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From Theory to Instruction: Implications for Christian Schools

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I. Introduction

One of the problems in education has been the gap between the discoveries from the world of psychology concerning how people at different times of life learn, and the use of that knowledge in instruction in elementary and secondary classrooms. The same problem has been noted concerning theories of instruction. By the time teachers have been informed concerning a given theory of instruction, the theory itself has often been so misinterpreted that teachers are left bewildered and applications of either theory or psychological findings to the classroom situation are pushed aside while teachers

return to the procedures with which they are most comfortable.

Theorists and psychologists have said that classroom application is the responsibility of the teacher, and rightly so. In the Christian schools we have given lip-service to the subject of learning development but have not always allowed our understanding of that development to influence what actually takes place in our classrooms. Teachers in elementary classrooms have often shown an understanding of and a concern for the whole child when planning instruction. However, the child who reaches middle school is usually faced with a product-oriented curriculum and with teachers who

consider their task to be more that of preparing the students for the subject matter which will be encountered in high school than concerning themselves with the learner characteristics which are unique to individuals between the ages of twelve and fourteen. This view of the middle school as primarily a training ground for high school has had an effect on instruction in the middle school so that, at times, academic tasks more suitable for the high school are found in the middle school itself. The danger is that when instruction is inappropriately placed (too much, too soon) the reaction of the bewildered student is to turn away from academic tasks altogether.

We have a great deal of statistical data which shows that a large number of students of above-average intelligence are academically successful (b average or above) through grade six, but flounder in grades seven and eight and do not ever again achieve the success of their earlier years.¹ Does the difficulty which students have with the academic tasks of the middle school have any relationship to our lack of understanding of the learner characteristics typical of students between the ages of twelve and fourteen?

School administrators, consultants, and college faculty in education must come to agreement on the implications of theories of instruction and theories of psychological development for the classroom teachers, who are then responsible to test the theories. I intend to demonstrate how a Christian theory of instruction as presented by Larry Reynolds and findings concerning intellectual development at a given stage of life should affect the curriculum and instruction at the middle school.

II. Differing views of the educational needs of transescents

The middle school includes the traditional junior high school grades. Middle school derives from a concept in education rather than from merely convenient plans for

grouping students. It may be a grouping of as few as three grades or as many as five grades between grade five and grade ten. The philosophy of the middle school in North America is based upon the needs of pre-adolescent and early adolescent young people, often referred to as transescents. Like the traditional junior high school, the design of the middle school has been to separate these transescent-age individuals from younger elementary school children as well as from older high school adolescents.²

Transescence refers to the period in human development prior to the onset of puberty and continuing through the early stages of adolescence. This usually includes most individuals moving through the ages from ten to fourteen. Physically, individuals moving through these ages have rapid but irregular growth and appear to be especially clumsy and awkward. Talkativeness and restlessness increase, and eye-hand coordination begins to improve rapidly. Emotionally, the transescent is impulsive, craves acceptance and approval by peers, and resents authority. Students at this age adopt an air of pseudo-sophistication, cover up the typical worries, doubts, and feelings of uncertainty, and long for independence and more responsibility, but are uncertain how to handle that responsibility.³

Intellectually, transescents are inquisitive and curious. Piaget points out that among individuals at this stage there is an increase in the ability to reason, to generalize, and to make deductions, but more recent research shows that for many individuals this ability does not come until much later in adolescence.⁴ Transescents are moving toward the ability to draw conclusions from fewer and fewer concrete facts and are becoming more able to solve abstract problems. Consistently, research suggests that this group must see a purpose in what they are asked to learn and tend to want to be actively involved in learning, rather than sitting passively listening to lectures.

The term "middle school" arose, in part, to challenge the term "junior high school"

which suggests that the real purpose of schooling at this stage is preparation for high school. So defined, the junior high school is viewed as a miniature high school with its numerous outside activities, its emphasis on competitiveness in academic and athletic ventures, and its emphasis on factual knowledge and group learning. The challenge of "middle school" is to under-

much suspicion by educators in the Christian schools. The middle school concept, to many Christians, appears to be very humanistic because it is child-centered rather than knowledge-centered.

