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A Brief Look at Experiential Learners

Let us begin by saying that the students who will benefit most from the lessons in this book may be either male or female. They are the experiential learners in your classroom, the ones who need to interact with information in an active way and probably in more than one way. These students are more likely to be boys, for the reasons outlined in this chapter, but many girls are also experiential learners and will respond similarly to the iconic or kinesthetic methods underlying the lessons in this book.

THE ACTIVE BRAIN: MALE OR FEMALE

There is a growing body of evidence that reveals that the brains of very young girls and boys are different—both structurally and developmentally. When we say that boys and girls differ, we mean that the average girl and the average boy are different, but some girls learn more like a typical boy and some boys learn more like a typical girl. Characteristic sex indicators such as hormonal levels do not show absolute differences, although average levels of hormones are very different between men and women (Kimura, 2004). That means that individual men may have the same levels of hormones as do individual women, but for most people, hormonal level is a clear indicator of sex differences. Individuals who are genetically female or male may show variations in the expression of typical sexual markers. For example, although all of the authors of this book are women, one of us is as tall as the average male. That does not make her male, just taller than the

average female. So, while we refer to the male or female brain, please remember that we are referring to behavior or responses which are typical for the majority of males or females, but certainly not for all.

One of the authors has been asked why she still refers to the boy brain if not all boys fit the description and some girls actually do fit the description. The problem is that male and female brains do not present a simple dichotomy. Some differences are due to biology, such as the differences in the structure of the ear that result in hearing differences and the hemispheric differences in brain development. If boys don't listen to directions is it due to hearing differences or due to their slower acquisition of language because their left hemisphere is a bit slower to develop? It may be that they don't always understand what is said or it may be due to their lack of interest in the subject. Since parents talk to infant boys less often than to infant girls, the problem may be that boys don't have a lot of practice in listening (Whitehead, 2006). The variations in how girls and boys learn begin with differences in brain development, which are shaped by the differences in how children are treated beginning in the minutes following birth, but since the majority of boys fit the model, it makes sense for teachers to think in terms of a gendered approach to the classroom.

All teachers are aware that there are many different avenues to learning and that to group students by any variable means that there will be a wide range of differences. Knowing that, we traditionally group children in school by age. Even though 10-year-old children can vary a great deal, most children in a fifth-grade class are 10 years old. As much as we would like to do so, it is impossible for a teacher to tailor instruction for each individual child in a class. So teachers focus on the most obvious groupings of students, and sex is one way to sort children. Preparing a lesson to include boy-style learners will meet the needs of many of the boys in a class, but not all. Additionally, the academic needs of some girls, especially girls who are experiential learners, will be met by lessons framed for boys.

Having apologized for the fact that children do not fit neatly into sex-defined learning groups, we still maintain that sex-specific lessons and even classes help a great many children. Simply saying that boys are more varied compared to each other than when compared to girls does not mean that the differences between the sexes do not exist. Of course they exist; what we do not want is for children to be limited in their school experience because they belong to one group or another. Providing lessons aimed only for boys or for girls is akin to teaching a sport only by reading a description of how to play the game without seeing how the game is played.

Structural Differences

Male and female brains do not develop in the same way. By the time we become adults, however, the male and the female brain function more similarly than they did when we were infants. The active approach to teaching is based on the belief that helping children use their cognitive strengths to learn will lead them to focus on academic strengths rather

than on areas of weakness. If a child does not learn using conventional methods, that does not mean the child cannot learn. It simply means that the child may have greater success using another approach. Those alternative approaches may be based on cognitive gender differences.

Right Versus Left

For boys, the right side of the brain develops early, whereas for girls, the left side of the brain develops first (Shucard & Shucard, 1990). We know that the language center begins in the left portion of the cerebral cortex and believe that is the reason that girls, on average, have stronger verbal skills than do boys as very young children (Halpern, 2000; Kimura, 2000). By age 15, for example, on a test of reading literacy administered in 25 countries, girls outscored boys in every country by a minimum of 15 points (Halpern, 2004). However, by adulthood, there is no difference in verbal intelligence between men and women (Halpern, 2000) even though men and women continue to process words differently (Goldstein et al., 2007). The right side of the brain is believed to be where spatial skills begin development, and that is usually given as the reason that little boys find it easier to throw a ball than little girls. Unfortunately, verbal skills are more valued in school than are spatial skills, particularly in the early years. Teaching boys to use spatial skills to help remember verbal information is one example of how to use cognitive advantages to compensate for cognitive differences. Giving girls practice in developing spatial skills will assist them when they get to upper-level math and science.

Frontal Lobe Development

The prefrontal lobe, the portion of our brain immediately behind our eyebrows, is referred to as the executive decision maker and is responsible for helping us make reasoned decisions and for controlling impulses. This part of the brain begins to mature first in girls, and the slower development in boys may be a contributor to the impulsive behavior which is a hallmark of young males (Giedd et al., 1999). Studying in short bursts will take advantage of this lack of ability to sustain attention and control behavior and give practice in developing concentration skills.

