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An Evolution in Education Individualization and Learning Activity Packets in Junior High Woodworking

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Abstract

The purposes of the study are:

(1) To show how education has evolved throughout American history; it has always taken the best of the past with it and amalgamated- it into its present; individualization has presently advantages which today's society needs to replace conventional programs.

(2) To explain the rationale for individualization.

(3) To give an explanation of the process of making learning activity packages.

(4) To provide learning packets for a course on machines in industrial education, namely lathe and band saw.

An Evolution in Education
Individualization and Learning Activity Packets
In Junior High Woodworking

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by
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CHAPTER I

INTRODUCTION

Education has been proceeding gradually and cautiously through an evolution. Historically, American education has been unique. Geared to the society or societies for which it was established, it has aimed to be functional. From tutorial programs to one-room schools (with differentiation according to geographic regions), to systematization (large and small), education has organized itself to deal either principally with the individual or with the group, be it heterogenous or homogeneous. Presently education finds itself swinging the pendulum more toward the individual within the group.

The researcher believes industrial education has chiefly leaned toward individualization by its very nature. Through research the writer has provided a brief history of education in America, a rationale for individualization, an explanation of learning packets, and two sample learning packets for students in an individualized program on machines.

Statement of the Problem

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(2) To explain the rationale for individualization.

(3) To give an explanation of the process of making learning activity packages.

(4) To provide learning packets for a course on machines in industrial education, namely lathe and band saw.

Importance of the Study

This study proposes to compile a brief historical background for the present day trend toward individualization and learning packages for the teacher in industrial education. It presents learning packets on the individualization of the lathe and band saw. These two machines are only one area in which industrial education can be individualized.

Limitations

This study gives an example of the research done to compile an explanation of individualization and learning packets as well as an historical background leading toward this step in education.

There are two controlled groups experimenting,

each taking a similar post test at the conclusion of a course on the lathe and band saw. Each of these groups were heterogeneously grouped to include an equal number of so-called below average, average, and above average students. One of the groups is taught in the conventional group and group demonstration method. The other group is individualized and proceeds through the learning packet at his own speed, asking for subsequent quests as he finds himself ready for each of them.

Definition of Terms

Individualization: an attempt to make a self-directed, self-actualized program of instruction capable of meeting the needs of a variety of potentials.

Auto-instructional: a student learns without direct supervision of a teacher.

Quest: Progressive test at the end of each lesson to determine the student's understanding of the material assigned to him in the lessons.

Test: Pre-test - a professional evaluation of the need for the content contained within the learning activity packet.

Post-test - a professional evaluation of the effectiveness of the package and the success of the learner.

Rationale: a definition, an overview of the content within the learning activity packet.

Learning Activity Packet (L.A.P.): a self-contained set of teaching-learning materials designed to teach a single concept or idea, and is structured for individual and independent use in an individual study program.

Behavioral Objectives: clearly defined behavior where performance is clearly established, with the conditions under which the behaviors exhibited are pinpointed, with performance criteria to determine if the student acts, performs, or behaves at an established level.

(a) General Behavioral Objectives: broad or global behaviors.

(b) Specific Behavioral Objectives: refinement of the objective which narrows the behavior to be accomplished.

CHAPTER II

REVIEW OF LITERATURE

Synopsis of Educational History

By 1825, the "three R's" had changed from "religion, readin' and ritin'" to "readin', ritin' and rithmetic". Secondary education had forsaken the Latin grammar school and had attempted to go on its own and prepare for life instead of for college, but had been brought up short by college-entrance considerations, and had tried its first public high school. Higher education had turned from theological training to the liberal arts idea and was in the process of inaugurating professional education in medicine, law, and engineering (Bayles & Hood, 1966, p. 115).

The year 1825 is taken as the beginning of what is known as "The Great Educational Awakening". This period witnessed gradual development of what had already been established in secondary and higher institutions, also thoroughgoing change in elementary schooling as well as the inauguration of systematic teacher training, of educational administration and supervision, and of open recognition and adoption of the public school idea. This was the period of Horace Mann and Henry Barnard. By the time of the Civil War, most of the

major aspects of today's school system had been inaugurated. Our whole national educational program was set and was ready to expand (Bayles & Hood, 1966, pp. 105-115).

Growth of American educational thought and practice during the first half of the nineteenth century was not a simple, one-line affair. The almost complete autonomy of local school districts made anything approaching it an impossibility. Westward expansion of the nation and the industrial revolution, with its encouragement of urbanization, introduced new factors effectual in shaping educational programs. Increasing urbanization, by taking children off farms where they work and play side by side with adults, eliminated the built-in opportunity for them automatically to absorb adult outlooks in life as well as adult skills. Hence, whole new fields of instructional obligations gradually devolved upon the schools, making three-R curricula wholly inadequate, certainly for areas classed as urban (Bayles & Hood, 1966, p. 116).

To quote Maclure on instruction at this time:

> The great or fundamental principle is never to attempt to teach children what they cannot comprehend, and to teach them in the exact ration of their understanding without omitting one line in the chain of ratiocination, proceeding always from the known to the unknown, from the most easy to the most difficult; practicing the most extensive and accurate use of all the senses; exercising combination; accelerating and carefully arranging comparison; judi-

> ciously and cautiously avoiding the delusions of the imagination, a constant source of ignorance and error (Lockwood, 1905, p. 236).

Another channel in the educational program was the vital position of Mann and Barnard. To these two have gone credit for taking the lead in promoting the changes that transpired in elementary education between 1825 and 1860. In 1837, the law was passed that established a State Board of Education. The Board would appoint a secretary to serve as the state school-officer who would report to the Board and the Legislature. Neither Board nor secretary had administrative control of the schools of the state; they would only investigate, report, and recommend. Mann was made secretary. Up to this time, though he had been interested in the improvement of education since his college days, when appointed secretary, he knew little of its professional literature or of classroom methodology. Hence, his early attention was focused upon two rather obvious needs - institutions for training elementary school teachers, and a system of free, public (or "common") schools. Two years later the first state normal school to be established in the United States was opened, financed by an appropriation of $10,000 by the state legislature. Mann began delivering lectures to influential groups throughout the state. In November, 1838, he initiated

publication of his Common School Journal, which was continued until his resignation from the secretaryship in 1848 (Bayles & Hood, 1966, pp. 120-123).

The foregoing account brings us essentially to the time of the Civil War which could be considered as the close of the period of nationalization. An educational system that was essentially American had been inaugurated, a system that has the basic characteristics of today: free, public, tax-supported schools, with parochial or other private schools permitted but not supported by public moneys; graded schools of the ladder type wherein completion of one grade or level opens the way to the next (at that time on the 8-4-4 plan); school architecture to provide on the elementary level a separate room for each grade, with classes in the neighborhood of not more than 25-30 pupils; women teachers coming to take the place of men, especially in the lower and middle elementary grades; strong state and municipal supervision of elementary and secondary schools by superintendents and/or boards of education; formal teacher training in state-supported college-level institutions (state normal schools); higher education provided in many states by state-supported, state-controlled universities and colleges; complete elimination of the pauper school principle (Harris, 1961, p. 126).

The reason for the state-supported schools is that a free, democratically-governed people is hardly a possibility unless the citizenry is educated and informed. The education of youth is as important to the nation as a whole as to each person, its benefits are social as well as individual. Education is as needful for the poor as for the rich, not only as a personal right purely subservient on the part of the latter. Preparation for college was a dominant factor in the preparation of high school students.

It is possible that future education will mark 1930 as a turning point for education in the United States. First, the colonial period, which was really one of transplantation wherein forms and institutions were lifted by the settler from the soil of their native lands, brought with them, and with small changes, set out in the soil of the new world. Franklin's Academy, begun because of chafing under the Old World domination, became a harbinger of things to come. Nation building through the Revolutionary War, a temporary setback due to the Civil War, the educational enterprise began to grow rapidly as has been mentioned, giving credit to people such as Mann. The past 1930 period in American education was one of reappraisal. Expansion had gone on; amounts of money appropriated for education had grown from $2 billion annually to $32 billion

for the year 1962-63 (Harris, 1961, p. 241).

A panoramic view of American education would not be complete without a brief explanation of Dewey's principle of interaction. It is essential for an understanding of the steps which lead to individualization as experienced in the 70's. Interaction must be taken as something more than mere push-and-pull among a coterie of forces. Dewey's thinking was in terms of mental processes; his was primarily perceptual or cognitive interaction, rather than the mere interplay of physical or psychological forces upon one another. Philosophically, Dewey was speaking in terms of epistomology, of truth-getting or of learning; in insightful or conceptual terms (Harris, 1961, p. 241).

For example, what is the process of determining whether an object is hard or soft? One may say merely observe it. But what is this observation process? It is considerably more than a look-see. It is basically experimental; a matter of trying out the deducible consequences of an idea or an hypothesis. Truth-getting is an interactive process.

Thinking relationally, as the Dewey-Einstein pattern requires, and doing so intentionally, systematically, and consistently may well be called the touchstone of twentieth century thought. These men were outstanding pioneers in this kind of thinking. This is to say that

Dewey's principle of cognitive interaction represents the idea of relativity taken seriously.

Learning is likewise assumed to be a process of developing insight. Learning is impeded by the practice of repetitive "drill". It is not the number of times one repeats an act that counts; it is what one learns; what insights are gained that enables practice to "make perfect". Hence, practice should always be essentially experimental - this is tried; that is tried; possible refinements are noted; confidence develops; and a way of handling the matter evolves; which is adopted until such time as a better one is found. This is why Dewey could say that "thinking is the method of an educative experience" (John Dewey, 1961, p. 163).

He does not feel that all education is reflective; like other methods, this is used as long as it appears to be satisfactory (Dewey, 1961, p. 163).

In the light of the foregoing, it seems that, for Dewey, experiences mean doing with insight, insight into the relation between the doing and what comes of it. Without the insight, we learn nothing; as when, after reading a passage in a book, we suddenly realize that we have not the slightest idea of what was in the passage. It might be added that, too, if the insight is caught without the doing, its job is done. This is one implication

of the idea of learning as development of insight (Dewey, 1961, p. 80).

This panoramic view of education has stressed the history of education as essentially American. It evolved basically with its geographical settlements, with its westward movements, its Industrial Revolution, its urbanization. Education has evolved basically in a democratic way for a democratic society. All phases of education in America have grown through the special intervention and dedication of a few greats. In keeping with the American way, however, the history of education involves the day in, day out efforts of the ordinary citizen. John Dewey's ideas seem a good place for moving toward an idea of individualization. There is no end of an era in American education. There is only a bridge between and among steps in education in America. Each draws on the other. Each is made better by the benefits of success and failure in the previous era. All of these phases of education lead toward the development of an age of Individualization. This is the way the pendulum presently swings. This is a temporary culmination of the good things of yester-year.

