Inviting Children

to Develop Inquiry Skills

Phillip S. Riner

University of Nevada-Las Vagas

Abstract

This article describes by vignette and analysis four primary instructional tasks necessary to develop inquiry skills in children. These tasks are shown to be fundamental to the inviting classroom and to experimental science.

Inviting Children to Develop Inquiry Skills

"If teaching were telling we'd all be so smart we couldn't stand it!" Unfortunately, children too often are left on the outside of educational experiences because they are *told* what to learn rather than being *invited* to a learning opportunity. There are few among us who do not incur a natural resistance to being ordered about with a "Do this because I say so!" command no matter how cordially delivered. But, when approached with an invitational attitude toward learning the message changes to a "Would you join me so that we can do this?" and individuals are faced with a series of inclusive choices rather than being confronted by external demands.

Having choices diminishes defensiveness and resistance while increasing social and personal responsibilities. Within the teacher's typical day, there are thousands of opportunities to turn "telling" into "invitations." Teachers who invite children to learning provide them with choices that assist them in developing self-control and personal responsibility. Teachers are confronted with a wide variety of strategies that can turn daily situations into invitations for children to explore, examine, and analyze the world around them. Unfortunately, the classroom is a very complex place and these opportunities often are lost, not due to a lack of teacher skill, but simply to a lack of teacher awareness. The purpose of this article is to provide opportunities for teachers to become more aware of the classroom's inviting moments, partially by being told about them, but also by being

invited to analyze two short vignettes of teachers expanding the inquiry skills of children using an inviting stance. The article is open-ended and the reader is encouraged to interact and analyze the vignettes with the four instructional tasks provided in the conclusion..

Inquiry into School Life: A Vignette

The teacher had shared with a class of young gifted children the development of a research project that was part of a university course the teacher was taking. The children were fascinated and asked their teacher if they could do their own research project. The teacher entertained the idea and concluded the children were quite capable of dealing with intellectual problems as well as the rudimentary statistical tools used in survey research. The math involved was certainly within their abilities. The logic involved in a rational approach unquestionably was demonstrated by these children. The teacher and students agreed to develop and conduct a survey about a question that both teachers and students might find to be meaningful and useful.

After some discussion the teacher suggested that the students systematically approach the issue of learning satisfaction among the students in the school. The culminating report could be a presentation to the teachers in a future staff meeting. The children were quite excited about the prospect of “teaching the teachers” and the project was set in motion.

The children determined that the survey's lead question would be "What is your favorite subject in school?" followed by "Why?" By random sampling (using a table of random numbers and the Rolodex) the students selected 150 of the school's 600 students. Each was interviewed and the results tallied. The findings astounded the children's teachers. The children were quite excited about their presentation to the faculty. With charts on overhead transparencies they proceeded to talk about learning satisfaction. When the staff was informed, the results were a source of great consternation. The favorite subject by far was spelling. The children typically provided the same answer as to why: "I know what to do to get a good grade." The least favorite was science. The children were surprised by the teachers' reaction of concern.

The teachers asked the child researchers to do a follow up interview to find out in more detail why science was so unloved and to explore more thoroughly how the students felt about learning in the school. The children, knowing more than the teachers on the issue of learner satisfaction, hypothesized that science was not liked because it was "hard". After some probing, it was found that hard was a proxy for "I don't do well." A list of other possible reasons was created, the random sample of children interviewed, and again the results were tallied. The children's hypothesis was confirmed: children didn't like science because they weren't sure how to do well. Spelling was liked because it was easy (i.e., children succeeded). Spelling required them to memorize twenty words and write them on Friday. Every child knew precisely what to do to get an A if they wanted one. The principal's examination of report

cards verified the

findings. Spelling was the top subject for As with science trailing at the end.