Historically the junior high school came into being for the convenience of instruction and in order to separate individuals at this stage from younger and older students. The

The Middle School

The Junior High School

Philosophy

Emphasis on positive self-concept and the importance of the individual. Stresses the uniqueness of the transescent learner.

Emphasis on knowledge, group learning, and societal norms. Views the learner as an adolescent and tries to determine how to overcome the problems presented by adolescence.

Curriculum

Stresses learning how to learn. Involves the learner in exploration, creativity, interdisciplinary instruction by means of an integrated curriculum. In athletics only intramural sports are recommended.

Stresses teaching a body of knowledge, using competition in emphasizing the mastery of facts, skills, and concepts, and goals which have been predetermined for the group. In athletics, both intramural and interscholastic sports are recommended with a strong emphasis on interscholastic.

Instruction

Emphasis is on a variety of teaching techniques, allowing for planning time on the part of teachers to ensure an integrated curriculum. Student involvement in determining goals. Individually-paced learning where it is needed by struggling students or by students who are capable of moving at a faster rate.

Emphasis is on teacher-centered and controlled instruction, textbook learning, and lecture style classrooms with some discussion. Commonly employs group-paced learning only.

stand the unique characteristics of the learner and the learning task at this particular stage of life. A clearer way of understanding the distinction between the two is presented in the accompanying chart.⁵

In considering this chart, one can recognize the child-centered nature of the middle school in comparison with the junior high school. And that, I believe, is why the middle school concept has been held in so

unique character of learning at this stage has been disregarded in favor of the development of a concept which argues for giving all the students more facts, expecting them all to learn the same facts, and then understanding will take place and they will all be ready for high school. Christian educators have adopted the curriculum of the public schools and have been afraid to make significant changes in curriculum or instructional techniques

because they have been uncertain how, in light of a Christian theory of instruction, to apply the new findings concerning human development to the classroom. Significant changes must be made because neither the middle school concept nor the traditional junior high school concept fulfills our goals.

III. Unique learner characteristics of transescents: Stage theories

But how do we know for certain that the learner characteristics of the middle school student truly are different from those of the younger or older individual? What are the findings concerning human development which must be considered when planning the instruction of the individual at this level? Piaget provided a conceptual framework for intellectual development. Within that framework he discussed late childhood and adolescence as the beginning of the ability to do formal operations. Piaget, however, did not clearly define the types of transitional thought process which he claimed were typical of individuals between the ages of eleven and fourteen.⁶ Piaget's work concerning the stage of formal operations has been criticized as oversimplified, too non-specific, and simply too limited to explain many of the cognitive thought processes which accompany the early adolescent growth period.⁷ Recent research has also indicated that Piaget set his entrance into the stage of formal operations too low. In the United States no more than 24 percent of fourteen-year-olds have initiated or can function at formal operations and abstract thinking.⁸ These figures are corroborated by the research of Shayer⁹ and Renner.¹⁰ Toepfer hypothesizes that the large degree of overchallenge to middle school learners not ready for formal operations thinking may be a critical factor in the learning difficulties experienced by students during these years and may also be a reason for the turning away from academic tasks which we see in many high school students. The increases in emotional illnesses and frustration with

academic work in the junior and senior high school age group may be intensified by placing transescent learners in situations which require advanced thinking skills which cannot be handled by the twelve to fourteen age group. Toepfer observes that teachers continue to assume that youngsters of normal or superior ability can be manipulated into learning new thinking skills and facts despite discouraging results, and he suggests that a focus of middle grades educators must be upon prevention of the "turn-off" that occurs by over-challenge during the age twelve to fourteen years.¹¹

Gesell, using an evolutionary conception of development, attempted to delineate childhood and adolescence into periods by noting the changes in the internal rhythm and tempo of development and determining the general flow of the process. By means of observation, Gesell was able to identify patterns of behavior which tend to alternate at different ages in a fairly lawful sequence of rhythmic unfolding.¹² He viewed the early stages of childhood as the most crucial for interpreting personality and for determining the appearance of qualitative changes in development. The response of the transescent learner was always considered to be dependent on happenings of those early years.