Background for Individualization

In any system of education, the focus should be on the individual student. The primary responsibility for

helping him set goals, assume responsibility, identify appropriate instructional materials and methods, and monitor his progress, is the teacher's. No program for individualizing education can succeed without adequately preparing the teachers for their roles. The preparation of teachers includes knowledge and understanding required to deal with children as individuals. Because of lack of adequate support procedures and appropriate programs, most of the teachers have had little opportunity to individualize their educational programs in more than a superficial way. Some insights into the research and development problems facing those responsible for the training of teachers for individualizing instruction must be gained from intensive research and reading. The writer has decided to treat this section of the paper with basically two ideas in mind. He will give a psychological background from people in the field who emphasize the need for man's nature to be treated as one which has infinite potential. The climate being right, growth will follow. The other basic ideas being touched on is the other half of this team. Having touched on the nature of the child, the teacher is given opportunities to see how methods, ideas and experiences can unfold an infinity of truth.

Individualized instruction is not the same as independent study. Independent study is a vital element

of individualized instruction. Nevertheless, individualized instruction is the larger aim. Independent study contributes toward its attainment. Confusion on this point has apparently led some people to suggest that individualized instruction cannot be substituted at the kindergarten-primary levels. To what extent can we provide a variety of learning activities that (a) will be highly motivating (b) have enough self-instructional features to ease the problem of classroom management (c) can accomodate a wide range of individual differences and (d) will encourage the accomplishment of worthy objectives? Formal schooling should be trying to develop human beings who will become competent, life-long learners. It must begin early, when a child first enters school, and continue throughout the years of formal instruction (Individualizing Instruction, 1964, p. 4).

At the heart of the matter lies practice, learning by doing. This should proceed in stages, move gradually from teacher-directed to self-directed learning. Schools have not always helped students acquire the habits of independent study. For maximum effectiveness, this must be done on an individual basis. The reason for this is that what will be most suitable for one student at a given time will not necessarily be best for another. We have all heard over the years the silly argument that rages around

the question of teaching kindergarten children to read. Much of this controversy might lead you to suppose that these youngsters have all been cut from the same mold. Rather, is this child ready to learn to read? Even better, what might we do to help this child become ready to read? It is one thing to talk a good game of individualizing instruction and another to make it funtional. Educators have been doing this for years. It is difficult to make the institutional changes necessary to move in that direction.

Considerable progress could be made by abolishing subject matter time schedules. Modular scheduling is a step forward in this respect, but it is still basically a conservative movement that tends to substitute one set of restrictions for another. Although modular arrangements have succeeded in breaking through the unvarying 45 to 55 minute time slots that characterize most traditional secondary schools today; the typical "flexible schedule" often has its own rigidities that are only just beginning to yield to such devices as open laboratory periods of long duration. A more feasible plan would be to relate scheduling to objectives.

In 1944, Stephen M. Corey described a lovable but lost adolescent in an article titled "The Poor Scholar's Soliloquy." The author made it clear that the hero, a

seventh grade repeater, was alienated from his teachers and his schooling but not from his peers and his out-of-school world. Concerning his own educational experience, the adolescent reported:

> I don't know why the teachers don't like me. They never have very much. Seems like they don't think you know anything unless they can name the book it comes out of...
>
> I guess I just can't remember names in history. Anyway, this year I've been trying to learn about trucks because my uncle owns three, and he says I can drive one when I'm sixteen. I already know the horsepower and number of forward and backward speeds of twenty-six American trucks, some of them Diesels, and I can spot each make a long way off. It's funny how that Diesel works. I started to tell my teacher about it last Wednesday in science class when the pump we were using to make a vacuum in a bell jar got hot, but she said she didn't see what a Diesel engine had to do with our experiment on air pressure so I just kept still...

The young adolescent then concluded his report:

> Even in shop I don't get very good grades. All of us kids made a broom holder and a bookend this term, and mine were sloppy. I just couldn't get interested. Mom doesn't use a broom any more with her new vacuum cleaner, and all our books are in a bookcase with glass doors in the parlor. Anyway, I wanted to make an end gate for my uncle's trailor, but the shop teacher said that meant using metal and wood both, and I'd have to learn how to work with wood first. I didn't see why, but I kept still and made a tie rack at school and the tail gate after school at my uncle's garage. He said I saved him $10.
>
> Civics is hard for me, too. I've been staying after school trying to learn the

> "Articles of Confederation" for almost a week, because the teacher said we couldn't be good citizens unless we did. I really tried. A bunch of us boys from the south end of town have been cleaning up the old lot across from Taylor's Machine Shop to make a playground out of it for the little kids from the Methodist home. I made the jungle gym from old pipe, and the boys made me Grand Mogul to keep the playgound going. We raised enough money collecting scrap this month to build a wire fence clear around the lot.
>
> Dad says I can quit school when I'm fifteen, and I'm sort of anxious to because there are a lot of things I want to learn how to do, and as my uncle says, I'm not getting any younger.
>
> "The Poor Scholars Soliloquy"

Twenty years have passed since this adolescent and thousands of his contemporaries and successors have awaited their opportunities to leave school. Some have been brighter and some duller, but most have contained within them much untapped talent. During the same twenty-year period, Guilford and his associates have noted that of the many dimensions of the human mind, teachers have almost no measures, e.g., flexibility, originality, and sensitivity to problems. Getzels and Jackson have suggested that when intelligence tests are used in selecting the talented, about 70 percent of persons who score among the top one-fifth on tests of creativity are overlooked. Torrance's findings tend to support those of Getzels and Jackson, while Calvin Taylor points to America's need for divergent thinkers with what he calls "tomorrow minds" (Taylor, 1956, p. 31).

One of the considerations which necessitates a near clairvoyance about learners' individual destiny is the appalling waste of potential one sees all about him. During their recent attempts to resurvey the problem of dropouts, educators have had to view the shipwreck of young lives in a context of critical national need. A population which is burgeoning in an era of rapid scientific and technological development and in times of ever-present threat to the national welfare can ill afford the waste of talent which results from pupils' dropping out of school psychologically even before they leave physically. The nation requires the fullest development of mental resources and technical skills of its young men and women. Lawrence Frank notes in the ASCD 1963 Yearbook that

> ...studies of human growth, development and aging reveal a wide array of stunted and disordered personalities as well as many forms of physical impairments and dysfunctions at all ages, but increasingly frequent and serious in later years of life. We may, as many are persuaded, interpret this melancholy record as evidence for a pessimistic conception of human nature and an assessment of human potentialities as essentially defective, prone to evil or neurosis, and inescapably condemned to repeat these patterns endlessly in every generation. Or we may regard the record as an indication of how we misuse and waste our human potentialities, partly because of our traditional beliefs about human education, but principally because until recently we have had no dependable knowledge of man or any adequate realization of his many potentialities for good or ill.

A presidential fact-finding committe on employment of youth has reported an "immediate and desperate" problem which confronts 600,000 to 800,000 school leavers who are between the ages of 16 and 21. While members of this throng constitute only 1/14 of the nation's labor force, they account for 1/6 of all unemployment. Complicating the evil of insufficient and inadequate schooling in their situations are segregation, cultural disadvantages and other social ills. President's Committee on Youth Employment.

One may add to multiple social influences that fact of personal alienation which educators are beginning to recognize in its broader aspects. Originally identified with disadvantaged cultural environments and with learners of low socioeconomic status, the concept of alienation now encompasses many psycho-social effects on human behavior. Personal alienation from one's world may stem from cultural poverty, but it apparently originates also in an inadequate self-concept, in the cultural malaise to which the economically privileged are exposed, in disintegrating patterns of family and community life, and in the failure of teachers to interact empathetically and helpfully with their pupils. As seen in the schools, alienation constitutes a psychological curtain in which the learner is somehow induced to draw before him, thereby shutting out desirable experience and contact with his environment. For instance, can it be that

the current drive toward excellence has created such competition among able learners that, for many of them, a curtain has lowered between them and their peers and teachers? If so, much needs to be done to free learners to reduce competition, restore communication, increase interaction, and make mistakes in the only reprisal-free environment which society can easily provide (Individualizing Instruction, 1964, p. 9).

To decrease the tendency toward alienation and to encourage discovery of potential, certain agreed-upon findings about learning need, we believe, to be pressed into use. We fear that learning is being discussed today too much in terms of rate, though we know that learning is multidimensional, exceedingly personal, and virtually limitless. The insightful teacher encourages the presence and use of multiple ways of learning because he views the realm of human intelligence as being markedly extensive and complicated. He knows that the testing of intelligence and achievement supplies him with only part of the data he needs, and that wide ranges of his pupils' potential are yet to be explored. Each day he listens to pupils' "ridiculous" questions and aberrant answers because he believes that evidence of potential appears in obscure places and at unexpected times. Like the best teachers of all the ages, he assumes an optimistic attitude toward

both the talents and the limitations of the learners in his charge (Individualizing Instruction, 1964, p. 9).

Accordingly, the teacher often has settled for a superficial view of the individual and of individualization. He has said that learning is an individual matter. Each child brings to his classroom personal characteristics and ways of perceiving and responding which are peculiar to him. When he teaches his whole group, its members are probably being affected in different ways. The nature of the group itself may make a difference. If so, perhaps his principal can group his pupils before he will receive them, so that reaching the individual will be easier in a group in which the children are more nearly alike. He will test all the children so that they may group them uniformly (Individualizing Instruction, 1964, p. 9).

In 1916, the psychologist Terman suggested a need for differentiated courses of study, to permit each pupil "to progress at the rate which is normal for him, whether that rate be rapid or slow." He proposed to teachers that they "measure out the work for each child in proportion to his mental ability." As might have been expected, attention soon became focused upon the extremes of "giftedness" and of slow learning, a consequence which remains much in evidence today. In its 1925 yearbook, the Department of Superintendents of the National Education Association

recommended that the "general core of subject matter which should prevail throughout the nation for the first six grades" be modified in content and time allocation to provide for individual and community differences (Terman, 1916, p. 10). Meanwhile, Franklin Bobbitt, a curriculum authority of the 1920's, had advocated determining the curriculum for the brightest pupils first, then modifying it for the average group, and simplifying it for the slowest (Bobbitt, 1924, pp. 41-62).