Amygdala and Hippocampus

These nodes deep within in the brain can be found approximately at the points where horizontal lines running backward through the eyes intersect a line connecting the ears. The hippocampus has long been known to be involved in helping us turn short-term memories into long-term memories. The exact function of the amygdala is beginning to be understood; it is thought to be implicated in emotions such as fear and aggression as well as in emotional memory. The term *implicated* means that scientists do not know if the amygdala is the source of these emotions or whether it is simply a mediator or manager of these emotions, but it is involved. Recently, it has been noted that the amygdala enlarges first in boys and the hippocampus first in girls (Giedd, Castellanos, Rajapakse, Vaituzis, & Rapoport, 1997; Yurglen-Todd, Killgore, & Cintron, 2003).

Does that mean that girls have better memories and boys have stronger emotions? There is plentiful evidence that little girls learn words better than little boys; one study reported that 20-month old girls have twice the vocabulary of 20-month old boys (Morisset, Barnard, & Booth, 1995). That is probably due to a combination of factors including the earlier left hemisphere development of the brain combined with the early memory skills. Little boys certainly have the reputation of being loud and obstreperous, and that behavior can be seen as the result of emotions in an individual with poor verbal skills. Helping boys use their considerable energy and framing the material so that it interests them will improve the chances that boys will learn the material.

Additionally, children who are bored in school become disconnected from what happens in the classroom. Only if the lesson provides control, choice, challenge, complexity, and caring can bright students be motivated to engage in the class exercise (Kanevsky & Keighley, 2003). Boredom is a huge problem for boys in school because of enforced inactivity, and any lesson that provides control, choice, challenge, and complexity, together with a teacher who cares, will engage boys in the learning process.

Sensory Differences

Hearing

Most newborns in the United States receive a test for hearing involving a sudden burst of sound that, if the ear is functioning correctly, results in an echo-type reaction detected by a device in the ear canal. The results of this test indicate that the ears of girls are more sensitive than the ears of boys, especially for high frequencies (Cassidy & Ditty, 2001). Other research indicates that girls' ears are more sensitive to soft (low-volume) sounds as well (McFadden, 1998). Additionally, little boys are more likely to suffer inner ear infections (Stenström & Ingvarsson, 1997), which means that while they have an infection what they hear may be muffled and indistinct. So speaking to a little boy in a high, soft voice may not get his attention or result in his remembering what has been said. Classroom exercises which help boys develop phonemic awareness will assist boys in learning to read and to listen to others. Additionally, training in listening and developing skills in accurately reporting what is heard will help students develop the auditory proficiency necessary to learn in the classroom.

Vision

One of the major problems with vision is *saccades*. The reader will find a complete description of the subject in Chapter 3. Saccades may be larger in novice readers and boys, and an active approach to learning may well get the student engaged in a task; as students gain more control of their bodies, they will be ready to read. Probably related to this situation is the understanding that girls are better at perceptual speed than boys (Kimura, 2000). This is the skill that allows us to locate similar objects in a field of many other objects or determine which figure is different. Proofreading

requires good perceptual speed; the fact that many boys will not check their work or are poor proofreaders is probably a result of this gender difference. Teaching boys techniques for finding mistakes will make it more likely that they will check their work and correct their errors.

Touch

While girls may have a greater sensitivity to touch than do boys (Velle, 1987), the observation of teachers is that boys have to physically interact to learn (Reichart & Hawley, 2009; Vallance, 2002). Recent information suggests that boys who are moving, especially moving their hands such as fiddling with something, are better able to remember class information (Rapport et al., 2009). In fact, it is such a salient learning trait for boys that most of the suggestions contained in this workbook are designed at least in part to give students the chance to interact with the classroom environment.

Cognitive Differences

Verbal Skills

It is believed that because of the differential development of the brain, girls have a verbal advantage. It is well established that by third or fourth grade the average girl reads better than the average boy, and that continues to be the case into early high school (Halpern, 2004). The reasons for this difference in performance are complex and beyond the scope of this brief discussion. However some of the factors determining boys' reading achievement have been identified as a perception of reading as a feminine activity, lack of familiarity with books and literacy, weak reading skills, poor academic self-concept, and inefficient learning strategies (Sokal, Katz, Chaszewski, & Wojcik, 2007; Swalander & Taube, 2007). You will note that all of those factors are determined more by society than by biology. The verbal problems that are typical of many boys may start with a neurobiological difference, but are exacerbated by societal assumptions that boys either will have problems reading or don't want to read. Strategies to help boys become more adept with all kinds of verbal skills will help boys feel more comfortable with reading and writing tasks.

Spatial Skills

It is well established that, probably because of the early development of the right cerebral hemisphere, boys have good spatial skills (Shucard & Shucard, 1990). Teaching boys to use charts, graphs, and other graphical methods of organization will help them structure information in such a way so that it is more easily retrieved. The act of displaying words in such a way will help boys remember the material.

