

Solving Problems: A Quick Reflection

Humans solve problems to seek solutions to a pressing need or want, and to gain perspective on their world. Students solve problems to gain practice in this life-long activity. Unfortunately, as is with any repetitive activity, we run the risk of going through the motions and forgetting the significance of the exercise. Students tend to believe with time there is only one, right, solution to a given problem....and this leads to a simplified world view.

Any problem has multiple solutions, depending upon how you perceive it and the inquiries, i.e., questions, you make of it. The problem solver determines the answer, as much as the situational context of the problem itself. Humans are the active ingredient, the creative element, the question askers, the catalysts, toward finding a solution. I suppose our penchant for seeking the right answer comes from what gets ingrained in us about solving math problems. After all, either $1+1=2$ or it doesn't; but not so for many other types of problems. Having answers in the backs of books does not much help either, giving us a false sense of security that there is only one true answer.

The high value currency of solving problems is the ability to ask good questions.....questions that will yield useful and interesting data and information. As we search through possible solutions we notice something interesting. Some solutions seem sophisticated, elegant, and more complete than others. The best solutions seem to possess a certain high quality. They are rich in texture, solved from an inter-disciplinary and multi-dimensional viewpoint, and appear as though they will stand the test of time. High quality solutions stem from the asking of high quality questions.

It stands to reason we should be teaching gifted and talented students how to ask high quality questions. They should get to know problems, communicate with them, and extract information they can use and build upon. It also stands to reason that since problem solving is so dependent upon viewpoints, outlooks, and question asking, it is a messy and somewhat unstructured, endeavor. Gifted students need to be comfortable solving problems in this environment, empowered to reach outside the box if need be, without fear of academic penalty.

In many of the activities and design challenges in this book, you will notice a constant asking of questions to prompt, stimulate, and foster thinking and discussion. There is no magic here, a Socratic form of classroom leadership to be sure; but it is congruent with the need to integrate the curricula. This is where the multi-dimensionality and multi-disciplinary aspects of high quality solutions comes in....from an appreciation of how subjects are linked together; and formulating these linkages into intriguing questions that examine the interface between the various dimensions of the problem.

Civilization is a tapestry woven with some thick fundamental threads like:

- Society
- Economy
- Technology

- Environment
- Government
- Law
- Politics
- Global perspective

When we solve problems we should be trying to include consideration of these fundamental threads in both the question asking and solution formation. For instance, when trying to implement a new cross-cutting technology like nano-particles, it will most definitely have impacts on the fundamental threads, and hard questions need to be asked at the outset to help define a high quality solution down the road. Our problems today with the automobile and our dependence upon oil stem from our inability to get a high quality solution many years ago when the automobile was young, and question asking was in its simplistic infancy. There are penalties to be paid down the road (no pun intended) with simplistic solutions that lack multi-dimensionality and multi-disciplinary approaches.

The really rich soil for intellectual exploitation exists at the interfaces between subjects and the threads of civilization. Where these threads meet, new research ideas are forged, lush new subject matter grows, and new knowledge is born. These are where the tectonic plates of knowledge build new continents, and tear down the old. When gifted students solve problems, these interfaces are prime areas for their creative thought, and out-of-the-box paradigm shifts. Empower them to explore and create!