The National Survey of Secondary Education, which was conducted in 1932, revealed that in more than 11,000 high schools individual differences were being cared for chiefly by homogeneous grouping, special classes, and "unit assignments" occurring under the Morrison, Dalton, and Winnetka plans, as well as through problem and project method teaching (Billett, 1933, p. 415). A few years later, Harap reported that ability grouping was the commonest method of attempting individualization of teaching. In addition, he noted, schools were adjusting their courses of study to the needs of slow and rapid learners, were preparing special courses of study for retarded children, were developing remedial programs, and were using auto-instructional materials in the form of workbooks and individual assignment sheets (Harap, 1936, pp. 161-72). However, the activity program of the same era tended to

discourage ability grouping by promoting the idea that each pupil should be permitted to contribute to his heterogeneous group according to his ability and interests.

Since the 1930's, rate of learning has continued to be a central interest of persons advocating various plans for individualizing instruction. Many of the plans have emphasized so-called homogeneous grouping, though this form of grouping has not been found consistently effective. Fifty-two percent of the principals of large elementary school districts have reported an increase in grouping according to ability and/or achievement levels, and 46 percent of elementary school principals in districts of all sizes have noticed this increase during the period 1956 to 1961. Nearly two-thirds of high school principals have stated that grouping has increased in their schools during the same period (Principals Look at the Schools, 1962, p. 15).

Several proposals that are old and a few that are new are finding their way into elementary and secondary schools with some thought of increasing and improving individualization. These include departmentalization, elimination of grade levels in elementary schools, team teaching, and employment of paraprofessionals and teacher aides, programmed learning and language laboratories, and acceleration and enrichment. State-wide testing and nation-

al examinations appear to be assuming greater importance. In New York City, a committee of high school administrators has suggested that the four-year secondary school program be shortened to two years, with pupils attending school eight hours a day.

Most of the proposals carry the implication that standard content should be learned more speedily. Educators have learned, however, that rate of learning prescribed content is only one consideration in individualization. Learning is personal, unique, unstandardized. Furthermore, learning has numerous dimensions, and it is without limit. Obviously, then, new and different proposals are needed if teachers are to use these facts in individualizing teaching.

> By human potential we mean those nascent powers of unpredictable proportions which are within the person: powers which can be diminished or expanded through educative (and other) processes. Human potential is everything with which the individual is capable of responding. It is seen in the individual's dynamic interplay with his environment. It is, in brief, total personal responsiveness without preconceptions concerning the limitations of that responsiveness. The most helpful orientation that an educator can hold toward discovering, developing, and releasing human potential is open-mindedness concerning each learner's potential, together with a sense of obligation to help each learner realize his potential, which is in conformity with his own best interests and with social ideals (Individualizing Instruction, 1964, pp. 13-14).

Educators, like other persons in our culture, tend to oversimplify man. Eric Hoffer states a danger in this oversimplification: "It is an awesome thing," he says, "that the most breathtaking example of daring we have witnessed in the second quarter of the Twentieth Century was the daring to think low enough of human beings. Both Hitler and Stalin displayed this daring in an unprecendented degree, catching the world unawares and almost overwhelming it" (1962, p. 36).

Totalitarian powers in the past have tried to remove from man his essential humanity and thereby make him a predictable robot to serve the purposes of the state. The genius of the Hebrew-Greek concept of man is its insistence on the person with unlimited potential, its effort to cherish highly his unpredictability and to find in the weakest and smallest of men the potential for a new movement toward meaning in society. It is toward the discovery and release of hidden powers that educators need unceasingly to bend their efforts (Individualizing Instruction, 1964, p. 14).

Individualization of teaching does not replace or supersede the content of education. Rather, individualization brightens and enhances content. The role of curriculum content may be compared roughly with the part the booster rocket plays which puts the capsule in orbit. However,

in education the booster rocket and the last-stage rocket fire simultaneously.

We believe that individualization of teaching is increased when education relies as much as possible upon reality and upon actual experience for its content. Observations, firsthand experiences, and direct contacts with the world are the raw material of education. In general, the more direct the transactions the pupil can have with such raw material and the more often such transactions occur, the better (Individualizing Instruction, 1964, p. 20).

Allport believes knowledge about teaching is directly related to and at times is a direct corollary of man's knowledge of human nature. It is hardly possible to conceive of a teaching situation that does not involve, at some level of operation, beliefs concerning human learning, development and relationships. These beliefs are present and embodied in the actions of teachers as they plan, organize, interact and evaluate in classrooms (Allport, 1955, p. 14).

> The essence of development eludes the viewer unless the realm of personal responsiveness is considered as foremost in the appraisal of development processes. Or, to put it another way, growth, maturation, and socialization are much more useful for understanding similarities than they are for the consideration of differences. Thus, when viewing the specialization process, we may readily see how language becomes a part of the child's development; how self-

> concepts emerge; and so on. What is missing is the dimension of personal responsiveness to the socialization process. Likewise, in the biological realm, the forces of maturation explain much about walking, sexual maturation, etc., but little about personal responsiveness to these developments (Maslow, 1959, p. 31).

In another context, Allport says:

> Hence the individuality of man extends infinitely beyond the puny individuality of plants and animals, who are primarily or exclusively creatures of tropism or instinct. Immense horizons for individuality open when billions of cortical cells are added to the neural equipment of lower species. Man talks, laughs, feels bored, develops a culture, prays, has a foreknowledge of death, studies theology, and strives for the improvement of his own personality. The infinitude of resulting patterns is plainly not found in creatures of instinct. For this reason we should exercise great caution when we extrapolate the assumptions, methods, and concepts of natural and biological science to our subject matter. In particular, we should refuse to carry over the indifference of other sciences to the problem of individuality (1955, p. 32).

Success in the attainment of goals becomes of crucial significance to the self. When failures are recurrent in self-relevant, or ego-involved areas, lasting feelings of inferiority arise; and defense mechanisms are developed in order to avert encounters which arouse these feelings. When this occurs, the youngster closes his contact with reality and becomes embedded in some structured feelings which will thwart the development of his potential by

warding off the learning of new meaning schemes (Allport, 1955, p. 39).

Thus the pupil as self provides the teacher with a way of entering the life of the individual in meaningful ways, through helping the pupil see himself clearly, and by fostering his sense of identity and success in his striving toward selfhood. All the learner's experiences are relevant in the development of selfhood. Success or failure, joy or shame, pleasure or guilt and/or anxiety in solving an arithmetic problem feed as directly into the development of self as do peer group reactions or parental attitudes (Allport, 1955, p. 39).

More significantly, the child's concept of self provides him with his most manageable and productive means for self-actualization. This concept is, actually, the only rational way by which the child can enter into his own development to influence growth through the setting of ideals, purposes and commitments which strengthen the ego processes as self-perceptions change. Here is a crucial point at which the teacher may hold open the world for a child (Allport, 1955, p. 40).

The kindergarten youngsters are working with jigsaw puzzles. Some, without hesitation, move to complete the most difficult designs; others struggle in limited, nonpatterned trial and error, and then jump the whole

thing. What is this basic difference between children? One group has been cued for action, knowing there are clues in color, shape and size. Some children seem to discover these cogent clues on their own. Others discover but one or two clues, and still others are seemingly unaware that there is anything significant to look for. These are the lost, the frustrated, apparently lacking means for "latching on" (Individualizing Instruction, 1964, p. 57).

A pupil who is given a significant clue may be released for exploration, even as mathematicians were released by the notion that postulates are man-made. If the teacher knows what is involved in the solution of a puzzle, then observation and/or questioning should reveal those clues which any particular pupil employs. Now, the teacher may intercede for the "lost one". The teacher will not tell him merely where to place pieces. Rather the teacher may suggest that the pupil feel around their edges, to encourage using each sense for obtaining information. The mandate to the teacher is: Give him a clue: to use his sense of touch. This action leads the pupil to necessary information while he is still involved in his search for, and organization of, data. A spreading grin of delight, at the ensuing competence, is the teacher's reward (Individualizing Instruction, 1964, p. 57).

One basic evidence of individual differences is the manner in which each person takes in sensory data. All too often, despite what we say about individual differences, we assume that every child receives sensory data in the same manner. Working with youngsters who have learning difficulties indicates that there are sensory preferences in children whose complete sensory equipment is intact. For one pupil, kinesthetic experiences must be utilized to reinforce what the eye sees and the ear hears. For another, the inability to shift from one sense mode to another creates problems in reading. The teacher must provide opportunities for and encouragement of fuller utilization of senses whether in kindergarten or the twelfth grade. Failure to do so deprives youngsters of indispensable data (Cohen, 1960, p. 51).

A fascinating book for young children, well worth adult reading, is <u>It Looks Like This</u>. This book tells the story of four mice - High Mouse, Side Mouse, Front Mouse, and Back Mouse (so named because they live in those parts of the barn), each of whom perceives a cow, a horse, and a pig differently. Each is convinced that the other is wrong until a cat arrives. In frantic haste to escape, the mice run and hide together. Now they discover that each is right, for they all see the cat from the same angle. Each time the enemy turns, the mice see her -

front view, side view, back view. Would that human beings might absorb the lesson from this story early in life! How much more receptive we would be toward others; how much more willing to stay with the stuff of the world, to explore it from many angles! One viewing and labeling deprives us of any reasonable encounter with reality. To know, in a personal sense, demands multiviewing.

The vast knowledge which man has accrued, enables him to approach and respond to our world in different ways, and should free us and our children to respond in our own individual ways. This essential part of our nature, individual difference, we have yet to take fully into account. If a composite picture of our world is to be gained from our different viewings, then each of us has a point of view to contribute, as did Dr. Webber's mice (Schachtel, 1959, p. 65).

At the outset, the teacher should think about his role and come to recognize what is of significance in the dynamic interplay of humankind as each human being explores the world of people. All that we know about the direction and force of human growth, all that we know of the natural and physical world of which we are a part, and all that we know of our cultural context come together to result in a pattern of behavior which is highly specific for any one individual. Therein lie our essential differences.

Even as we recognize these differences, the universals which are our similarities, emerge as well.

As the teacher meets with his group of pupils on the first day of any school year, he confronts a mass of faces. There is a sameness about them all, but only for a brief period of time. Gradually, individual faces emerge to be matched with names, with specific ideas expressed, with personality revealed. The amorphous mass takes shape as the teacher differentiates one person from another. Only when he knows each member as a person does he come to know the true nature of his group. Only then can he operate to free the potential energy of the individuals within the group.

What does the teacher do as he views his group? He takes five important actions: (a) he becomes alert to significant clues; (b) he responds to these clues; (c) he is sensitive to time and timing; (d) he diagnoses; and (e) he encourages interaction that is continuous and self-perpetuating (Individualizing Instruction, 1964, p. 76).

