TOWARDS AN UNDERSTANDING OF BRAIN HEMISPHERICITY AND HOLISTIC LEARNING: IMPLICATIONS FOR ADVENTIST EDUCATION

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INTRODUCTION

The first announcement of the plan of God to create man is given in Genesis 1:26-27 as follows: "Then God said, Let us make man in our image, in our likeness, and let them rule over the fish of the sea and the birds of the air, over the livestock, over the earth and over all creatures that move along the ground. . ." (NIV). This passage tells us that men and women have much value and worth when compared with the rest of creation and that it was God's plan to have them bear responsibilities over all creation and life.

Ellen G. White, in her book Education, points out that at creation, Adam and Eve were endowed "with high mental [brain] and spiritual gifts. . ., that they might not only discern the wonders of the visible universe, but comprehend moral responsibilities and obligations." To help human beings perform their duties to maximum capacity, God established a school in the Garden of Eden and its purpose was to help them sharpen their potential and to ". . .expand the mind [brain] and to develop the character." For a while, Adam and Eve (the first human beings) bore God's image both in resemblance and in character, until sin shattered the likeness. Since the fall the ability of human beings to perform at best has been gradually decreasing and they have also lost, through sinful

nature, a great deal of the glory they had when they were created. Christian education, however, has continued to exert its influence on the mind of the sinful human beings in order to assist them in transforming into the image of God again. The purpose of this paper is to attempt to examine through literature how the brain endowed to human beings at creation functions and its implications for Christian education.

BRAIN FUNCTIONS

Research in the late 1960's and early 1970's, according to Buzan, in Use Both Sides of Your Brain, has changed the history of our "appreciation of the human brain." Findings from various laboratories seem to agree that the brain has enormous "intellectual and emotional powers" with the ability to absorb information, express and organize itself comprehensively according to the way one functions. This concept is echoed by several authors such as Jones (1987), Sonnier (1984), Edwards (1979), Chall and Mirsky (1978), Springer and Deutsch (1985), et cetera. These laboratory discoveries appear to confirm what E. G. White wrote in connection with the "high mental and spiritual gifts" that first human beings received at the creation.

Further laboratory discoveries confirm that the brain packed together inside the skull is divided into halves which are linked by nerve fibers that serve as channels of communications between them. In addition, a great deal of evidence that has been

accumulated in recent years shows that these two halves now known as left and right hemispheres are not identical. Many investigators who have speculated on this issue have attempted to go beyond these distinctions. A popularly accepted view of the differences between the left and right hemispheres according to Springer and Deutsch (1985), however, is that the "left brain operates in a logical, analytical manner" which Buzan (1983), calls the "academic activities" and the right brain works in a "Gestalt, synthetic fashion."

The human brain is thus divided into two hemispheres - the right hemisphere and the left hemisphere. Sonnier (1984) gives detailed information regarding the apparent differences between them. He writes:

> The educational process of the cognitive domain have parallel relationships with the processes of the right hemisphere.
>
> The processes of the cognitive domain are recall or recognition of the development of intellectual abilities (Bloom, 1956). Whereas the processes of the affective domain are interests, attitudes, appreciations, values, and emotional sets or biases (Krathwohl, 1964). P. 66.

Judging from what Sonnier (1984) has said above and from various sources of literature on this topic, the left hemisphere has an apparent functional relationship with cognitive achievement which is the processing of the "linear-logical, analytical data." Likewise, the right hemisphere has apparent functional relationships with the affective domain that are the processing of "visual-spatial configurational data which are instantly evaluated

in a holistic and subjective manner."