At about the same time that Piaget and Gesell were attempting to separate themselves from the oversimplification of behaviorism and were defining the stages of intellectual development in childhood and early adolescence, their counterparts in the Soviet Union were restoring many of Stalin's victims to their rightful place in the history of Soviet science. Among these resurrected scientists was one of the Soviet Union's most brilliant psychologists, Vygotsky. Although Vygotsky died in 1934, his writings were not published outside of the Soviet Union until the 1960's. Thus, Piaget, the Western world's foremost authority on the central mediating processes of children, realized about a quarter of a century later that the findings of his Soviet colleague were

as significant as his own, and paralleled his own to a great degree.

Vygotsky identified stable stages and crisis stages in the lives of children and young people. He said that not a single Soviet researcher had been able to negate the fact that these distinctive periods exist. Moreover, there is agreement in the Soviet Union as to when the age periods have been observed to take place. Age three was recognized as a time of growth in new

cerning the relationship between intelligence in humans and the functional organization of the brain. Nevertheless, within the past twenty-five years a number of nationally known neuroscientists have been working in the area of phrenoblysis, or special brain and mind growth periods. They have worked from the hypothesis that human brains have periods of especially large increases in weight that are uncorrelated with periods of general body growth. When such a spurt of

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abilities and new personality traits. If for some reason this change evolves in a limp or inexpressive fashion, then there will be a significant delay in the development of the following period. Age seven is a period of great intellectual achievement, along with an increase in the child's independence. During the crisis at age thirteen, there is a decrease in the child's mental productivity and a temporary decrease in classwork. The most essential part of development during any of these critical periods, according to Vygotsky, is that they each end in the appearance of new forms of intellectual development.¹³

Piaget, Gesell, Vygotsky, and others working in the area of learning development have used as their methodology direct observations of changes in behavior. While such observations give excellent descriptions of behavior, one wonders whether they accurately distinguish what ought to be happening.

IV. Unique learner characteristics of transescents: Brain periodization research

There is much that we do not know con-

cerning the relationship between intelligence in humans and the functional organization of the brain. Nevertheless, within the past twenty-five years a number of nationally known neuroscientists have been working in the area of phrenoblysis, or special brain and mind growth periods. They have worked from the hypothesis that human brains have periods of especially large increases in weight that are uncorrelated with periods of general body growth. When such a spurt of

brain growth occurs, axons and dendrites lengthen and branch so that new neural networks are increasing dramatically. The instructional environment of the individual takes on a new meaning because the individual is qualitatively more capable of absorbing new kinds of intellectual inputs. He or she is a very different child from the period before that spurt of growth. During the period between the peak growths there are troughs or periods of slow brain growth. Apparently it is during these trough periods that the new competencies have a chance to develop and mature.

This is a very interesting hypothesis and if it is true, it should have definite implications for schooling. But how can such an hypothesis be tested? Epstein, a neurophysicist at Brandeis University, reported on the significant number of studies which have been done to determine brain growth spurts in human individuals.¹⁴ Brain growth and brain weight can at present be measured only during an autopsy, and in each of these studies a determination was made of the brain weight of children who had died in accidents. Brain/body weight

ratios automatically factored out the effect of general body growth.

Using the data from eight studies done at separate institutions, researchers observed brain growth spurts at ages two to four, six to eight, ten to twelve, and fourteen to sixteen. The slow growth periods are the intervening ages: four to six, eight to ten, and twelve to fourteen.¹⁵

Since the problem is so sensitive, Epstein was aware that the correlation of findings in these eight individual studies would have to be extremely high if the research was to be helpful. All of the studies identified the ages two to four, six to eight, and ten to twelve as brain spurt ages. Three of the studies extended to the higher ages and those three identified the fourteen to sixteen age group as an age of brain growth. All of the studies showed a trough at ages four to six, eight to ten, and twelve to fourteen.¹⁶

V. Basic agreement between stage theorists and brain periodization research

But what does all of this information say to people interested in schooling? There is already enough information about relevant aspects of brain growth to provide knowledgeable education experts with a framework for a new kind of curriculum at specific levels. Four decades of work by Piaget and his associates have already provided us with a wealth of information concerning observable learning changes in children. We may choose to make our own interpretation of the observations of those psychologists engaged in learning development research, but when we compare the stages of intellectual growth set forth by Piaget, Gesell, and Vygotsky with the ages of brain growth spurts, we see a very interesting similarity. It is possible that the problems found in these schemes just might be explained by more narrowly defined research.