"Tuning in" requires time: time to listen, time to respond. For each human being, there is an ebb and flow of thought, of feeling, and of action as he interacts with his environment. He needs time if he is to become involved in this interaction. The need for adequate time is expressed by Combs and Snygg:

> The discovery of personal meaning is a process which seems to proceed best in an unhurried, unharried atmosphere. We have seen that perceiving takes time and good teachers are keenly aware of this fact. They know it is possible that the pressure of speed may destroy the process of exploration entirely. The organization and reorganization of perceptions in the phenomenal field is an active process best accomplished through some form of interaction of individuals with problems. The value of a learning situation can be completely lost by such an emphasis upon speed that the learner is reduced to passivity while subject matter is poured forth at a rate he is unable to comprehend. Almost any student has at one time or another been exposed to the teacher in such desperate haste to "cover the subject" that he succeeded in burying it forever (1960, p. 81).

Sooner or later, the teacher should diagnose the strengths and weaknesses, the advantages and needs of individual learners. Initially, he diagnoses tentatively and informally. As the evidence on which he may base more careful diagnoses continues to accumulate, he becomes comparable with the internist in medicine, who gains thorough familiarity with the dynamics of the human body so that he may diagnose and prescribe with confidence. The skilled teacher diagnoses situations in his classroom with confidence, though he may say he teaches "intuitively," as if he were dealing with elements beyond his control. Could it be that the "intuition" upon which he bases his actions comes from the same thorough familiarity with

learners and the dynamics of learning situations that the internist has, correspondingly, in his field? Is it possible that the skilled teacher is able to receive clues from his perceptual field and to respond to them immediately (Combs and Snygg, 1959, p. 82)?

No one can develop or express his greatest possibilities in a threatening situation. For idea to grow upon idea, an individual must be made to feel that his thinking is worthy and appreciated. There must be an air of acceptance in the group. At times, ideas may not seem to be related, but life itself is an experimental laboratory where one expresses according to his particular talents. Where ideas can be freely expressed, the way is open for help and guidance. If they are smothered and the individual does not feel free to express his thoughts as they come to him, we may be guilty of standing in the way of progress because we use our authority to close the door of thought (Individualizing Instruction, 1964, p. 86).

Exploration and discovery invite involvement. Involvement, in turn, invites questioning, and the spirit of inquiry invites and compels search. The questions raised, however, must be real questions whether they are asked by teacher or pupil. Actually, questions are more than stimuli for limited response; they may serve to focus attention, invite recall of past experiences relevant to

the exploration at hand, or serve as clues on the path of discovery. It is through insightful questioning that the teacher may release the learner. It is through such questioning that the teacher may help the pupil "open up" to the world; may sensitize him to those aspects of his environment which have not been brought into the focus of his perceptual field (White, 1959, p. 329).

The ideas are expressed by Combs and Snygg:

> Since exploration necessarily involves trial, practice, seeking, striving, and pushing into the new and unknown, it is bound to result in frequent error. Therefore, a learning situation which regards mistakes as affronts against God and man is hardly likely to encourage the exploration of meaning. Personal meaning can only be discovered in settings wherein one has the opportunity, indeed even the right, to make mistakes. An educational setting which cannot tolerate or permit mistakes imposes severe limits upon the freedom with which students can explore their own perceptions (1959, p. 92).

In the statement of the problem, it was mentioned that American education has traditionally progressed in a manner evolving in such a way as to move into various phases always capitalizing on the knowledge gleaned from experiencing the benefits of the past.

With systematic and planned training for elementary educators as early as 1825, it seemed that continuous study would necessarily lead to better approaches. Already at the time of the Civil War, most of the aspects

of today's school system had been inaugurated. Only expansion and growth were necessary. This was to come from men such as Maclure, Mann, Barnard, and more contemporarily, Dewey and Einstein.

What had to come was a greater appreciation for a student's individual needs. The many-faceted approach could come only through study, discovery, experimentation, and conviction.

Through realizing educator's attitudes on the magnitude of human potential, gradually these theories of man have taken shape into a meaningful practice. The individual is an extremely worthwhile member for whom a diagnosis of his unique needs can mean a greater realization of his potential.

CHAPTER III

TECHNICAL INFORMATION

Problem

As it was stated in the conclusion of Chapter I, first section, American education has as one of its qualities, an ability or habit of taking from one era the knowledge and experience gleaned from those who have made the history. As was indicated, the pendulum presently swings toward the process of meeting the psychological needs of children by individualization. Its inbuilt reward system encourages self-motivation.

Having faced a problem common to other teachers including teachers of industrial arts, the writer was faced with a problem of not being able to meet the individual needs of the 160 students he was scheduled to meet bi-weekly; he proceeded to design an experimental program in which he took two groups of fifteen eighth grade boys homogeneously grouped from Intelligence Quotients of 93-127. Each of the groups has three boys below 100 Intelligence Quotients and four boys above 120 Intelligence Quotients.

The experimentation illustrated a comparison of the traditional lecture, activity, group test method as compared with the process of individualization through learning packets on two specific sections of woodworking,

namely, studying the band saw and the wood lathe.

Each of the two groups spent an equal amount of time scheduled into the wood shop either as a group process or to work on the learning packets. The band saw, traditional and individual programs, were given a period of four weeks. The period of time for the lathe was six weeks. Twice weekly each boy is scheduled; each may come when the woodshop is available during his free periods or after school hours when the instructor is present.

A similar test was administered to the comparable groups. For purposes of experimentation, he designated the Control Group, A, as the group on the traditional method; Group B as the experimental group which worked on the individualized study of learning packets.

The key to individualization and learning packets is worthwhile objectives. To determine whether a program is worthwhile, there must be a form of evaluation. It must be able to be determined behaviorly what one is doing. The writer concentrated on the historical background of the traditional method leading toward a rationale for individualization in the preceding part of the paper. The following section will concentrate on behavioral objectives, the process of making learning packets, and the actual learning packets used in the experimentation.

Behavioral Objectives

The most perplexing aspect of evaluation is knowing exactly what to evaluate for. Somehow, and in some way, it is necessary to find out what, how, and when children have learned. To more effectively cope with this problem, many psychologists now recommend the establishing of "behavioral objectives" on which to base evaluation.

Simply stated, a behavioral objective is a statement describing what the student is expected to be able to do after instruction that he could not do before instruction. This is a measure of the learning that has taken place, since learning is defined in terms of changed behavior.

The careful statement of behavioral objectives has been referred to as the "systems approach" to developing instructional materials. In the systems approach, behavioral objectives are stated initially so that instructional materials can be designed to induce the designed behaviors.

At the completion of the instruction, one is able to determine whether or not the students exhibit the desired behaviors. If they do not, change can be made in the instructional materials or the objectives are refined to make them more realistic.

In actualizing desires, aims, goals, intentions, and expectancies, behavioral objectives have the following

earmarks:

1. Behavior is clearly defined.
2. Performance level is established.
3. Conditions under which the behavior is exhibited are pinpointed.
4. Performance standards or criteria to determine if the student acts, performs or behaves at an established level are included.

Students are helped to acquire functional learning through behavioral objectives - and if one believes education is a means whereby behavior is changed, behavioral objectives are indispensable (Mager, 1962, pp. 1-3).

Mager states: "Before you prepare instruction, before you choose materials, machine, or method, it is important to be able to state clearly what your goals are" (1962, p. 4).

An objective is an intent communication by a statement describing a proposed change in the learner - a statement of what the learner is to be like when he has successfully completed a learning experience.

Statement of an objective is useful to the extent that it specifies what the learner must be able to Do or Perform when he is demonstrating his mastery of the objectives.

A well-written instructional objective should

say three things:

1. It should say what it is that a student who has mastered the objectives will be able to do.
2. It should say under what conditions the student will be able to do this.
3. It should say to what extent the student will be able to do this.

To put the matter in a single sentence, a well-written instructional objective should specify under what conditions and to what extent a certain kind of student performance can be expected to take place. If teachers at all levels of schooling would be explicit in writing instructional objectives, they might reasonably hope to eliminate almost immediately one cause of learning failure among students, the traditional fuzziness of classroom assignments.

A usefully stated objective is one that helps us to see where we are heading and tells us how to know when we have arrived.

When writing objectives, it is suggested that words open to many interpretations be avoided.

Words to avoid: to know, to understand, to really understand, to appreciate, to grasp the significance of, to enjoy, to believe, to have faith in.

Good words to use: to write, to recite, to identi-

fy, to differentiate, to solve, to construct, to list, to compare, to contrast (Mager, 1962, p. 6).

Words much as those previously used and words such as understanding, comprehension, and appreciation point to noble aims, but when stated wholly in these forms, they do not refer to anything directly observable and therefore, do not permit us to evaluate how well we are doing whatever it is we are trying to do.

The trick is to supplement each announcement of purpose with a statement of criterion performance. That is to say, each declaration of an instructional aim should be accompanied by a clear description of what the learner must be able to do in order to demonstrate his accomplishment of the objective.

The emphasis here is on the word do. And the doing must be observable. A warm feeling in the pit of the statement is not enough (Mager, 1962, p. 8).

A well-written statement of desired performance should not only say what it is that a student who has mastered the objective will be able to do. It should also say under what conditions the student will be able to do this. In a related manner, it is significant to say that some learning justifiably presents the student with an all-or-nothing situation. For example, if the learner is supposed to tie his shoe laces, it would not make sense to talk

about his being able to do this with 90 percent level of accuracy. Another example would be to be able to know the mechanics of the lathe. Here the proposition is absolute: he can either tie his shoe laces, or he cannot. There is nothing in between (Mager, 1962, p. 15).

An instructional objective should not ordinarily be limited to specific means, but should be stated in terms that permit the use of various procedures. For example; when studying the lathe, if one had to do it according to a particular method, and was so stated in the objective, no other method could be chosen. There could, however, be many comparable methods (Manatt and Meeks, 1971, pp. 13-18).

Finally, a well-written objective will suggest how its accomplishment can be measured. This follows for our view that a well-written objective specifies under what conditions and, when appropriate, to what extent a certain kind of student performance can be expected to take place. An example: A student must master the alphabet at 100 percent level of accuracy (with both upper and lower case letters and in random order). The objective makes it clear how its accomplishment can be measured.

Not presently dealing with the quality of subject matter, an adequate educational objective should provide the following information: It should tell us in the clearest possible way exactly what it is that the student

who has achieved the objective will be able to do. It should set forth, whenever it makes sense to do so, the minimum standard of acceptable student performance. And it should describe plainly the conditions under which the student will be expected to accomplish the objective. We must specify what behavior we are willing to have stand for or represent the cognitive achievement we are seeking (Manatt, 1971, p. 29).