In the views of most authors on left and right brain dominance, there is an apparent common agreement of opinion that society has over-emphasized the development of left hemisphere abilities. Some refer to I.Q. tests as an example of that which is aimed at justifying the claim that success in society is measured in terms of productivity and money. Springer and Deutsch (1985), argue that such measures are "very narrow and do not take into account artistic creativity and other not easily quantifiable right hemisphere skills." It appears from the argument above that the major thrust of the left hemisphere is the logical representation of reality and communication with the external world. Thinking, reading, writing, and concern about time may be attributed to the left hemisphere in this regard. In contrast, situations relating to understanding patterns and complex relationships that cannot be precisely defined and which may not be logical are attributed to the right hemisphere. Several studies have indicated that the qualities of the right hemisphere are important and essential in that they involve the creative insight and values but they tend to be inadequately emphasized. Springer and Deutsch (1985) explain why the right hemisphere is often neglected:

> Because we operate in such a sequential seeming world and because the logic thought of the left hemisphere is so honoured in our culture, we gradually damp out, devalue, and disregard the input of our right hemispheres. It's not that we stop using it all together; it just becomes less and less available to us because of established patterns. P. 247.

Several authors consider the development of mental abilities of both left hemisphere and right hemisphere as essential. Otherwise, if the abilities of both hemispheres are not raised to the highest and finest working power, the education of the student will be imperfect and one-sided.

RIGHT HEMISPHERE AND ITS SIGNIFICANT ROLE IN CHRISTIAN EDUCATION

This section will look at the functions of the right hemisphere of the brain and its significant role to Christian education. Several authors show that the right hemisphere is synonymous with the affective domain which caters for interests, attitudes, appreciations, values, and biases of individuals. Thus the right hemisphere has an apparent functional relationship of configurational data which are evaluated in a holistic and subjective manner. This suggests that in order to obtain meaningful learning results and maximum positive results from the application of the right hemisphere, the teacher will necessarily have to employ a teaching strategy which allows students to have real and personal involvement with the subject matter to be learned. The term holistic suggests meeting the needs of both hemispheres. When applied correctly, it includes first hand experiencing, hands-on experiencing, learning by doing. Therefore, efforts to foster the right hemisphere usually result in both hemispheres being involved. According to the research, the

education that involves both left and right hemispheres as shown above, is complete and balanced.

It is interesting to note that what research is finding today in connection with the left and right hemispheres and their implications in education, bears resemblance to what God introduced as the course of instruction in the Edenic School. In Education, White (1952) mentioned that "The book of nature" provided a "source of instruction." In today's understanding in the light of de Bono's research (1971) at Cambridge University on the behavior of biological systems, the study programme in the Edenic School reflects two main components: 1. Vertical thinking which is concerned with analytical (left-brain) the conclusion of which may come after the evidence. 2. Lateral thinking (right-brain) which is concerned with generating new ideas and approaches and with extending capabilities through imagination, intuition and inspiration. The curriculum in the Garden of Eden may, therefore, be analyzed as follows:

Vertical Thinking: Composed of Studies In	Comparison With Modern Subjects
1. Leaf of forest and Animals	Biology
2. Stones of the Mountains	Geography/Geology
3. Stars	Astronomy
4. Earth, Sea and Sky	Geography
5. Mysteries of Light and Sound	Physics/Math

6. Laws and Operations of Nature	Physics/Math
7. Great Principles of Truth	The Word of God

Lateral Thinking: Learning Activities involving caring of the Garden "to dress it and keep it." Genesis 2:15.

Since the education system "instituted at the beginning of the world" was to be a "model for man throughout all aftertime," it would appear then that God was addressing the issue of left hemisphere and right hemisphere. The lateral component involved learning activities in the garden as reflected in the comments of White (1952) below:

> To Adam and Eve was committed the care of the garden "to dress it and to keep it." Gen. 2:15. Though rich in all that the Owner of the universe could supply, they were not to be idle. Useful occupation was appointed them as a blessing, to strengthen the body, to expand the mind and to develop the character. P. 21.

In the light of this it is possible to believe that the Edenic education system had a holistic thrust, thus involving the accumulation of theoretical (vertical) knowledge and learning by creative activities (lateral thinking).

Today recent scientific findings help us to know that our brains are double, each half with its own way of knowing, its own way of perceiving external reality, and that each of us has two minds, two consciousnesses, mediated and integrated by the connecting cable of nerve fiber--Corpus Callosum, between the

hemispheres.

