

Education and Superstitious Practices

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People believe many things that are not necessarily true; they may also engage in unusual rituals. We may call these false beliefs “myths” and these unusual rituals “superstitions.” In 1948, B.F. Skinner presented food to hungry pigeons every 15 seconds independent of their behavior. He found that each subject engaged in an idiosyncratic pattern of behavior, and he attributed the development of these idiosyncratic patterns to accidental reinforcement. The subjects tended to repeat whatever they did just prior to food delivery and behaved as if their behavior caused the food, even though it did not.

Teachers may also develop idiosyncratic patterns of behavior. One could imagine a teacher who received reinforcement for hopping around the classroom on one foot or jumping on a table during class. Although accidental reinforcement may explain idiosyncratic patterns of behavior (Vyse, 1997), most common human superstitions are culturally transmitted. We don’t carry a rabbit’s foot because we just happened to do so one day and accidentally experienced good luck. Instead, we may carry a rabbit’s foot because we were told that it would bring good luck; if people happen to notice, we may even receive social reinforcement. A similar process may be responsible for many of the superstitious behaviors frequently exhibited by teachers. Teacher preparation programs, in-service workshops, and other products marketed to teachers may promote a culture of practices that are not supported by evidence and may be superstitious. This essay examines a sample of such superstitious educational practices.

Self-Esteem

A prime example of a superstitious practice was initiated by a member of the California legislature who introduced a bill requiring that all schools use programs to increase self-esteem based on some evidence that self-esteem and academic achievement were correlated. As a result, there are now numerous books and programs to enhance self-esteem but no evidence that enhancing self-esteem improves academic performance. In fact, some evidence suggests that such programs do more harm than good (Baumeister, Campbell, Krueger, & Vohs, 2003).

Learning Styles

Students differ. Common is the belief that students learn best through different modalities and that it is best to teach to a student’s preferred modality. It is possible to develop measures to assess a student’s preferred style of learning, and various inventories that claim to do so exist (Dunn, 1987; Keefe, 1982). Some students are said to be visual learners who learn best if teachers write information on the board or use slides and other visual images in their teaching. Others are said to be auditory learners who learn best if they can listen to a complex subject

being explained. Many teacher preparation programs require prospective teachers to develop methods that teach to a variety of these learning styles in an attempt to maximize learning opportunities for each student. Such preparation may be important for the prospective teacher as many school districts may include questions about teaching to various learning styles as part of the interview process. Applicants for teaching positions who are not able to provide a satisfactory answer to such questions may not be hired. However, the question is not whether it is in the best interest of prospective teachers to learn to teach to learning styles, but whether teaching to learning styles is of benefit to students.

Whenever an assessment instrument is developed, we must be concerned with its psychometric properties. Unfortunately, learning style inventories are known to have problems with both reliability and validity (Kratzig & Arbuthnott, 2006). More critically, although it is easy to find studies suggesting that students differ in their preferred learning style, it is difficult to find studies showing that teaching to individual learning styles actually makes in difference in student learning outcomes. In fact, there is now evidence showing that teaching to learning styles is not an effective method (Kratzig & Arbuthnott, 2006). Unfortunately, the practice continues.

Discovery Learning

Discovery learning is a constructivist approach that argues that learning should be student-centered rather than teacher-centered. This approach assumes that students “discover” how the world works with little or no teacher guidance. Although the approach works for some students, a significant percentage of students do not discover effective solutions to problems. A recent study (Klahr & Nigam, 2004) compared discovery learning to direct instruction, a behaviorally-based method of instruction (see Binder & Watkins, 1990). With discovery learning, 15-23% of the students learned how to solve the problems, whereas direct instruction resulted in 69-77% of the children achieving mastery. Discovery learning clearly works for some students and may be appropriate in advanced classes where all students have the prerequisite knowledge and skills, but students without the necessary prerequisite knowledge and skills in beginning classes may be put at risk.

Brain-Based Learning

There have been tremendous advances in neuroscience in recent years. It is not surprising, therefore, that educators have paid attention to these advances and developed brain-based learning. Based on the work of Roger Sperry, Michael Gazzaniga, and others (e.g., Gazzaniga & Sperry, 1967), who studied patients with a severed corpus callosum, an interest in brain lateralization developed. The “left brain” is said to be the logical hemisphere, concerned with language, and left-brain individuals are said to be verbal, analytical, and good problem solvers. The “right brain” is said to be concerned with visual-spatial activities, and right-brain individuals are supposed to be good at art and mathematics. The rationale behind brain-based learning is that teachers should teach to each specific hemisphere. To teach to the left hemisphere, students should engage in speaking, reading, and writing. To teach the right hemisphere, students should engage in drawing and painting. Of course, the problem with this approach is that few students have had their corpus callosum severed. In addition, the hemispheres are not as rigid as this story

suggests, and whether a visual-spatial task involves the right or left hemisphere depends on details of the task (Bruer, 1999).

Research has also suggested that there are gender differences in brain lateralization. Boys are supposedly right-brain dominant, whereas girls are left-brain dominant. And because schools are purportedly left-brain institutions, favoring girls over boys, there is a gender gap in academic achievement. Because of these alleged brain differences between boys and girls, one school in Owensboro, Kentucky, even separated boys and girls into separate classrooms so that it would be possible to teach to these brain differences. For example, teachers might provide boys with activities that emphasized spatial tasks, a right-brain activity; girls, on the other hand, might be exposed to more reading and writing, left-brain activities. However, these gender differences are generally small and tend not to have broad practical importance. In addition, such differences reflect group differences, not individual variation. Thus, addressing brain differences simply by segregating boys and girls without direct measurement of such differences is likely to result in two classrooms that, although segregated by gender, in fact, have a mixture of right- and left-brain individuals.