An Invitation to Failure Is No Invitation

This piece of student research illustrates two things. First, it illustrates how children, although they initiated the invitation, received an invitation in return in order to explore the school community. The children were not only invited to learn but also to teach the teachers. Second, the children's research illustrates how a subject most inclined to attract children can be destroyed by a lack of invitations to success. Worms, butterflies, electricity, rockets, rocks, and chemical "booms" are all a part of science, but somehow, the school had taken the wonder of nature and reduced it to confusion and failure. This was particularly sad in light of the fact that the teachers in this school were exemplars in compassion and caring.

Even more disturbing, the children told the teachers quite simply that spelling, because if afforded them success, was their favorite *even though* it involved little intellectual skill other than memory and required virtually no curiosity. Spelling doesn't allow much room for exploration, invention, experimentation: How could it be their favorite?

Inviting Students to Grow

William Purkey (1990), in a speech to the Association of Teacher Educators, lamented the oft used saying "What's worth doing is worth doing well." Instead, he claims that what's worth doing is worth doing poorly, at least at first. He noted that almost every skill that we do well

today was preceded by efforts that were unskillful, bungling, and inept. Effective teaching research consistently shows, however, that effective teachers will alter the presentation of new information and new skills in order for children to retain moderate to high success rates (Borich, 1992). To wit, effective teachers keep the bungling to a minimum and keep the necessary early mistakes focused on achieving future successes. Invitational education meshes nicely into this aspect of effective teaching research in that it argues for a gentler, more open attitude about learning and the challenges faced by students as they learn. The inviting attitude emphasizes intentional encouragement and support during early learning which then leads to the precision that comes only with repetitive experimentation and practice. Experimental science and invitational education share this common perspective. Whitehead (1957) describes this perspective as the rhythm of learning. The natural flow from ignorance to knowledge starts with confused interest, leading to participation, which then leads to continued exploration, which leads to knowledge. There can be little doubt that this is the very attitude that is the foundation of both invitational education and modern experimental science. Everything from rocket development to heart transplants is littered with misconceptions and false starts. This is at the heart of understanding the inviting posture of effective teachers. Inviting children to learn is exemplified by the undefined road to science knowledge that the children in our first vignette had learned to fear most. While children may be taught explicitly that failure is always the precursor of success in scientific and other endeavors, the lesson often lacks credibility in light of teaching

practices that discourage children who fail.

Inviting in Increments: An Analogy

Even though baseball requires a level of finesse not available until the later teen years, that does not preclude teaching the game to our children, sometimes at incredibly early ages. One version even requires that the ball, rather than being pitched to the batter, is perched on an enlarged version of a golf tee so that the eye-hand coordination lacking in six year olds will not prevent participation in the game. This does not mean that youngsters do not enjoy and profit from the game played even on rudimentary levels. That the game is adapted to their abilities only *increases* their success and enthusiasm for the game. During practice the coaches concentrate on one skill at a time and periodically all the skills are combined to play the game. With this strategy America regularly turns out not only stellar baseball players, but also athletes in all sports.

As in baseball, we can teach the skills of inquiry one at a time *and* play the game. A combination of strategies invites some successes to counteract the disappointment of the inevitable and unavoidable failures that occur along the way. For the coach, talking about baseball is very inefficient in teaching catching, throwing, and batting. Likewise, talking about inquiry is not very effective. Inquiry requires practice. Doing inquiry is learning inquiry. As with baseball, inquiry is best achieved by practice, practice, practice....

Establishing Reasonable Expectations

Traditional school approaches to inquiry rarely lead children to an understanding of the necessary perseverance of trial and error or the joy of discovery. For too many children, inquiry is a process of locating answers to problems by "looking them up in a book." Since inquiry is often stereotyped as difficult, esoteric, and demanding, students view subjects (such as science) that typify inquiry as being limited to a brilliant few. This is a sad consequence of the fact that as a society we have very little understanding of how knowledge is developed and assessed. When teachers invite students into a curriculum of inquiry, certain expectations must be discussed in advance. The first expectation to be developed is that learning requires effort (and a lot of it.) Replacing the hedonistic notion that “learning should be fun” with the inviting view that “learning is satisfying and empowering,” children are led to the conclusion that learning is not an amusement, but the only way to build a “more powerful you.” The second expectation that needs to be established is that being smart is great but being smart and kind is greater. Learning should be valued but there are values more important to the classroom. Being a responsible capable person requires respect and compassion for others.