Summarizing what has been previously said, an adequate educational objective will specify under what conditions and, when appropriate, to what extent a certain kind of student performance may be expected to take place.

Educational objectives expressed in terms of observable behavior will enable students to take on an increasing measure of responsibility for their own learning. The assumption here is that clearly stated learning tasks will encourage the development of better learning strategies (Mager, 1962, p. 29).

Learning Activity Packet Development

Following is a learning packet on how to make learning packets. It is designed to teach the fundamentals necessary in a program for individualized instruction. This self-instruction, like any other in the New Design program organized by Manatt, is designed to teach one

major concept, namely the development of learning activity packages.

Major Concepts and Subconcepts. A learning package is a modular instructional unit intended to facilitate the individualization of instruction. The package becomes a vehicle for a variety of instructional materials that are auto-instructional, thus allowing a student to go off by himself and learn without a teacher's direct supervision. The development and use of packages is based on two major premises, both of which have been validated by research.

1. Students learn at different rates, and
2. Learning is incremental.

The learning package is learner-oriented not teacher-oriented as lesson plans are. Experience with programmed learning of the 1950's and early 60's revealed that students learn better if:

1. They are told what it is they are expected to do after the learning experience.
2. They are given learning experiences which help them learn to do what they are able to do, and
3. They are finally asked to do whatever it is they were do to.

The learning package has been given a number of names by different user groups and writers, e. g.,

Title:
Modular Instructional Unit
Audio-tutorial
UNIPAC
LAPS (Learning Activity Packages)
IPI (Individually Prescribed Instruction)
TLU (Teaching Learning Unit)

Five essential elements for developing packages are generally included by each user group: 1) concepts, 2) behavioral objectives, 3) multi-dimensional learning materials and activities, 4) pre- self- and post-evaluation, and 5) quest or self-initiated learning.

The package(s) must be systematically organized and the instructional materials are "programmed" in a logical and sequential manner. Once the package is produced, it is tested and revised until there is empirical proof that the learning materials work.

THE PACKAGE MUST HAVE:

1. Concepts (to learn)
2. Behavioral Objectives
3. Multi-dimensional Learning Materials
4. Pre-, Self-, and Post-Tests
5. Quests

Behavioral Objectives

At the end of the instruction you will be able to:

1. Define the five distinguishing characteristics of a well designed learning package,

2. Distinguish between the types of learning packages advocated by the different user groups,

3. Name at least three ways that learning packages may be used in a school situation,

4. Construct a flow chart and briefly explain the main steps involved in developing a learning package, and

5. Construct and explain a model for continuous progress in classroom learning.

Pretest

"Learning Packages"

1. Name the components or characteristics of a Learning Package.
   (1)_____
   (2)_____
   (3)_____
   (4)_____
   (5)_____

2. What group produces each of the following Learning Packages?
   (1) UNIPAC_____
   (2) A-T_____
   (3) TLU's_____
   (4) LAPs_____

3. Name two possible ways for a school to use packages.
   (1)_____
   (2)_____

4. List the steps in constructing a Learning Package.
   (1)_____
   (2)_____
   (3)_____
   (4)_____
   (5)_____
   (6)_____
   (7)_____

Answers to Pretest "Learning Packages"

1. (1) Concepts (to learn)
   (2) Behavioral objectives
   (3) Multi-dimensional learning materials
   (4) Pre-, Self-, and Post-Tests
   (5) Quest or self-initiating learning

2. (1) UNIPAC - Kettering Foundation's IDEA Corporation
   (2) A-I - Sam Postilwait, Purdue University
   (3) ILU's - Westinghouse Learning Corporation
   (4) LAPS - NOVA High School, Ft. Lauderdale

3. (1) enrichment
   (2) remediation
   (3) interspersed with Lockstep Program
   (4) dual offering to Lockstep Program

4. (1) Determine concepts and rationale
   (2) Develop general objectives
   (3) Research, place in sequence, and refine content
   (4) Define specific behavioral objectives
   (5) Adapt media and methods
   (6) Develop post-test
   (7) Try out and revise package

Lesson I What do you find in a package about learning packages?

One thing that makes individualizing instruction so tough is the problem of providing the teacher with sufficient alternatives to deal appropriately with the large number of students that he must confront. Diagnosis for large numbers of students takes a great amount of time; even more is needed to provide differential instructional programs. The learning package has proven a very convenient way to facilitate individualization of instruction while requiring a minimum of teacher participation for its use.

A learning package provides a means for planning the learning activities for a particular concept or set of objectives. The teacher writes the package and assigns it to the student - thus giving the student specific knowledge of what is expected as well as instructional experience.

Each package generally contains 1) a rationale and general concept, 2) behavioral objectives, 3) multidimensional learning materials and activities, 4) pre-, self-, and post-evaluation and 5) quest or self-initiated learning.

Lesson I - The rationale, a definition and an overview.

Lesson II - Characteristics of a learning package.

Lesson III - Developing a learning package.

Lesson IV - Using the package.

Lesson V - Selection of prepared packages.

This package on learning packages is intended to be self-instructional. Except for quest activities, it is self-contained - not requiring any outside materials or equipment. Complete all lessons and assignments, including the post-test. Quest activity suggestions are optional; use your own judgment.

Writing, prescribing, and acquiring packages will be a major part of your professional life in a school using the new design - move on to Lesson II!

Self-Test - Contents of a Package

Each learning package has three types of evaluation. What are they?

1. _____
2. _____
3. _____

That's right! Pre-, Self-, and Post-Evaluation.

Lesson II Characteristics of a Learning Package

Well-designed learning packages are built as instructional systems and are characterized by:

1. A significant change in the role of the teacher. He is no longer a lecturer or dispurser of facts. As packages become available through local production, access to a package "exchange bank", or by the school's adoption of a commercial system of packages, the teacher becomes a diagnostician with the major purpose being to lead each student to the point of mastery. A "pharmacy" containing many prescribable packages gives the teacher much more time for effective instructional planning yet keeps each student working steadily and at his own rate during this time.

2. Concise behavioral objectives tell the student the quality of performance expected of him. Haven't you said to yourself just before taking a final exam in college "I wonder what the prof will ask on the test - I wonder what I should know?" Doesn't it strike you as ironic that the learner, the very person charged with learning, is in doubt as to what is expected? The provision of behavioral objectives in the package removes that doubt.

3. The emphasis is on individualization; the responsibility is on the student. Pretest, a self-test and a post-test allow the student to move through a

package or series of packets at his own rate. All students are not expected to complete all procedures as in traditional programmed learning. The self-tests permit the student to determine for himself when he is ready to take the post-evaluation and to move on.

4. Packages are based on broad concepts which have been capsulized into sequential, coordinated modules. Packages are free standing, they are not dependent on a textbook or a previously established course of study. Once a concept or concepts behavioral objectives are selected for instruction the package is written to reach these goals, to teach these concepts.

5. Wherever possible the packages contain multimedia including a choice of vehicles for learning for various steps in the process. Recognizing that different persons learn in different ways, package writers provide a variety of media.

6. Not only does the package provide diversified materials, it also contains diversified learning modes, particularly student-student interaction and teacher-student interaction. A given package may include a wide range of activities; large group and small group instruction, field trips, model building, role playing, simulation, laboratory experimentation and independent study.

Quest: Write for description of the three commercial packages: IPI, PLAN, and STAR.

Lesson III Developing a Learning Package

Writing learning packages, like most teaching activities, is not as easy as it looks. The task is simpler if you stick to concepts you personally understand and have taught in a traditional mode. The following flow chart has proven helpful to others in learning to write packages.

Flow Chart

Determine Concepts to be Taught and Give Rationale	Select the area to be covered. A rationale should tell the reader what the unit is about. Often this will include some explanation or history of the topic.
Develop General Objectives	Few teachers think in terms of behavioral objectives as they conceptualize a package. Broad or global objectives usually come to mind first and easier.
Research, Sequence, and Refine Content	A completed package looks quite different from a research paper or a theme; however, the writer must steep himself in the subject concept, place a variety of thoughts and subconcepts into a logical sequence, and polish them.
Define Specific Behavioral Objectives (Develop Pretest)	At this point you are ready to shape behavioral objectives from the general objectives and your content research. From the student's point of view the behavioral objectives tell him what he must be able to do to successfully complete the package.

Adapt Media & Methods (Provide for Self-Test)	The content learning must be shaped to fit your behavioral objectives and presented with a variety of media to appeal to a variety of learners and learning styles. Self-test questions should be written to provide the student with a progress report.
Develop Post-Test	The post-test will be a professional evaluation of the effectiveness of the package and the success of the learner. The same types of questions should appear in all three tests. In fact, some package writers insist that one test should be written and then split into thirds for package use.
Try Out and Revise Package	Seldom will a package stand the test of usage without review and modification. Just as small group discussion reveals how much is misunderstood in large group sessions. So does student use of packages.

Now let's review the steps in writing a learning Package:

1. Determine concepts and rationale;
2. Develop general objectives;
3. Research, place in sequence, and refine content;
4. Define specific behavioral objectives;
5. Adapt media and methods;
6. Develop post-test; and
7. Try out and revise package.

Self-Test

The Steps In Developing A Learning Package

Sketch a flow chart and briefly explain the steps involved in developing a learning package.

Answer:

1. Determine concepts and rationale;
2. Develop general objectives;
3. Research, place in sequence, and refine content;
4. Define specific behavioral objectives;
5. Adapt media and methods;
6. Develop post-test;
7. Try out and revise package.

Lesson IV Using the Package

Keep in mind that the learning package is auto-instructional, a student may take one into the corner and learn without a teacher being present. Packages, of course, vary in complexity. The booklet you are reading is very simple, utilizing the printed page and a few simple illustrations - but it is not a textbook in the usual sense.

A learning package may also be an audio-tutorial presentation in an electrified learning booth (wet carrel) using a taped audio control, single concept film projectors, pictures, specimens, and printed study questions. The Link trainer of World War II fame was actually an elaborate learning package featuring simulation.

How you, the teacher, will use packages depends to a great extent on the packages available to you or your time for and skill at preparing them. Most packages you might buy or prepare are intended for individual and/or small group instruction and permit the pupil to progress at his own rate.

Most teachers first use packages to teach a skill. Skill teaching seems easier to adapt to packages because you can reduce a skill to a cluster of specific objectives. For example, packaging "How to Use the Maytag Automatic Washing Machine" is rather easy. Teaching the English

sonnet by package format is more complex.