For example, one of the questions which has often been raised about Piaget's theory concerns the relationship between intelligence

and rate of movement through the stages. Webb studied children with IQ's of about 160, between the ages of six and eleven years.¹⁷ Their mental ages were therefore between ten and eighteen years but in no child was there a trace of formal operations before a chronological age close to eleven years. In children of more normal intelligence, formal operations often do not appear until age fourteen. Thus, the appearance of a new operational stage in Piaget's scheme is linked closely to biological development, presumably brain development. Webb's studies showed that the difference between children with normal intelligence and those with IQ's of 160 was not in the age of appearance of new operations but rather in the rate at which the competency matures. High IQ children mastered the competency in a few months while normal children took two or three years. We might also assume that children with lower than normal intelligence may never fully master each new competency before the next brain growth occurs, resulting in a somewhat confused state for the child.

In addition, there appears to be a fifth stage of intellectual development not identified by Piaget. Arlin suggests that evidence shows this new stage might include the ability for problem finding, in contrast with stage four which she calls problem solving.¹⁸ Problem finding has been described as the ability to do creative thinking or inductive reasoning at an advanced level and Arlin's studies indicate that it appears first between the ages of fourteen and sixteen, in excellent accord with the last identified brain growth spurt.

We cannot focus on the brain growth spurts, however, without studying the periods between the spurts. According to the research cited by Epstein and according to the Piagetian scheme as well, the periods between the growth spurts and the periods before the entrance into a new stage are times when existing competencies are mastered. That is, concrete operations do not appear full-blown at any point in the six

to eight age group. Rather they appear in a rudimentary form and then are mastered over a period of time.

Is there research from educators indicating that the brain growth spurts or the stage theories are evidenced in the learning capacities of children? Rosenthal and Jacobson have reported that children in grades one and two show a high learning capacity (ages six to eight), children in grades three and four show a low learning capacity (ages eight to ten), and children in grades five and six (ages ten to twelve) again show a high learning capacity.¹⁹ Their study did not go beyond those age levels.

The Head Start Programs provided for children between ages four and six were much less successful in helping children master new thinking competencies than were

tual processes in junior high school than in the periods both preceding and following this period.²¹ Epstein suggests that this period should be characterized far more by increments in already initiated skills than in the acquisition of new skills. This does not mean that the expected achievement levels of the junior high school student would be lowered, but that the curriculum should be altered to avoid new types of learning and to include a much larger component of experience and practice of skills, relating the practice of these skills to the world around the student. But Epstein properly leaves specific suggestions for ways in which the curriculum should be altered, to informed educators. And in the remaining part of this paper, I shall attempt to describe a new curriculum for the junior high school, based

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the programs for ages two to four and ages six to eight.²⁰ That does not mean that the programs for the four to six group were worthless, only that brain periodization research might indicate that our expectations for that group should be different than for the other two groups.

Let us look at one more slow brain growth period, that of the twelve to fourteen age group, which corresponds with the age usually found in the middle school or the junior high school. Based on brain growth research and on stage theories, the prediction would be that learning at this point in life would have a unique quality when compared with the earlier and later years.

Whatever the reason for this occurrence, it appears less wise to initiate novel intellec-

on a Christian theory of instruction and making use of research concerning the development of learner characteristics at ages twelve to fourteen.

VI. Curriculum design for educating transescents

There is little doubt but that there is an urgent need for developing a high level of mental competence among today's transescent youth. And those of us involved in Christian education have pledged ourselves to instruction which will lead our students toward being lifelong disciples in the Kingdom of God. However, those responsible for directing development of intelligence in such disciples may not ignore the nature of

the learner. Although it doesn't really matter what name we give to the level of schooling about which we are concerned, neither the middle school concept with its emphasis on the child, nor the content-centered traditional junior high school can provide the direction needed to fulfill our goals.