Edwards (1979) pushes the observation above further by pointing out that: "Inside each of our shells therefore, we have a double brain with two ways of knowing. The dualities and differing characteristics of the two halves of the brain and body intuitively expressed in our language, have a real basis in the physiology of the human brain. Nevertheless, as each of our hemispheres gathers in the same sensory information, each half of our brains may handle the information in different ways: the task may be divided between the hemispheres, each handling the part suited to its style." Research shows that the left hemisphere analyzes, abstracts, counts, marks time, plans step by step procedures, verbalizes, makes rational statements based on logic. On the other hand, we have a second way of knowing: the right hemisphere mode. We see things in this mode that may be imaginary. We see how things exist in space and how the parts go together to make up the whole. Using the right hemisphere we understand the metaphors, we dream, we create new combinations of ideas. We use intuition and have leaps of insight--moments when everything seems to fall into place without figuring things out in logical order. To Edwards (1979), "This then is the right-hemisphere mode: the intuitive, subjective, relational, holistic, time mode. Yet--this is the disdained, weak mode because in our culture it is generally ignored. For example, most of our educational system has been designed to cultivate the verbal, rational, on-time, left hemisphere, while half of the brain of every student is virtually

neglected."

With their verbal and numerical school programmes (classes) the right-hemisphere is not under very good verbal control. The right-hemisphere is not good at sequencing--doing first-things-first, taking the next step, then the next. It may start anywhere or take everything at once. It is not good at analyzing and abstracting characteristics.

The study of Edwards (1979) suggests that "Even today, though educators are increasingly concerned with the importance of intuitive and creative thought, school systems in general are still structured in the left-hemisphere mode. Teaching is sequential: students progress through grades in a linear direction. The main subjects learners study are verbal and numerical, reading, writing and arithmetic. Time schedules are followed. Seats are set in rows. Students converge on answers. Teachers give out grades. The right brain--the dreamer, the artist, is lost in our school system and goes largely untaught. There might be a few art classes, a few shop classes, or something called creative writing. But separate courses in imagination, in visualization, in spatial skills, creativity, intuition and inventiveness hardly appear on the time table." Yet educators value these skills and have apparently hoped that students would develop imagination, perception and intuition as natural consequences of training in verbal, analytic skills. The emphasis of our culture is so strongly slanted toward rewarding left-brain skills that our students are losing a very large portion of the potential ability

of the other halves of their brains.

POINTS OF TENSION ARISING

While it is important that Christian education should plan the program to an extent that it will bring about a well-balanced mind, there are those situations which make it difficult to maintain such a balance in our schools. The reasons and excuses for not being able to offer balanced education are many. This paper will discuss briefly only a few such as (1) high cost, (2) examination-oriented system, (3) lack of facilities, and (4) teachers lacking skills for holistic education.

1. High Cost. It requires a lot of money to plan for and run an educational system that would involve the development of abilities and skills for both right and left hemispheres. The programme would call for more teaching space, well equipped laboratories, additional faculty and staff, visual aids, excellent communication system, ample land, et cetera. Because the church does not always provide sufficient funds to sustain a programme of this nature, education leaders and teachers in the organization are sometimes forced to run an educational programme that will be synonymous with the processes of the cognitive domain involving recall or recognition of developmental abilities and skills which have a sympathetic function of left brain hemisphere processes. White (1977) in Mind, Character, and Personality, states that students who go through such a school program come out with largely book knowledge. "The energies that should have been devoted to

business of various lines have been neglected," she stresses. She continues to argue that education does not consist in using the book learning alone, and then remarks pointedly that such students are only partially prepared to make life a success. The dim picture painted by her can only change when learning is constructed to involve the right hemisphere in conjunction with the cognitive domain. Hence, the holistic approach to learning cannot be brushed off in favour of mostly vertical learning activities without resulting in a high degree of negative results in the end.