Inquiry into Animal Behavior: Another Vignette

The struggling teacher was an American teaching in a British Infant School and could not get the English children to understand hunting strategies of predatory animals. In the teacher’s home town, the children were well versed in things of the wild and the TV was saturated with nature

programming. But in this small English village it was different. The children could not believe the teacher when told that lions were usually unsuccessful in their hunting trips. Surely, they thought, an animal as large and powerful as a lion just runs into a crowd of antelope and bites the first one it comes to. The teacher wanted to teach to them about the best theories of animal behavior but feared that lecture might be both too abstract and too unbelievable. The teacher decided to invite the children to engage the problem directly and apply their newly acquired knowledge. A new plan was laid and the teacher invited the children to visit an African plain and watch the animals.

Lacking an African plain, the football pitch [aka the soccer field], both open and spacious, seemed the closest thing to the hunting environment of the lion. Twenty-one children were designated as antelope and sent out to graze on grass wherever they chose. The five strongest and huskiest children became lions and were sentenced to hungry bellies and cross tempers. At the whistle, the lions could feed on the helpless antelope grazing peacefully on the pitch. In a mindless dash the lions attacked. But the strong husky lions weren't as fast as the frisky antelope. After five minutes of gnashing of teeth, near misses, and taunting gestures by the antelope, not one of the hapless hunted creatures had been bitten.

The lions lamented and the teacher invited the lions to a strategy session. The “mindless-dash” theory was analyzed: that it didn’t work was the first item of discussion. The children concluded that the antelope were too fast, the chase was too tiring, and the antelopes had too big a head start. The lions were indecisive but posed some important questions:

“How can we slow down the antelope? How can lions get rest? How can lions get rid of the confusion? Which antelope should be caught first? How can the head start be cut short?” A plan was laid. The lions spread out as they approached the antelope. Zoe, the frailest of the antelope was singled out by the first lion. The chase ensued; the other lions ignored the remaining antelopes who, for a lack of being chased, stood still and watched. As Zoe passed the second lion, the first lion broke off and the second took up the chase. The chase was passed three times before Zoe raised her hands in exhaustion and was bitten by the hungry predator. The four other lions paraded around the carcass, celebrating their victory. The lions soon figured out they could capture even the strongest of the antelope--it just took longer.

The antelope realized their danger but within the pitch could not find any protection from the deadly strategy of the lions. The antelope were unhappy with their teacher whom they felt had unfairly sided with the lions. "Not fair!" they cried. "You helped! Anyway, animals don't think." The teacher invited them to reconsider, “Are you saying animals are mindless? That they don’t have any ideas about how to survive?”

The antelope gathered and began to talk. The antelope decided not to go anywhere near a lion and if one is chasing you run away from the other lions as well. The tide turned and the lions are once again hungry. The lions counterattack. "Let's hunt in packs...surround the antelope, wear them down while trying to trap them...." The antelopes countered again...."run for wide open spaces as straight as possible...dodge only when

a lion gets close. Speed and openness means survival." Though the children had not learned how lions hunt (lions don't exactly hunt this way although some jackals and hyenas do), they had learned planning was the most direct route to success and that there are many bumps along the way.