The general characteristics of my curriculum design include the following guidelines. Students in grades five and six, in keeping with their high learning capacity, would receive strong, carefully structured instruction in all areas of the curriculum. Because most of these students are at the concrete operational stage, this instruction would make use of visual aids and manipulative objects to ensure understanding. This is particularly true for instruction relating to the mental process of categorization, as in the areas of grammar, outlining, mathematics, science, and chronology. A second language would be introduced at this level, in keeping with the research indicating that a foreign language studied before the age of twelve is more likely to be retained and used.^{22, 23} A move away from the ego-centric thinking of the earlier years would be encouraged in the areas of social studies, literature, and Biblical studies by exposure to the lives, interests, and worship of others. The *Revelation-Response* curriculum materials provide the background needed for exposure to the worship activities of others. In literature, mythology would be read and discussed in order to provide background for references to mythological characters at a later period in education. Remediation in both reading and math is an essential part of such a strong curriculum and a decision might be made concerning whether this remediation would take place during the period when other students are receiving foreign language instruction.

As the students move into grades seven and eight, the curriculum design would be altered to include a much larger component of experience and practice of skills, in keeping with the unique character of learning at this level. Rather than continuing the

forward movement with adding more content to the curriculum, instruction at this level would emphasize strengthening of skills which have been part of the earlier instruction, deepening of concepts which have already been encountered, and relating the skills and concepts to the lives of the students in such a way as to encourage an understanding of their responsibility in meeting the needs of others as disciples of Jesus Christ. Facts and skills are an essential part of instruction at this level, but students need experience in being willing to use those facts and skills in the service of others.

Skills which need careful attention at this level include reading to comprehend facts but also to identify inferences, study skills, outlining, note-taking, and summarizing. An integrated curriculum will ensure that these skills would be strengthened in every subject area, but the emphasis would be on strengthening of the skills rather than on providing the students with new ways to think about the content. In English class the students would receive careful, step-by-step instruction in the writing of essays, summaries, outlines, reports, and short research papers. Each subject will require such writing. Instruction in math would be characterized far more by increments in already initiated skills than in the acquisition of new skills, and would always be taught in terms of applications to human problems: filling out tax forms, paying mortgages on homes, determining whether a family could live from the interest of a specific sum. Again, an integrated curriculum would ensure that problems encountered in the social studies class would be worked out in the math class. Intensive vocabulary instruction, relating the new vocabulary to the lives of the students in a variety of ways, would provide background for reading and writing skills.

Second language instruction would continue and the emphasis would continue to be on reading, increasing vocabulary, and using an aural approach with patterned drills rather than instruction in grammar. As at

the earlier levels, remediation will be needed by a number of students and this remediation could take place during the regular period set aside for foreign language instruction.

In all areas of the curriculum emphasis would be on the students' responsibility to help each other learn rather than pitting their talents against each other in competition. Instructional strategies especially designed for such cooperative efforts would be an important part of the curriculum. Students who are gifted in specific academic areas would be given individual opportunities to move forward at their own pace but they would also be expected to set aside time for helping fellow students who are struggling. In athletics, only intramural competition would be allowed with students who excel in that area assuming the responsibility of helping those who struggle.

The focal point of the curriculum during this period would be a helping relationship which each student would develop with one other individual who was in need. For example, in the middle of the week every student would spend a half-day with either an elderly person in a rest home, with children in day-care centers, with a mentally or physically handicapped person, or with a younger child who had learning difficulties. The point of this experience would be that the student would help that person in whatever way was needed and in the process, develop an understanding and a concern for the welfare of others. The student's relationship with that one person or one group would continue weekly at least through one semester, in order to develop an empathy for the needs for human dignity in our society. At the end of the semester, each student would be assigned a new person to help. This activity would help to counter-act the ego-centrism and need for peer approval which is often so detrimental to learning during the period of transescence. We may not excuse or explain away sinful actions on the part of the early adolescent by saying that it is a normal occurrence for that par-

ticular stage in development. Rather, we must arrange instruction which will move students away from sinful attitudes and toward lives of service.

The integrated nature of the curriculum would ensure that students express themselves in a variety of ways concerning this relationship. Oral histories would be taken and presented in written form, poetry would be written about the feelings and lives of the individuals or about the relationship, discussions and debates would center on care and services for those in need in our society. And the emphasis in the English class would be on such products rather than on grammar instruction during this period. Art projects would include sketches and paintings of the individual or of the setting. New cognitive information would be taught in relation to these activities and supplement the student's total growth in ethical responsibility to society and to individuals. Social studies and math classes would provide the facts needed for solving societal problems and ensuring dignity in human existence.

