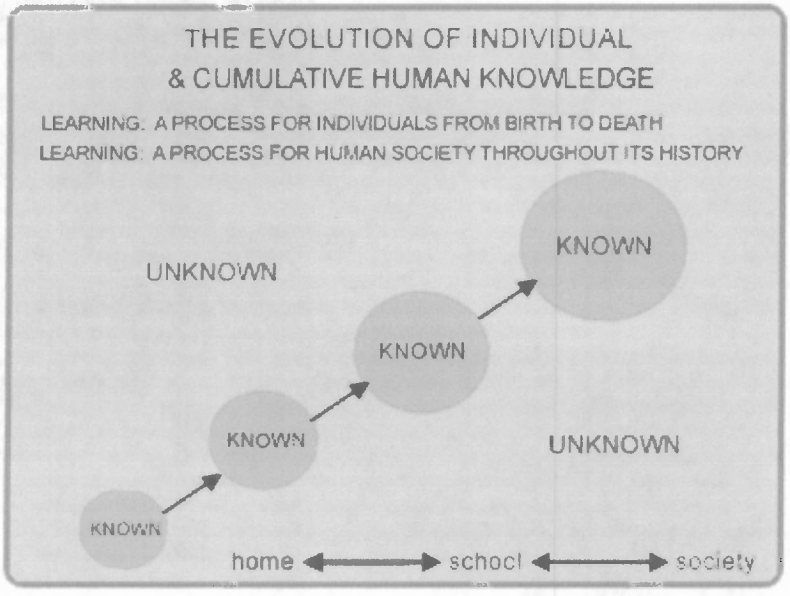


Illustration developed by Joe Exline

This chart illustrates that while knowledge is constantly increasing, so is the boundary of the unknown.

An effective and well-rounded education gives individuals very different but interrelated

views of the world. All disciplines have important relationships that provide a natural and effective framework for the organization of the school curriculum, as shown in the chart below. The subject matter of disciplines can be set in the larger context of a **conceptual framework** [3]. This framework is crucial for understanding change and also for the organization of the discipline and its application to the natural and human-designed worlds.

3. Buzzwords

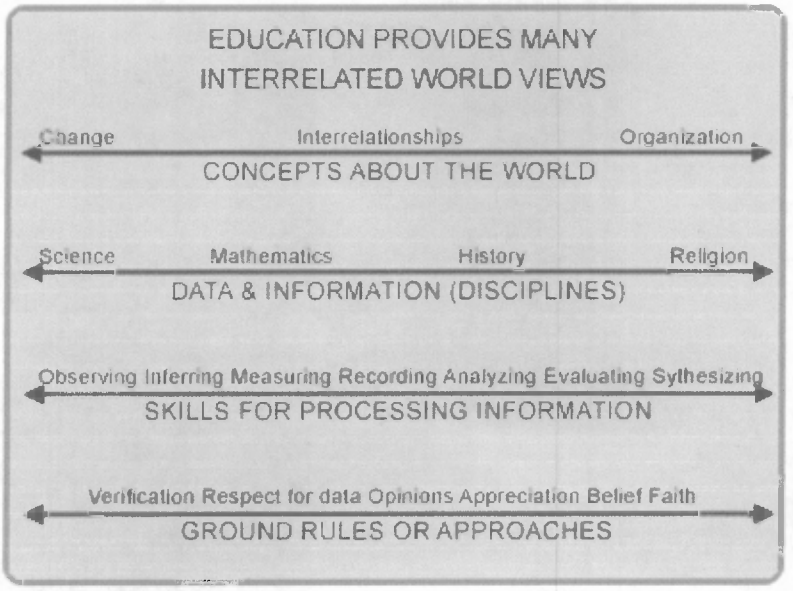


Illustration developed by Joe Exline

This chart illustrates that skills for processing information are similar across all disciplines.

The habits of mind [4], values, or "ground rules" of a particular discipline provide that discipline's unique perspective. The sciences, for example, demand verification of data, while the study of literature often relies on opinions and subjective interpretations as a source of information. Habits of mind vary in their rigidity across disciplines. This doesn't mean that one is right and the other is wrong, but simply that the "ground rules" are different.

4. Buzzwords

The Application of Inquiry

While much thought and research has been spent on the role of inquiry in science education, inquiry learning can be applied to all disciplines. Individuals need many perspectives for viewing the world. Such views could include artistic, scientific, historic, economic, and other perspectives. While disciplines should interrelate, inquiry learning includes the application of certain specific "ground rules" that insure the integrity of the various disciplines and their world views.

Outcomes of Inquiry

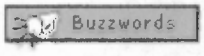
An important outcome of inquiry should be useful knowledge about the natural and

human-designed worlds. How are these worlds **organized**? How do they **change**? How do they **interrelate**? And how do we **communicate** about, within, and across these worlds? These broad concepts contain important issues and questions that individuals will face throughout their lives. Also, these concepts can help organize the content of the school curriculum to provide a relevant and cumulative framework for effective learning. An appropriate education should provide individuals with different ways of viewing the world, communicating about it, and successfully coping with the questions and issues of daily living.

