

Asking Questions—the Basis of Self-Actualization and Problem-Solving in the Gifted Classroom
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"Computers are useless. They can only give you answers." – Pablo Picasso

Do we teach our G&T students to ask high quality questions? Are questions really welcome in the traditional gifted classroom? Is there enough time to seriously allow questions in the already crowded, overly tested curriculum? Is question-asking something we track to show the involvement and commitment of student learning? Do we understand how valuable the process of question-asking is for the future of gifted students and their eventual transition to the world of business? Do we appreciate how it is probably more important than topic specific information we teach them? Question-asking is what motivates us to fill our potential, to self-actualize. It is a life-long skill.

In our dynamic, competitive global economy.....the ability to ask (and answer) high quality questions will most certainly affect one's career, and continued employment. Business teams are convened exactly for the purpose of asking tough questions about new technologies and how they might impact organizations, business models, development of new business strategies, and feasibility of new products and services. It cuts to the very heart of the world of business.

Clearly, more gifted students will derive a better understanding of the relevancy of their academic day if they can see the direct impact of their questions on the outcome of team designs, and personal project challenges. It is time to teach students the art of asking questions. We can accomplish this in a variety of ways—some of which should involve a closer interaction with the business community.

Back in the day, many of us "oldsters" remember the basics of reporting and journalism, which really is all about asking questions....who, what, when, where, how, and why. This forms a basic understanding of inquiry we sort of take for granted. If we worked on a school newspaper, such a paradigm was the first thing drummed into our heads. Get the facts and report them, clearly and concisely. High quality questions, as will be discussed below, are the key to success as our G&T students transition from a school environment to a spirited, highly competitive, and unforgiving workplace. School is the place to begin honing the art of asking questions...the sooner, and the more often, the better. The bonus of good question asking in our society leads to a more aware, well-rounded citizenry.

"In school, we're rewarded for having the answer, not for asking a good question." - Richard Saul Wurman

Why do we ask Questions?

We ask questions to: -Know more -Satisfy curiosity -More fully understand something -Validate our reasoning -Reach a conclusion -Make a decision -Quantify something.

Asking questions is intimately connected with the process of conducting research; the compiling of information ultimately leading to a conclusion or summation of what to do next—maybe develop a new product or service. We do this every time we empower gifted students to work in teams to address a problem. The real crux of asking questions however is about asking really good questions. Knowing which questions to ask about any problem has been shown to be as important as the answers (i.e. asking high quality questions is really the Aha! moment). Jonas Salk once opined, "What people think of as the moment of discovery is really the discovery of the question." Those of us who have done graduate work know well that good questions lead to a great thesis.

Our responsibility in the G&T classroom is to help students appreciate and practice good question-asking—as often as possible whether through project based design, discussion of current events, or debating. One great way to get question-asking underway is to stimulate student discussions based on a "what if" kind of presentation (something like this....What if all gasoline cars are banned tomorrow?.....What are the key concerns we need to address to accommodate and deal with this? Formulate the concerns in the form of questions...What happens to gas stations? What do we replace traditional cars with? What form will these new cars take? How will this affect the way we travel? To what extent will the air be cleaner?....etc.]

High quality questions are characterized as those that:

-Cut across the curriculum—knitting together the threads of our culture [multi-dimensional] -Foster deep appreciation of the problem's components -Inspire a desire to find a mediated solution (i.e. addressing multiple constraints) -Promote a Socratic style of learning -Challenge students to envision a solution based on pragmatic analysis -Empower students to bravely think out-of-the-box -Lead to quantitative analysis.

"Judge a man by his questions rather than his answers." - Voltaire

Questions, Research and Thomas Edison

Edison's greatest invention is still returning huge benefits to the world. His concept of R&D labs is enshrined in the "Invention Factory" museum at the Thomas Edison National Historical Park in West Orange, New Jersey. Here is the template for creating new products...moving from raw ideas to commercial products. It is timeless, the very concept of technology-driven progress we lionize today. In recent years, America has spent somewhere between \$400 and \$500 billion per year on R&D, of every kind, in all sectors of the economy.

And what is R&D, but the asking of really incisive questions, aimed at arriving at the development of something new! Good researchers, great inventors, insightful entrepreneurs (think Steve Jobs) are master question askers. Asking questions is the "mother's milk" of innovation; and our gifted students should live and breathe this.

Another thing to keep in mind is the huge push toward STEM/STEAM activities in our schools. Thomas Edison and the philosophy of an invention factory is recognized as the taproot for all STEM/STEAM. We must challenge our students to conduct research before designing something. Mentally they should be asking questions in a team-based setting and based on their inquiries, arriving at a design—so having a STEM/STEAM curriculum is one step closer to learning and practicing the fine art of question-asking.

Consider how question-asking and research are intimately connected in the following hierarchy: -A team asks initial questions about the problem at hand -Research is conducted by team members to learn more -The team reviews what has been learned and revisits the question-asking process -More research is performed and new things are learned (The team will ask questions and conduct subsequent research as needed to zero in on a solution. **This process is highly iterative.**) -The team develops conclusions and recommendations, and solves the problem.

Some of the things G&T student team members might ask about their problem could entail: -Has this problem ever been tackled before and what were the results? -What is known or not known about the problem? -How did the solution or how will a new solution impact society? -What is the state-of-the-art of the technology and concerns for this problem? -Who are the major players in this problem area—people, companies? -What is the value of a solution to this problem? -Can this problem be solved in an economical manner? This is just a brief list of representative questions to be asked, not an exhaustive itemization; but it serves to identify some important aspects of the question-asking process.

The process of question-asking must ultimately arrive at a quantitative solution. It is not enough to say something will not harm (for example) the environment. It must be backed-up by numbers, analysis, and perspective. Likewise if a new device can be made cheaply, how much will it cost compared to other options and maybe competitor devices now on the market?

"What we observe is not nature itself, but nature exposed to our method of questioning." - Werner Heisenberg

Question-asking can be facilitated through a variety of avenues, some of which are shown here; and can be implemented via school or at home, or maybe using traditional library sources. Again, this listing is a representative example:

-Internet based searches -Discussions with experts -Review of topically relevant papers, conference proceedings and articles -Business community -Entrepreneurs -Inventors -Collegiate researchers.

Classroom Activities

Here are some controversial examples to get those G&T students asking questions. Get them working in teams and empower them to have a "no-holds" forum on asking meaningful and balanced questions, pro and con, about topics like those listed below.

Remember to impress upon your gifted students the importance of asking questions that touch on the rich fabric of our civilization. Something I have written previously about which I call 360 degree problem solving—looking at the economic, social, technical, environmental, regulatory, legal, safety, and political aspects of a problem—is very important here. It is essential that you and your gifted students see this as a way to integrate their subject matter. To think and debate like responsible adults.....and future leaders of their communities.

Continued in the February-March 2016 Issue of Gifted Education News-Page.