Learning Modalities

For whatever reason, boys tend to learn best when they can see the information depicted pictorially—what is known as *iconic learning*—and when

they can interact with the information—what is known as *kinesthetic learning*. Information in school is overwhelmingly presented as verbal information or as auditory information. One study of college students found that none of the men in the study preferred to hear about information. Most of the males in this study (87.5%) preferred to receive information in multiple ways, whereas less than half of the women in the study (45.8%) did (Wehrwein, Lujan, & DiCarlo, 2006). When a lesson is designed to help students interact with the information in more than one way, the learning of boys and other experiential learners is enhanced.

LANGUAGE ARTS, MATHEMATICS, SCIENCE, AND STUDY STRATEGIES

The lessons in the following chapters are arranged into four broad areas: language arts, mathematics, science, and study strategies. Many of the lessons in each area can be adapted for use in other areas, and we hope that you will be inspired to develop strategies of your own.

Each lesson is divided into five or six parts: The level of each lesson is followed by the purpose of the lesson, the time required for the lesson, the materials needed (if any), the procedure for the lesson, and suggested ways to assess the success of the lesson. The level will tell you what level of students the lesson is intended for, and also what the lesson is designed to do. Some of the suggestions are designed to teach material and are designated as lessons. Others are for review, to provide enrichment, to help students learn problem solving skills, to provide incentives to learn lessons, or to present information traditionally given in verbal form in an alternative modality. Some lessons are complicated and require several pages to describe, while others are very simple and can be explained in less than a page. Table 1.1 is a chart indicating which lessons are designed to meet specific cognitive needs of experiential learners.

The point of all of these lessons is to provide a more active approach to learning. While most active learners are boys, some girls are also active learners and will benefit from this approach. Remember, too, that students who learn well in less interactive ways will also profit from getting involved in the learning process. All students need a variety of experiences so that they can develop different ways of accessing information. Outside of school, we are rarely handed a book to learn what we need, but have to acquire information by interacting with the environment. These active lessons will help students prepare for the world.

Table 1.1 How the Following Lessons Meet the Cognitive Needs of Experiential Learners

Brain/Cognitive Differences	Lessons to Try			
	Math	**Language Arts**	**Science**	**Study Strategies**
Right Brain Versus Left Brain Allows students with strengths in one side to use those strengths to develop strengths in the other; e.g., helps students with strong spatial skills to help develop verbal skills.	8, 11, 13, 16, 19, 20, 21	28, 34, 37, 43	48, 51, 54, 56, 61	67, 68
Frontal Lobe Development Gives students practice in executive function tasks such as controlling impulses and making reasoned decisions.	3, 5, 7, 10, 13, 14	24, 26, 31, 32, 37, 42, 43, 46	49, 50, 52, 54, 60, 63	64, 66, 67, 68, 69, 70, 71, 73
Amygdala Some students need an emotional connection with a lesson to develop an interest in the subject. These lessons help here.	7, 16, 21	22, 23, 26, 27, 29, 30, 31, 32, 33, 44, 45	48, 54, 55, 59, 62	64, 66, 68, 69, 70, 72, 73
Hippocampus Boys' memory skills tend to be based on visual cues and girls' on verbal cues. These lessons help students develop skills in both areas.	8, 9, 21	23, 32, 39	47, 56, 57, 58	66, 67
Listening If students do not develop good listening skills in part because of different development in sections of the ear, these lessons help develop listening skills.	1, 2, 4, 6	22, 30, 39, 43	51, 52, 53	64, 68, 71, 72, 73
Vision If students are particularly strong in visual skills, these lessons take advantage of those strengths. They also help other students strengthen their ability to use visual cues.	3, 8, 9, 10, 12, 15, 16, 17	25, 28, 38, 42, 44, 45	47, 49, 53, 57, 58, 59, 61, 62	65, 66, 67
Touch Boys report that they learn well from active learning; these lessons provide lots of touch. Girls may be reluctant to engage in such activities and will benefit from the experience.	1, 2, 6, 9, 10, 14, 18, 21	23, 25, 36, 45,	All lessons	65, 66, 67, 68, 73
Verbal Skills For students whose verbal skills are slow to develop, these exercises are designed to provide active and interesting ways to help them practice those skills. Students with strong verbal skills can use their strengths even more.	4, 11, 15	27, 29, 30, 31, 33, 34, 35, 38, 40, 41, 44	55, 60	65, 67, 70, 71
Spatial Skills These exercises will provide practice for students whose spatial skills are slow to develop. At the same time they will allow students with strong spatial skills to shine.	1, 2, 5, 6, 8, 10, 14, 16, 17, 18, 19	25, 34, 36, 40, 41, 42	49, 50, 53, 54, 55, 56, 59, 60, 61, 63	65, 67, 72
Learning Modalities Most lessons are based on verbal/visual or auditory tasks. These lessons provide iconic (picture) and kinesthetic (hands-on) activities.	3, 9, 10, 11, 12, 15, 18	24, 28, 29, 35, 36, 40, 41, 45	48, 52, 53, 55, 57, 58, 60	66, 67, 68, 69, 70