2. Examination-Oriented System. Many Seventh-day Adventist schools are situated in countries which place heavy emphasis on external examinations. Some teachers teaching in such schools may have a real burden to involve the students holistically in their learning activities. But because of pressure from the Ministry of Education or from Academic Accrediting Associations teachers usually panic and rush the students through a "conveyor" style approach, involving them in rote memory and in activities that are mostly geared to development of intellectual abilities. So the emphasis is on language, recall and logical thinking to ensure the left hemisphere is well exercised in preparation for the external examinations. White (1977) comments that students rushed through in a "conveyor" style often come out with defective education which often leads to failure in "whatever branch of business they may undertake."

3. Lack of Facilities. The problem concerning lack of facilities is quite common in most Adventist school systems.

Usually schools do not have sufficient textbooks, visual aids, laboratories, classroom space, et cetera. Faced with critical situations of this nature, teachers sometimes throw their arms up in the air in despair and the result is that most of them take an easy route of just passing information to the students, encouraging them to memorize a passage or section, and in doing so rush over important subjects without leading the students to think and clearly understand the truth for themselves. White (1977) makes it very clear, emphasizing the point that "God expects His institutions to excel those of the world, for they are His representatives." Therefore, teachers connected with Adventist education are called to be innovative. Christian education requires painstaking efforts to ensure students in their school will not just do brain work (cognitive) and stop there.

4. Teachers Lacking Skills for Holistic Approach. It is reasonably safe to mention here that a good number of teachers involved in Adventist education do not have the skills to enable them to place emphasis on the holistic approach to learning. As a result, many of them place too much stress on rote learning at the expense of insightful learning and understanding. Teachers who are affected in this area should be assisted to improve their level of effectiveness with the affective domain.

SUGGESTIONS FOR LEARNING ACTIVITIES THAT MAY INVOLVE THE BRAIN OF RIGHT-HEMISPHERE

Sonnier (1985) postulates that affective domain learning activities skills are best learned through the process of "hands-on investigations, . . ." Included along with this list are "student interests, attitudes and values." Research also indicates that the right-brain is host to motor skills, intuition and emotion and is a ready receptor of music.

Literature, therefore appears to emphasize the fact that skills on these talents are developed and sharpened when learning involves activities related to right hemisphere in which the parts acquire meaning through their relations with other parts. The right hemisphere comprehends through the process of synthesis. Through this exercise, therefore, values are reached, attitudes and appreciation are developed. Yet religion has a great deal to do with values and attitudes that one acquires as he goes through life. White (1923) in Fundamentals of Christian Education, throws light on the importance of values in one's Christian experience: "Religion does not make the receiver coarse and rough, untidy and uncourteous; on the contrary, it elevates and ennobles him, refines his taste, sanctifies his judgement. . ." P. 85.

Every one of these has to do with values one has to sharpen and develop and this reaffirms the significance of the holistic approach to learning. Below are suggestions that the teacher desirous of integrating faith and learning may use in order to assist his students to have opportunities of resharpening the skills and abilities of the right hemisphere. In the development of the suggestions, the writer has gleaned from the literature.

The list of suggestions is not exhausted by any means. The Christian teacher who is interested in helping his students develop positive Christian values may add to the list, or using this example, draw up one of his own.

SUGGESTIONS

As indicated in literature, the traditional educational pattern is largely to produce literate persons through the emphasis of basic facts and concepts. But the research is discovering a need today to get into the inner cosmos of the human brain so that the goals of educators will deal with the outer limits of human potentials and not just minimums. Thus, the educational goals are to be holistic. From study of literature the following major goals for an educational system that may support a foundation for a holistic framework which is ideal for integration of faith and learning may be summarized as: (1) creative, (2) ethical, and (3) cooperative goals. A brief examination of each goal is described below.

1. The Creative Goal. Discoveries and conclusions in all disciplines and in life situation are made and reached by human beings who are exposed to creative activities. According to literature, true creativeness in today's super-rational culture, has withered away in most educational programs and as a result, the schools are mostly producing technical students whose mental abilities dwarf their creative potentials. The real challenge in Christian education lies in the development of creativity in course

offerings as research agrees that it is essential in the integral development of attitudes and values in each human being.