How Inviting Inquiry Lessons Are Created

When teachers provide inviting inquiry lessons they must perform several instructional tasks. They must plan appropriately by having strategies that :

- *establish risk recognition and provide support*
- *mobilize meaning and interest*
- *flex time scheduling and use*
- *provide a tentative attitude toward knowledge*

When teachers *establish risk recognition* they help students increase their awareness that inquiring into the unknown is an adventure where the road may be unclear and the direction can be unexpected. Since inquiry requires exploring the unknown, certain risks are always present. First, the problem under study may result in better understanding but the problem remains unsolved. Even with the best efforts of the children, an answer might not be found. Second, inquiry may mean that children acting as investigators may derive differing answers that seem equally plausible. This requires even more cooperation from the children. And finally, children must understand all contributions must be given consideration. The inviting inquiry curriculum is rooted in a teacher attitude where discovery and

experimentation is not only valued but the risks are understood. Those risks, though, are accompanied by a psychological safety net initiated by the teacher and supported by the students.

When teachers *mobilize for meaning and interest,* special attention must be paid to the unique characteristics of the learners. While guidelines for an inviting curriculum can be formulated, the curriculum can never be packaged because an inviting stance can only exist where teachers and students endeavor together to promote curiosity, questioning and learning in a mutually respectful and supportive environment. Therefore, an inviting inquiry curriculum is an elusive and ephemeral destination which requires continual renewal. Successfully inviting inquiry depends on a teacher who manages the active engagement of children's energies on significant and meaningful situations from their lives. Inquiry needs to be relevant and appealing to their emerging interests.

Teachers need to be prepared to *flex time schedules* to capitalized on these emerging interests of children. An inviting inquiry curriculum requires a teacher who actively searches for the opportunities afforded by the intersection of student interest and planned curriculum. The teacher needs to be sensitive to the use of a broad range of experiences both through careful planning and being ready to exploit happenstance. Teachers must also set aside time for students to work through unexpected problems and to provide sufficient time so that long term inquiry problems can be studied. While breakthrough achievements almost always have an element of serendipity, it is a fortuity born of perseverance and purposefulness. Even when children's attention is carefully

focused on a phenomenon or object

with an invitation to explore, interest may wane if quick solutions are not found. The teacher needs to assist students in understanding the need for precision that only comes through repeated study.

Teachers must accept and help students develop a *tentative attitude toward knowledge* so that students understand that knowledge is created in developmental steps. In an attempt to involve children more introspectively with their environment (Riner, 1983) isolated six preliminary skills inherent in inquiry methodology that also fit the developmental patterns of 8-12 year olds. Children can be encouraged to practice observation, problem finding/question asking, seeing relationships, note taking, sustaining interest/perseverance, and hypothesizing. Observation requires looking carefully and studying the detail of appearance and relationships. Problem finding and question asking requires that children actively pursue knowledge rather than taking on the role of passenger in the knowledge train of others. Note taking requires children to record their thoughts and ideas for later use and analysis. Sustaining interest and perseverance suggests to the students that problems are not readily solved and takes careful thought and study over long periods of time to resolve. Seeing relationships asks children to look for the interaction among entities and begin hypothesizing about both how and why events occur as they do. All six skills are virtual manifestations of invitations to look, ask, seek, and find.

Summary

This article attempted to illustrate the invitational nature of inquiry instruction and the rich benefits that can be derived from inviting lessons.

Inviting inquiry requires a tolerance of error, supportive environments that nurture inquiring intellects, and participation that involves meaningful endeavors that expand the child's understanding of the world. Inviting opportunities are found in the daily curiosity of children. Teachers need to be aware of the subtlety of the moment to invite children into inquiry and must be prepared with basic strategies, such as invitations, to observe, record, hypothesize, and interact. With an environment that recognizes risk and provides support, teachers can establish inquiring attitudes in children that mobilize children's quests for understanding and meaning.

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Dr. Phillip S. Riner is an Associate Professor in the Department of Instructional and Curricular Studies at the University of Nevada- Las Vegas.

Correspondence to Dr. Riner can be sent to:

4505 Maryland Parkway

Box 453005

Las Vegas, Nevada 89154-3005