Evaluation of the student's progress during this period would include a three-way conference two times during each academic year. The parents, the teacher, and the student would discuss the student's academic strengths and weaknesses and also discuss the student's willingness to be responsible for the learning, care, and nurture of fellow classmates and of other individuals.

At the end of this two-year period, students would be ready to enter a somewhat different educational environment. Existing cognitive skills will have matured, self-concepts will have been strengthened because of the service to others, and the students will have participated in actions of responsible discipleship.

As students move into the high school years, they are entering a period of heightened learning capacity. At this point it is important that every student has instruction in a strong core curriculum. Remembering that when a period of brain growth occurs the instructional environment of the

individual takes on new meaning, we may not waste this period of the last spurt of brain growth by allowing the high school years to be little more than a time of socialization. Responsible educators may not allow so many options for students that it is possible for them to select their way out of an education during this period.

The traditional core, with its emphasis on instruction in grammar, literature, the sciences, math, history, geography, music, and art is necessary but careful attention must be given to instruction techniques since many ninth and tenth graders are just beginning to move into the period of formal operations. Throughout the curriculum, emphasis would be placed on teaching students to think critically and to develop a spirit of inquiry about subject matter and about life. In order to help students integrate their learning in the responsible interpretation of their lives, each student would, once each year, have a planned one-hour interview with a teacher concerning the ways in which their thinking is changing. In other

tion in philosophical thinking²⁵ and in keeping with Van Dyk's recommendation,²⁶ consideration should be given to the inclusion of a course in philosophy in the core curriculum. The subjects of the core curriculum would be completed during the first three years of high school (approximately ages fourteen to sixteen) and at the end of grade eleven, students would decide whether they want to follow the pre-college track during grade twelve or receive technical training during that year.

In order to make certain that students continue to grow in their concern for the justice and the welfare of others, high school students would be encouraged to become student-members in organizations such as *The Association for Public Justice* or *Bread for the World*. Students would be encouraged to participate in *Teen Missions*, an organization which trains high school students and then sends them to help the poor and to witness in needy areas of the world. Representatives from organizations for the handicapped and organizations for

In all areas of the curriculum emphasis would be on the students' responsibility to help each other learn rather than pitting their talents against each other in competition.

words, each student would be strongly encouraged to think about his or her own thinking.²⁴ Remediation classes would be provided for students who need support, and all other students would continue with the foreign language begun in the middle grades, at this point studying the structure of that language. Students who show a greater degree of competence in that language would begin the study of a third language in grade eleven. Because of Buhler's finding that people moving into middle-age and then into retirement years do so more easily if during their adolescent years they have had instruc-

tion in philosophical thinking²⁵ and in keeping with Van Dyk's recommendation,²⁶ consideration should be given to the inclusion of a course in philosophy in the core curriculum. The subjects of the core curriculum would be completed during the first three years of high school (approximately ages fourteen to sixteen) and at the end of grade eleven, students would decide whether they want to follow the pre-college track during grade twelve or receive technical training during that year.

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If a curriculum similar to this one is followed, students in junior high school, at a

time when their learning capacities are low and their need to strengthen skills and to experience them is high, would receive careful instruction in keeping with their unique learner characteristics. Students would not be allowed to become academically overwhelmed because the emphasis would be away from a forward movement of content and new ways of thinking, and toward encouraging an understanding of their responsibility in meeting the needs of others as disciples of Christ. Students during the first three years of high school, at a time when their learning capacities are higher, would be involved in a sound core curriculum which would encourage the development of critical thinking and decision-making. Their growth in understanding concerning responsible discipleship throughout life would be encouraged through active participation in organizations which are working toward the same goals. And during the final year of high school, each student would take a deliberate step toward preparation for future learning by choosing either a pre-college or a technical track.

This paper has presented the learner characteristics unique to individuals in the period of transescence, as set forth by stage theorists and brain periodization research. A new curriculum for the junior high school has been presented, based on a Christian theory of instruction and making use of the research concerning learner characteristics at this level. Suggestions were also made concerning changes in the present high school curriculum. It is hoped that informed educators will consider the basic premises offered and use them in whatever way will be most beneficial in promoting the cause of Christian instruction.

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