2. The Ethical Goal. The real burden that the research findings have expressed is that in today's educational system, strong emphasis is placed on materials and things. Serious efforts should be made to place students higher than the material things that computer technology can produce. In addition to the accumulation of book knowledge, the education should be people-oriented in order to encourage students to develop values of compassion, love, care, concern, honesty, et cetera, for others. God's character traits involve all these, and many more. The acquisition of such values in their educational experiences will assist their right-brain perspective produce clear vision that is not readily apparent to the naked eye. Once they are able to see patterns they will be able to direct their efforts most advantageously and to learn to appreciate comfortably their God.

3. The Cooperative Goal. This is when there is a team spirit between the teacher and the students. The concept is based on the idea that students possess different intellectual abilities, as well as psychological functions such as imagination, intuition, emotions, et cetera. The concept is that in the classroom where a team spirit is promoted, students and the Christian teacher will interact in a healthy and friendly spirit resulting in a good environment conducive to a holistic approach to learning. The Christian teacher is a key figure in the cooperative environment in that he/she will assume the role to being a facilitator. In

this setting, the students and the Christian teacher will contribute in a dynamic manner to class activities. Security, trust and student self-concept will be promoted. The teacher then becomes the model to the students. He/she is loving, understanding, tolerant, a good counselor, and one who sees potential in each of his students. The team spirit in the classroom, therefore, encourages students to work on research or projects , and to engage in activities that will give them an opportunity to explore and make their own evaluations, appraisals, and perhaps judgments. The teacher's role in this endeavor is to provide opportunities for meaningful and purposeful practice, and as Gillespie suggests in his paper, "aid the learners in visioning the possibilities for life. . ." A holistic approach to learning activities gives requisite attention to the affective domain of experiences which are a motivational force in meeting the needs of the students. According to Gillespie, "these are the specific factors that influence spiritual commitment during the youth years."

Sonnier (1985) indicates that there are four general psychological concepts that characterize the cooperative environment. The four conditions are wholeness, openness, commitment, and specificness. He points out that once these are present, the environment is conducive and the learning is balanced. In such settings, a goal is envisioned, the application is clear, the truth is seen as actually possible in life.

White (1952) starts her book Education with a statement which

is emphatic and, in the opinion of the writer, calls for serious study and planning on the part of Seventh-day Adventist educators at every level. She begins by stating that Christian education requires more than pursuing a "certain course of study." It is the "harmonious development of the physical, the mental, and the spiritual powers." It is thus three dimensional and the three entities have to be developed simultaneously. Otherwise, there is no complete Christian education. As indicated earlier in the paper, the development of the "spiritual powers" is best achieved when the potentials of the affective domain are actively exercised in a holistic manner. The Christian teacher plays a crucial role in this in that he/she needs to create a climate in the classroom which provides a vehicle conducive for the development of three--the intellectual, the physical and the spiritual. Hence, the involvement of the right hemisphere in a meaningful learning experience is important.

CONCLUSION

Evidence is mounting through literature that a holistic approach to learning is important in that it involves the right hemisphere--the area of the affective domain which focuses attention on creativity, values, attitudes, appreciations, and wisdom. Each one of these is important in the development of wholesome character. As the holistic education stimulates the developmental activities of the right hemisphere, it fuses intellect and feelings which are found in the left hemisphere. The

holistic approach to learning, therefore, is a whole-brained approach to balance learning. Holistic education results in acquiring wisdom through positive development of values. It also encourages reasoning essential in positive spiritual development and growth. Therefore, by neglecting active involvement of the right hemisphere in teaching , students are in danger of losing their sound connection with their Creator. Perhaps now that neuroscientists have provided a conceptual base for right-brain training we can begin, as a church, to build an Adventist school system that will teach the whole brain requiring not only traditional valued skills, but also intuition, free spirited invention and comprehension of the overall situation. In other words, we must design a programme that will equip the students to learn how to draw on both the left side of the brain, home of logic and efficiency and on the right side of the brain, home of intuition and inspiration. Students graduating from Adventist education systems of this nature will be blessed with great knowledge and skills that will enable them to love and worship their Creator and to devote their sharpened God-given intellect and abilities to serving Him.

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