Home Economics teachers have written packages with titles like "Breads and Doughs", "Meet the Meats", and "The Egg and You"; each a skills package on food preparation. Math teachers have developed packages on use of the slide rule, probability, and working square root. English teachers have programmed "The Research Paper". Similarly you will find that routine skills demanded for your courses will most readily lend themselves to packaging. Try a package to prepare your student for a regularly taught unit. An example would be "use of the wood lathe" before a lamp-making assignment.

Once several packages covering related concepts are available, a sequence of learnings for continuous progress may be arranged. Self-paced learning is possible if carefully articulated packages are assigned sequentially. The following diagram illustrates the continuous progress model using learning packages. Given a pretest for learning number one, the learner may be directed to proceed through the package or referred to a second package if he already understands the basic concepts of the first package. The teacher also may opt to assign "enrichment" or "depth" activities before package number two is prescribed.

Self-Test

Using the Package

1. Which is easiest to package, skills, attitudes, or appreciations? _____

   Did you say skills? Good, try this one...

2. Name three different ways that learning packages may be used.

   (1)_____

   (2)_____

   (3)_____

   You could have mentioned enrichment, remedial, interspersed with the lockstep and finally as a dual program substituting for the lockstep program currently used.

3. How does pre- and post-testing allow for continuous progress in learning package instruction?_____

   _____

   _____

   The pretest might reveal that the learner already knows the concepts to be taught, so he might be directed to the next learning package. On the other hand, a post-test after instruction might reveal that the learner has not understood the concepts and he could be sent through the materials again.

Lesson V Selection of Prepared Packages

Where are the learning packages to be found? "OK, you say, I buy the concept of the New Design for education. I want to use the teaching-learning modes of LGI, SGI, IS. To make IS meaningful we'll need structure, we'll need lots of learning packages and I don't know where to find them."

At the risk of sounding like the Lone Ranger and Tonto, your authors will say "Hold on, help is on the way." Numerous school districts are developing instructional management systems to assist teachers in developing and structuring a program that will allow each student to learn at the pace and depth best suited to him. This self-paced learning strategy usually relies heavily on the learning package. Phillip Kapper has led the faculty at Valley High School, Las Vegas, Nevada, through a series of package developments. The NOVA complex at Fort Lauderdale, Florida, has been a front runner in the learning activity package approach to individualizing instruction.

In the Midwest, a number of Iowa school districts have packaged systems started; e.g., Boone, Adair-Casey, Bondurant- Farrar and the Washington Senior High School at Cherokee. Local districts and groups of teachers working for innovative schools are now selling packages. Burgess

Publishing Company at Minneapolis has had a major role in Audio-tutorial (A-T) packages since first publishing the writings of S.N. Postilewait, the Purdue biologist often credited with founding the A-T movement in the late 1960's.

Even more promising are the total learning systems and learning package banks developed and supported by Foundations, learning corporations, and the United States Office of Education. So far the Kettering Foundation's Institute for Development of Educationl Activities (IDEA) has been joined by the Westinghouse Learning Corporation, Ampex, Telex, Graflex, Research for Better Schools, Incorporated, Dorsett Educational Systems, IBM/SRA, and many others. A description of the activities of three of these, IDEA, Westinghouse Learning and RBS will give you a notion of what's coming.

Westinghouse Learning Corporation under the direction of Dr. Robert Marker, vice president, has been working on a project called PLAN (Programmed Learning in Accordance to Need). Research started in grades one, five, and nine bout 2,000 students in 14 districts. PLAN utilizes learning packages that cover about a two-week increment of a particular subject domain called TLU's (Teaching-Learning Units). These packages integrate a host of

"hard and soft" materials to fascilitate the accomplishment of the TLU's stated behavioral objectives. This is a computer-managed instructional system because the computer is used to keep track of learner progress and the program of studies materials. PLAN uses already-available commercial materials and is on the market nationally now.

The Kettering Foundation's IDEA corporation sells "How to do it" not learning materials or computer management of learner progress. IDEA has set up a Materials Center under the direction of Gardner Swenson (27965 Cabot Road, South Laguna, California 92677). Upon request the Center will send a kit of materials which include a learning package on how to build one. IDEA calls a learning package a "UNIPAC".

The IDEA Materials Center is designed to promote the preparation of packages by teachers and to make such teacher prepared materials available to anyone who has submitted a package to the center. Each package is put through a quality control procedure. When this is completed and the package is accepted by the Materials Center, the writer is eligible to receive all packages in his subject field which are on deposit.

Research for Better Schools Inc., is the regional educational lab for New Jersey and Pennsylvania (located at 1700 Market Street, Philadelphia 19103). RBS has pro-

moted and financed the development of the IPI project (Individually Prescribed Instruction) of the University of Pittsburgh. Bob Glasser, the researcher, and Bob Scanlon, the promoter, have the most elaborate and sophisticated package and prescription approach available. IPI is so good that districts are queing up to get a chance to replace the traditional K-6 program with the IPI pharmacy/prescription approach.

This program takes the formality out of the learning package approach. Masses of records must be kept on each pupil. This information is used to help the teachers write out "prescriptions" for each individual student to help him over the rough spots and to fill in the gaps in his work on a learning package. (This usually takes the teacher an hour each day for 25 learners.)

Though the plan is expensive to buy, almost 200 are using all or part of the total elementary school program now available. Over 1000 schools are on IPI's waiting list. A major screening device is the district's willingness to retain the principal and teachers and to provide auxiliary help. Soon IPI's materials and the management system will hit the commercial market.

Packages and learning systems such as these described probably will become even more popular as large school districts turn increasingly to private corporations for some

instruction (example, Texarkana which during the 1969-70 school year purchased math and reading instruction from Dorsett Educational Systems). Small school districts will also climb on the bandwagon as a means of increasing program offerings while holding the lid on rapidly climbing per-pupil costs.

Do's and Don'ts of Package Selection. It appears you will have ample sources of packages soon. No doubt you will be expected to prepare some packaged materials too. Below are a set of guidelines to use in the selection and/or preparation of learning packages.

1. Do develop your own behavioral objectives for each course and units.
2. Do select packages that provide concepts and skills which jive with locally planned objectives.
3. Do continue LGI and SGI even though IS time is loaded with packages. Programmed learning of the 1950's flopped because a steady diet of "frames" became a bore for students.
4. Don't allow students to spend all their time working alone - we don't want to produce a generation of little monks suited only for scholarship in solitude.
5. Don't write packages if you don't have the

requisite time or talent. The "hasty" package turns out to be little more than assignment sheets or routine seat work.

6. Don't think you will be replaced by a package - that's as foolish as believing the presence of the familiar Rexall Drug Store will reduce the need for medical doctors in a community.
7. Don't become discouraged if the first packages you write or purchase are not top quality. Wilbur and Orville Wright were told "Man was never meant to fly, and besides if he does, it won't be two tinkerers from Kitty Hawk, North Carolina!" Yet today we have airplanes with a luggage compartment long enough to accommodate the Wright Brother's flight.

Self-Test - Selection of Packages

1. Match the package name with the proper producer/user group.

IPI	Kettering Foundations IDEA
UNIPAC	Westinghouse Learning's PLAN
TLU's	Research for Better Schools, Inc.

IDEA promoted UNIPAC; RBS produced Individually Prescribed Instruction (IPI); and Westinghouse Learning Corporation sells Teaching-Learning Units (TLU's).

2. Which package approach uses a prescription and pharmacy format?

_____

(Bob Scanlon's IPI)

3. Why are packages becoming more available?_____

_____

_____

(Answer: Corporations see a profitable business in writing, publishing and selling instructional systems based on packages; teachers are being taught and encouraged to make their own packages. To get additional packages, teachers and schools swap packages with other producers.)

4. How do you decide what package(s) to use?

_____

(Answer: What does your behavioral objectives require?)

Post-Test - "Learning Packages"

(Answers on next page)

1. Complete the five characteristics of a learning package:
   (1) Concepts (to learn)
   (2) _____
   (3) Multi-dimensional learning materials
   (4) _____
   (5) Quest or self-initiating learning

2. What learning package name is used by each group?
   (1) Kettering's IDEA Corporation _____
   (2) Research for Better Schools, Inc._____
   (3) Westinghouse Learning Corporation_____
   (4) NOVA High, Ft. Lauderdale_____LAPS_____

3. Name three ways a school may use packages.
   (1)_____
   (2)_____
   (3)_____

4. Place the following package construction steps in sequence.
   ( ) Determine concepts and rationale
   ( ) Try out and revise package
   ( ) Define specific behavioral objectives
   ( ) Research, place in sequence and refine content
   ( ) Develop general objectives
   ( ) Adapt media and methods
   ( ) Develop post-test

5. Explain the model for continuous progress in classroom learning by indicating the flow with arrows and filling in blank spaces below:

LEARNING No. 1 LEARNING No. 2

Pre-test

Answers to Post-Test

1. (2) Behavioral Objectives
   (4) Pre-, Self-, and Post-Tests

2. (1) UNIPAC
   (2) IPI
   (3) TLU's

3. (1) enrichment/remedial
   (2) interspersed with lock-step
   (3) dual program with lock-step

4. (1)
   (7)
   (4)
   (3)
   (2)
   (5)
   (6)

5. See Lesson IV for completed model.

Band Saw (L.A.P.)

Rationale:

The band saw is a useful and indispensable machine in the wood working shop because of its variety of uses, such as cutting curved work and making straight cuts.

General Objectives:

1. Having completed the prescribed course of study, the student will be able to describe the different types of band saws and to identify the parts.

2. Having completed the prescribed course of study, the student will be able to set up the machine and properly cut with it.

3. Having completed the prescribed course of study, the student will be able to demonstrate the safety required for the uses of the band saw.

Lesson I

Specific Objectives:

1. Having completed the readings, the student will be able to identify and give a brief description of a) band mill b) band resaw c) band scroll saw.

2. Having completed the readings and studied the diagrams, the student will be able to identify the parts of the band saw (85 percent level of accuracy).

Readings:

Hjorth, Holtrop. Operation of Modern Woodworking Machines. pp. 40-42.

Frkylund. General Shop Woodworking. pp. 91-92.

Delta Rockwell Handout: Band Saw.

Self-Test #1

I. Fill in the Blanks

The size of a band saw is determined by _____(1)_____.

The first band saw was patented in _____(2)_____(country) in the year of _____(3)_____.

The part of the band saw that slides up and down and is placed 1/16" to 1/4" above the work is called _____(4)_____.

The kind of band saw that is usually found at a saw mill and is used for sawing logs into boards is _____(5)_____.

The part of the band saw that is located above the lower wheel and is slotted from the center to one edge is called ___(6)___.