While questioning and searching for answers are extremely important parts of inquiry, effectively generating knowledge from this questioning and searching is greatly aided by a conceptual context for learning. Just as students should not be focused only on content as the ultimate outcome of learning, neither should they be asking questions and searching for answers about minutiae. Well-designed inquiry-learning activities and interactions should be set in a conceptual context so as to help students accumulate knowledge as they progress from grade to grade. Inquiry in education should be about a greater understanding of the world in which they live, learn, communicate, and work.

There are several variations on inquiry-based learning. Among the most widely used are the **Future Problem Solving Program** [5] and the **Problem-based Learning Approach** [6]. See the "Resources" section for more on these approaches.

5.

6. 

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Explanation | Demonstration | Exploration | Implementation

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How does it differ from the traditional approach?

In general, the traditional approach to learning is focused on mastery of content, with less emphasis on the development of skills and the nurturing of inquiring attitudes. The current system of education is teacher centered, with the teacher focused on giving out information about "what is known." Students are the receivers of information, and the teacher is the dispenser. Much of the assessment of the learner is focused on the importance of "one right answer." Traditional education is more concerned with preparation for the next grade level and in-school success than with helping a student learn to learn throughout life.

Transcript

Jane Morton, who teaches grades 2 and 3 at Ardmore Elementary School in Bellevue, Washington, thinks rote learning doesn't equal understanding for her students.

Traditional classrooms tend to be closed systems where information is filtered through layers to students. In general, the use of resources is limited to what is available in the classroom or within the school. Use of technology is focused on learning about the technology rather than its application to enhanced learning. Lesson plans are used to organize the various steps in the learning process for the whole-class approach. On-target questions that would tend to cause deviations from the plan are met with, "We will get to that later."

The inquiry approach is more focused on using and learning content as a means to develop information-processing and problem-solving skills. The system is more student centered, with the teacher as a facilitator of learning. There is more emphasis on "how we come to know" and less on "what we know." Students are more involved in the construction of knowledge through active involvement. The more interested and engaged students are by a subject or project, the easier it will be for them to construct in-depth knowledge of it. Learning becomes almost effortless when something fascinates students and reflects their interests and goals.

Assessment is focused on determining the progress of skills development in addition to content understanding. Inquiry learning is concerned with in-school success, but it is equally concerned with preparation for life-long learning.

Part 1 of 2 **Part 2 of 2**

Transcript

Tim O'Keefe of the Center for Inquiry elementary school in Columbia, South Carolina, uses a hands-on, inquiry approach to excite his students about a botany unit.

Inquiry classrooms are open systems where students are encouraged to search and make use of resources beyond the classroom and the school. Teachers who use inquiry can use technology to connect students appropriately with local and world communities which are rich sources of learning and learning materials. They replace lesson plans with facilitated learning plans that account for slight deviations while still keeping an important learning outcome in focus. They meet on-target questions with, "How do you suggest we investigate that question?"

Another issue regarding inquiry-based learning has to do with a misconception about when to do inquiry. Inquiry is not only done in laboratory or group work -- it can also be done in lectures that provoke students to think and question.

Teachers often discount the fact that when they are giving talks or lectures to students, the students, if engaged, are applying listening and observing skills -- using their senses. If teachers focus more on "how we come to know" by presenting evidence and information and encouraging student questioning, then talks can even become powerful inquiry models for students. Collaborative meaning-making can take place through discourse.

For example, when discussing the internal structure of the earth, a teacher will often give the students information about just the names and sizes of these earth layers, or the "what we know." But what really is important and intriguing for the student is the "how do we know?" about these structures. No one has been down there, and physical probes have only scratched the surface. To enhance inquiry learning, the teacher should explain that indirect scientific evidence, mainly the transmission and reflection of different kinds of earthquake waves, provides much of our understanding about the internal structure of the earth. This approach provides the student with the opportunity not only to learn the names and sizes of the structures but, more importantly, to ponder and question the nature of indirect scientific evidence as well. Thus, an inquiry approach can help students connect science with the scientific method. Students learn to apply the method to various fields of study while coming to understand their content.

Perhaps a good way to summarize the important difference between traditional learning and inquiry learning is: Traditional learning focuses more on LEARNING ABOUT THINGS, while inquiry learning focuses more on LEARNING THINGS! Another useful way to contrast the two might be: Thinking WHAT as opposed to thinking HOW.

What Do You Think?

Next →

Key principles

To recap, the key principles of inquiry learning are listed below. You can use them to guide the creation of your inquiry facilitation plans.

Principle *1*:
All learning activities should focus on using information-processing skills (from observations to synthesis) and applying the discipline "ground rules" as a means to learn content set in a broad conceptual context.

Principle *2*:
Inquiry learning puts the learner at the center of an active learning process, and the systemic elements (the teacher, instructional resources, technology, and so forth) are prepared or aligned to support the learner.

Principle *3*:
The role of the teacher becomes one of facilitating the learning process. The teacher also becomes a learner by finding out more about the learner and the process of inquiry learning.

Part 1 of 2 **Part 2 of 2**

Transcript

Lisa Nyberg, a third- and fourth-grade teacher at Brattain Elementary School in Springfield, Oregon, talks about how she sometimes adjusts inquiry lessons based on student feedback.

Principle *4*:
What is assessed is what is valued. Therefore, more emphasis needs to be placed on assessing the development of information-processing skills, nurtured habits of mind, or "ground rules" of the discipline, and conceptual understandings -- rather than just the content of the field.

Next →