Brain research also suggests age-related learning effects. It is known that the brains of young children are densely packed with synapses, which increase in numbers until about age 10 and then decline to adult levels by around age 15. In addition, there is some evidence indicating that the brains of young children use more glucose than adults, with glucose uptake levels following a similar time course as synaptic density. The evidence on synaptic density and glucose uptake supposedly indicates that a “critical period” for learning exists and that as a matter of public policy, resources should be shifted from funding high schools and universities to pre-school and elementary education, because that is when students learn most effectively. Unfortunately, there is no evidence linking either the number of synapses or glucose uptake to rate of learning; there is also no evidence that 5 year-olds are better at learning than 15 year-old students (Bruer, 1999).

Other Superstitious Practices

There are many other educational practices that are not supported by data, or in some cases, have been shown to be ineffective. I have provided a sample of such practices to illustrate how easy it is to jump to conclusions on the basis of limited data or flawed science. Readers will likely be familiar with other superstitious practices such as the use of facilitated communication with autistic children. Or perhaps you are familiar with the use of whole language or “balanced” programs for teaching reading. In fact, many of these reading programs do not contain the key features that science has shown are necessary to maximize learning. Readers may even be familiar with the controversy that is currently raging among constructivist mathematics educators and mathematicians using direct instruction, who argue that the lack of fluency in basic mathematics skills leaves students unprepared for algebra and higher mathematics. Maybe you even have your own set of favorite superstitious practices.

Is There an Alternative?

Perhaps superstitious practices exist because many teachers are unaware of, or do not believe there are, effective alternatives. On the contrary, several evidence-based practices do exist, both

for pre-college and college instruction. Both Direct Instruction and Precision Teaching (Binder & Watkins, 1990) have data supporting their use in pre-college instruction, and a number of studies have demonstrated the effectiveness of the Keller Plan (Keller, 1968), otherwise known as the Personalized System of Instruction. In addition, evidence supporting a new method known as Interteaching (Saville, Zinn, Neef, Van Norman, & Ferreri, 2006), which capitalizes on cooperative learning, is beginning to accumulate. Unfortunately, such practices are not as widespread as the evidence suggests they should be, perhaps because of institutional policies, reward structures, and the transmission of superstitious practices. For lack of space, I will not discuss these methods further. However, I would urge you to examine these evidence-based teaching methods.

Why Does It Matter?

Superstitious educational practices are less effective than those based on evidence obtained with sound methods. Although the examples cited above are derived from K-12 education, many are relevant on college campuses as well. If you have a teacher education program, do faculty require students to demonstrate that they can teach to learning styles? Are reading specialists taught to base reading instruction on sound science? If you have a teaching improvement program on campus, do topics such as teaching to learning styles occasionally appear as part of the programming? Do faculty on campus worry that giving students lower grades might negatively affect their self-esteem? Are educational practices based on data obtained with sound methods? Or are some based solely on anecdotal reports by a particular faculty member? Is discovery learning promoted in science education without respect to the context where it might be appropriate? Can you honestly say that all of your teaching practices are based on sound evidence? If the answer is no, do you have a plan to address this? Or will your students continue to enjoy watching you hop around on one foot?

References

- Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness or healthier lifestyles? *Psychological Science in the Public Interest*, 4, 1-44.
- Binder, C., & Watkins, C. L. (1990). Precision teaching and direct instruction: Measurably superior instructional technology in schools. *Performance Improvement Quarterly*, 3, 74-96.
- Bruer, J. T. (1999). In search of . . . brain-based education. *Phi Delta Kappan*, 80, 246-257.
- Dunn, R. (1987). Research on instructional environments: Implications for student achievement and attitudes. *Professional School Psychology*, 2, 43-52.
- Gazzaniga, M. S., & Sperry, R. W. (1967). Language after section of the cerebral commissures. *Brain*, 90, 131-148.

- Keefe, J. W. (1982). Assessing student learning styles: An overview. In J. Keefe (Ed.), *Student learning styles and brain behavior* (pp. 43-53). Reston, VA: National Association of Secondary School Principals.
- Keller, F. S. (1968). Goodbye, teacher . . . *Journal of Applied Behavior Analysis, 1*, 79-89.
- Klahr, D., & Nigam, M. (2004). Equivalence of learning paths in early science instruction: Effects of direct instruction and discovery learning. *Psychological Science, 15*, 661-667.
- Kratzig, G. P., & Arbuthnott, K. D. (2006). Perceptual learning style and learning proficiency: A test of the hypothesis. *Journal of Educational Psychology, 98*, 238-246.
- Saville, B. K., Zinn, T. E., Neef, N. A., Van Norman, R., & Ferreri, S. J. (2006). A comparison of interteaching and lecture in the college classroom. *Journal of Applied Behavior Analysis, 39*, 49-61.
- Skinner, B. F. (1948). "Superstition" in the pigeon. *Journal of Experimental Psychology, 38*, 168-172.
- Vyse, S. A. (1997). *Believing in magic: The psychology of superstition*. New York: Oxford University Press.