II. Multiple Choice: Choose the correct answer and place the letter on the blanks provided to the left of the question.

_____1. The wheels of a band saw are 14" in diameter. This means that the size of the band saw is a) 93½" b) 7" band saw c) 28" band saw d) none of these e) all of these.

_____2. A band mill is used for a) sawing logs into boards b) sawing curved work c) sawing planks into boards d) none of these e) all of these.

_____3. When adjusting the tension of the blade and centering the blade the a) top wheel is moved b) the bottom wheel is moved to center the blade c) both wheels are moved d) none of these.

_____4. The table on the band saw a) is stationary b) tilts 45 degrees in both directions c) has a split table and the right half tilts d) tilts to the right only to 45 degrees e) none of these.

Lesson II

Specific Objectives:

1. Having completed the readings, the student will have a working knowledge of the simple rules necessary for the operation of the band saw. He will be able to recognize these rules in a progress quest, at the end of this lesson.

2. After having read the material and watched a demonstration by the instructor, the student will demonstrate his knowledge of straight cutting as outlined in worksheet one at the end of the learning packet.

3. After having read the material and watched a demonstration by the instructor, the student will demonstrate for the instructor his understanding of a relief cut and resaw, by referring and doing the operations as outlined in the worksheet included in this packet.

Readings:

Hjorth, Holtrop. Operations of Modern Woodworking Machines. pp. 45-54.

Self-Test #2

I. True and False. Write the word True in the blank for the statements that are true and False for the statements that are false.

_____1. Always make long cuts first and then shorter cuts.

_____2. In band saw work, there is little or no opportunity to save materials by using wise methods when laying out the stock.

_____3. When the saw cuts or "leads" to one side this is a sign that the blade should be replaced.

_____4. Resawing is the cutting operation whereby an individual makes several cuts to free an irregular shape.

_____5. The sliding blade board should be located about ¼ inch above the stock being cut.

_____6. Never back the saw out of long cuts because this may pull the blade of the wheel.

II. Fill in the Blanks

1. When a person lessens the thickness of a piece of wood this is called_____.
2. When ripping a board on the band saw a _____ is used in order to get a fairly accurate cut.
3. Before cutting a sharp curve it is a good practice to make a series of _____cuts first.
4. The _____is used for cross cutting on the band saw, and can be turned to 45 degree angle in either direction.

In the drawing below show how relief cut would be made in order to easily remove the irregular shape.

Lesson III

Specific Objectives:

1. Having completed the prescribed readings, the student must achieve a 90 percent level of accuracy on the progress quest regarding the safety rules of the band saw.

2. Having completed the readings and the self-test, the student will demonstrate to the instructor the proper way of setting up the sliding blade guard for a safe cut.

Readings:

Hjorth, Holtrop. Operation of Modern Woodworking Machines p. 42.

Fryklund. General Shop Woodworking. pp. 92-93.

Self-Test #3

I. True and False. Place the word True on the line for the statements that are true, and False for the statements that are false.

_____1. When the statement is made, "Maintain a 3 inch margin of safety," this means that the hands should be about three inches from the blade when the machine is running.

_____2. If the stock being cut on the band saw is too long, it is permissible to reach behind the blade to help support the overhanding stock.

_____3. When a chip of wood is wedged between the blade and the throat plate, always turn off the machine to remove the chip or other particles of wood.

_____4. As with all machines in the shop the band saw is safe to use. It cannot reach out and cut you. You can only be injured if you get your hand into the machine.

_____5. If a clicking sound occurs this may be an indication that the saw blade needs replacing.

II. Multiple Choice

_____1. If it is necessary to stop sawing on a long cut a) back out b) cut through waste stock c) stop the machine and gradually work stock out d) none of these.

_____2. When cutting narrow stock a) use a push stick b) ask for help c) never cut narrow stock d) both a and b e) none of these.

_____3. Accidents on a band saw often happen a) having a dull blade b) improper tension c) both a and b d) none of these.

_____4. When cutting cylindrical stock such as dowels a) cut them free hand b) use the mitre gauge c) use the fence.

_____5. When cutting on the band saw, one should stand a) to the right of the machine b) to the left of the machine c) in front of the machine.

_____6. If a blade should break a) move away b) move to the right of the machine to get clear of the blade c) move back, shut power off and tell instructor d) none of these e) all of these.

Worksheet #1 Straight Cutting

While the instructor is present the student will do the following:

1. Using the ½ drawer fronts, measure the board to five inches in length.
2. Using the mitre and properly setting the machine, crosscut board to stated size.
3. Using the board just cut, set the fence up to four inches.
4. Rip board to stated size.

Instructor will tell you if you have successfully done the above operations. If unsatisfactorily done, you will review lesson II and re-do worksheet #1.

Worksheet #2 Relief Cutting

1. Using carbon paper, trace on the piece of wood you cut for straight cutting ½ x 4 x 5 the drawing at the bottom of this worksheet.

With instructor present:

2. Set up machine properly and cut out the irregular shape.
3. If operation is done incorrectly, repeat lesson II and re-do worksheet #2.

Band Saw Progress Quest Answer Sheet

Progress Quest #1

I.
1. diameter of wheel
2. England
3. 1808
4. sliding blade guard
5. band mill
6. table

II.
1. d
2. a
3. a
4. d

Progress Quest #2

I.
1. False
2. False
3. False
4. False
5. True
6. True

II.
1. resawing
2. fence
3. relief
4. mitre

Progress Quest #3

I.
1. True
2. False
3. True
4. True
5. True

II.
1. b
2. d
3. c
4. b
5. c
6. c

Post-Test - Band Saw

I. Fill in the Blanks

1. When a person lessens the thickness of a piece of wood, this is called _____.
2. The size of the band saw is determined_____.
3. When doing straight cutting on the band saw the _____is used for crosscutting, and the _____is used for ripping.
4. When cutting sharp irregular shapes, it is a good practice to make _____cuts to ease the cutting operation.
5. The first band saw was patented in _____(country).
6. The kind of band saw used for cutting logs into boards is called _____.
7. The sliding guide post must be _____above the board being cut.
8. Tension is applied to the blade by moving the _____ wheel.
9. The table on the band saw can be tilted _____degrees to the _____.
10. When working the band saw _____must be worn.

II. True and False. Write the word True in the space provided if the statement is true and False if the statement is false.

_____1. When the saw cuts or "leads" to one side this is a sign that a tooth may be out of line.

_____2. Resawing is lessening the thickness of a piece of wood on the band saw.

_____3. Always make long cuts first followed by the shorter cuts.

_____4. If long stock has to be cut on the band saw, it is a good idea to ask for help.

_____5. The primary purpose of a band saw is for cutting curved edges.

III. Multiple Choice

_____1. When resawing boards on the band the a) mitre is used b) the fence is used c) a pivot block is used d) none of these.

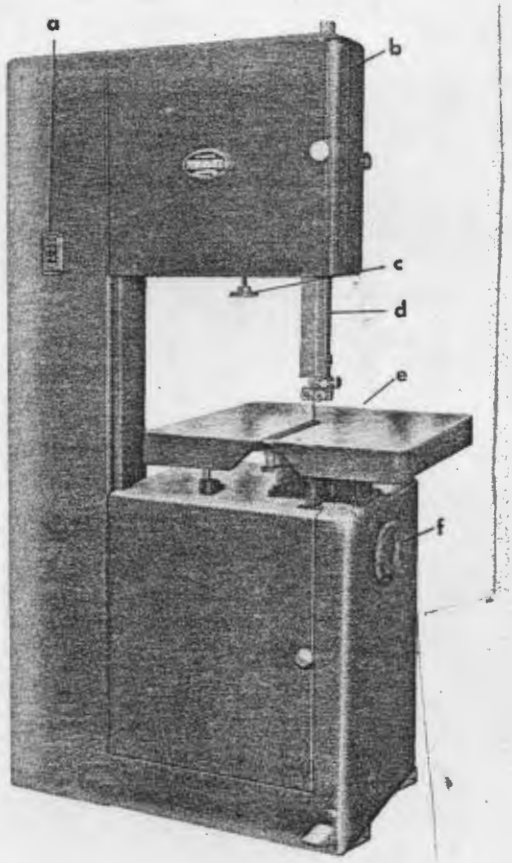
_____2. Accidents happen on the band saw when a) having a dull blade b) twisting the blade c) cutting too narrow of stock d) both a and b e) none of these.

_____3. If it is necessary to stop sawing on a long cut a) back out b) stop machine and gradually wait blade out c) cut through waste slack d) none of these.

_____4. For straight cutting on the band saw the blade should a) be on the line b) on the inside edge of the line c) outside edge of line.

_____5. The blade is made to track on the center of the wheel by a) adjusting the guide blocks b) tilting the table c) tilting bottom wheel d) tilting top wheel

IV. Identification



A. _____

B. _____

C. _____

D. _____

E. _____

F. _____

Answer Sheet
Post Test Band Saw

I.
1. resaw
2. diameter of wheels
3. mitre, fence
4. relief
5. England
6. band mill
7. ¼"
8. top
9. 45
10. safety glasses

II.
1. True
2. True
3. False
4. True
5. True

III.
1. b
2. d
3. c
4. c
5. d

IV.
A. switch
B. wheel guard
C. tension knob
D. sliding guide post
E. table
F. base

Lathe (L.A.P.)

Rationale:

The common wood turning lathe is a link between machine and hand tools, because it combines the art of hand tool work with the mechanical movement of the machines.

General Behavioral Objectives:

1. As a result of having completed the required course of study on the wood lathe, the student will be able to identify the parts of a wood lathe and be able to answer at 85 percent level accuracy a post-test in which he can prove a working knowledge of the parts.

2. As a result of having completed the required course of study, the student will be able to identify the tools used with the lathe and give a purpose for each of them.

3. Upon completing the prescribed course of study, the student will be able to recognize and distinguish among a) dividers b) inside calipers c) outside calipers.

4. Having completed the prescribed course of study, the student will be able to demonstrate his under-

standing of the safety practices required for the safe use of the lathe.

5. Having completed the course of study the student will carefully study the trouble shooting chart, and will be able to recognize the different problems, their causes, and remedies.

6. Having completed the prescribed course of study, the student will demonstrate his ability to distinguish between faceplate turning and turning between centers by completing the attached worksheets at the end of the learning packet.

Lesson I

Specific Objectives:

1. Having completed the work of this section, the student will be able to identify the principal parts of a wood-turning lathe.

2. As a result of accomplishing the assigned readings, the student will be able to distinguish among the lathe accessories, and tell where and how each is used.

Readings:

Fryklund. General Shop Woodworking. pp. 92-100.

Hjorth. Operations of Modern Woodworking Machines. pp. 141-144.

Delta Rockwell Handout: Lathe.

Movies:

"The Lathe"

Self-Test #1

I. Fill in the Blanks.

1. The wood lathe combines _____and _____to perform delicate operations.

2. The part of the lathe that contains the driving mechanism is called_____.

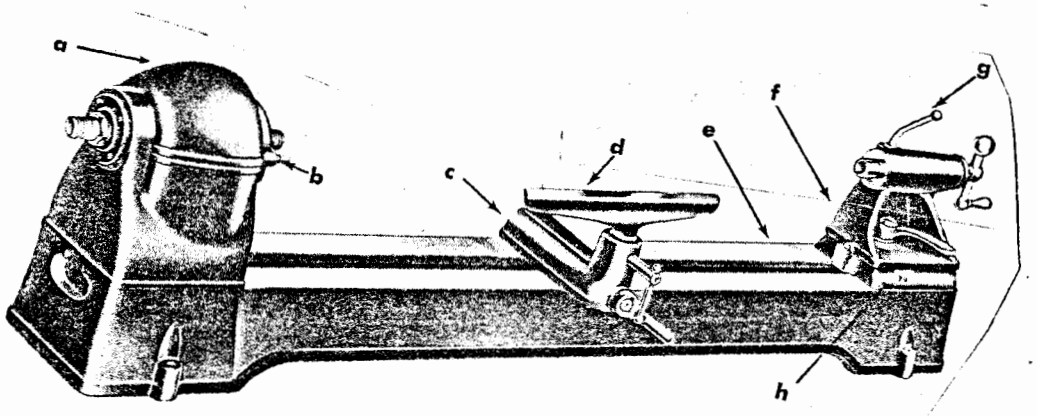
3. The dead centers can be of two types _____and_____.

4. A support for the turning chisels during the turning operations is called _____.

5. A lathe used in industry for mass production is called _____.

6. A steel disk with a threaded hub which screws on the headstock, and is used for turning circular disks or bowls is called _____.

II. Lathe Part Identification:



a_____ e_____

b_____ f_____

c_____ g_____

d_____ h_____

Lesson II

Specific Objectives:

1. Having completed the readings, the student will be able to recognize the differences between gouges and chisels and their different uses.

2. The student will be able to identify the different measuring devices used on the lathe, and tell where each is used.

3. The student will demonstrate his understanding of the measuring tools, by measuring different objects as asked him in the self-test.

Readings:

Hjorth. Operation of Modern Woodworking Machines. pp. 144-45.

Feirer. Woodworking for Industry. pp. 304-05, 92.

Self-Test #2

I. Name the common turning tools.

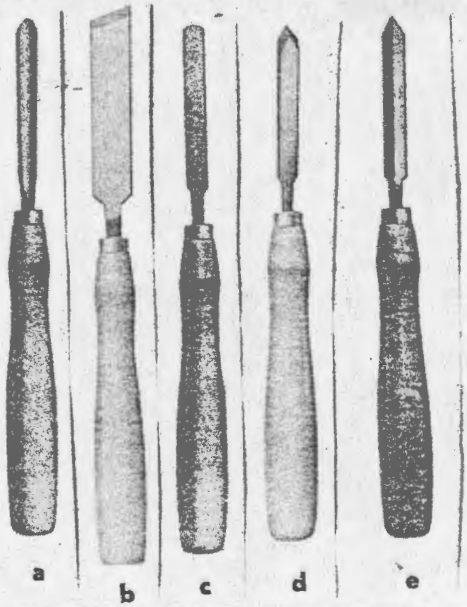
a_____

b_____

c_____

d_____

e_____



II. Matching: Match the tools in Column A with their purposes in Column B.

A	B
a. Gouge	___To finish the inside of recesses or square corners.
b. Skew	___To cut a groove with straight sides and a flat or square bottom.
c. Parting Tool	___For rough turning and forming concave recesses, coves, and circular grooves.
d. Round Nose	___To rough out stock to round shapes.
e. Diamond Point	___For smooth cuts to a finish surface.

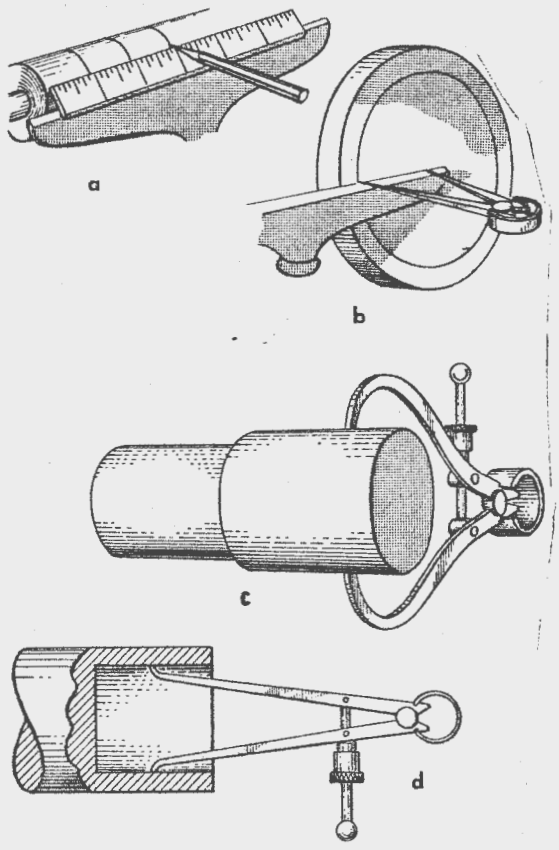
III. Measuring Tool Identification

a_____

b_____

c_____

d_____



IV. Tool Usage

1. Using the outside calipers, measure the outside diameter of the small pepper shaker located on display cabinet.

Answer_____

2. Using the inside calipers, measure the inside diameter of the hole in the pepper shaker.

Answer_____

Lesson III

Specific Objectives:

1. The student will familiarize himself with the safety rules and demonstrate his knowledge therein by answering questions on a test at 85 percent level of accuracy.

2. The student will demonstrate his understanding of the safety rules by setting up work on lathe and having it checked by the instructor as outlined in Worksheet #1 and #2.

Readings:

Hjorth. Operation of Modern Woodworking Machines. p. 147.

Wagner. Woodworking. p. 80.

Self-Test #3

I. Multiple Choice

_____1. When turning between centers, if the dead center is not oiled or waxed a) the stock will burn and squeal b) the center will burn c) will help lubricate the turning mechanism to which the dead center is attached d) all of these e) none of these.

_____2. When working on the lathe, you must wear a) no

eye protection b) face shield only c) safety glasses d) both safety glasses and face shield e) none of these.

_____3. When sanding on the lathe the tool rest should a) be completely removed from the machine b) be moved to one side away from work c) should be left in position to aid in sanding.

_____4. When rounding square stock a) use a round nose chisel at a high rpm b) use a gouge at high rpm c) use gouge at low rpm d) use skew at low rpm.

_____5. When gluing stock to be turned on the lathe, a person has to a) be sure to have boards free from knots and cracks b) have smooth surfaces that are to be glued together c) have good glue joints d) all of these.

II. True and False. Write the word True on the line provided if the answer is true and False if the answer is false.

_____1. If a tight fit is necessary to secure the face plate tightly to the spindle, it is permissible to screw the faceplate part way on the spindle and then turn the power on.

_____2. The tool rest should be placed close to the work as possible to prevent the tool from being caught

between the work and tool rest.

_____3. Always cut square stock at a slow speed.

_____4. Dull tools, if handled correctly, can be used safely.

_____5. When the stock is mounted on the lathe, the next step is to turn the power on to see if the stock will turn easily and not hit anything.

_____6. All measurements can be made while the lathe is either stopped or while the stock is rotating.

_____7. Some of the wood turning chisels can be held with one hand such as the parting tool.

_____8. Once the stock has been checked to see if it will turn freely by hand, it is all right to stand in front of the stock when the power is turned on to see that it will miss the tool rest.

_____9. Boards that have a small knot can be used on the lathe if the cutting is done at a slow speed.

____10. A good practice to get into is to always double check to see if the ram lock, tailstock, and tool rest are tightened.

Lesson IV

Specific Objectives

1. Having studied the trouble shooting chart, the student will familiarize himself with the sections of the chart which will guarantee the safe operation of the lathe and be able to identify different situations and remedies on a test (85 percent level of accuracy).

2. Having studied the touble shooting chart, the student will be able to identify and remedy the problems that he will have in order to successfully complete his projects on worksheets #1 and #2.

Readings:

Trouble shooting chart.

Self-Test #4

Matching: Match Column A with Column B. Some answers can be used more than once.

A	B
A. Hard to remove scored lines left by sand paper	___Work loose between center
B. Excessive vibration or chatter on faceplate work	___Use lubricant such as oil or soap on center
C. Motor labors when switch is turned on	___Work not on true center

D. Sanding burns

___Sand paper held too long in one spot.

___Sanding heats work quickly apply lightly

E. Work burns at cup center end

___Back off quill or dead center just a little

F. Excessive vibration

___Work loose on faceplate

___Jumping from very coarse paper to very fine

G. Work chatters

___Excessive friction

___Excessive speed

H. Turning tool hard to hold

___Dull tools

TROUBLE-SHOOTING CHART FOR THE LATHE

THE TROUBLE	POSSIBLE CAUSES	THE CURE
Work burns at cup center end	excessive friction	Slack off slightly on quill extension Use lubricant such as oil, tallow, or soap on cup center Use live cup center
Excessive vibration	excessive speed for large work	slow down to correct rpm
	work not on true center	re-establish centers if vibration is very bad or vibration will disappear as soon as work is turned to true round
Work chatters	excessive speed	slow down to correct rpm
Turning tool hard to hold	dull tool	none
	excessively deep cut and/or feeding too fast	slow feed and moderate bite is good shop practice and produces smoother work
	work loose between centers	extend quill

TROUBLE-SHOOTING CHART FOR THE LATHE, Cont'd

THE TROUBLE	POSSIBLE CAUSES	THE CURE
Turning tool hard to hold (cont'd)	work loose on faceplate	retighten or replace screw
	insufficient support for turning tool	maintain ideal tool rest position as much as possible
Hard to remove scored lines left by sandpaper	jumping from very coarse paper to very fine	always work through progressively finer grits of paper until desired finish is achieved
	sandpaper held too long in one spot	keep paper moving when sanding
Hard to get glass-smooth finish	"Nap" on wood raises after final sanding	do final sanding by reversing work between centers -- mount faceplate turnings on upper auxiliary spindle--use damp cloth on work before final sanding
Spindle turning "whips"	work is long and thin	use back-up or steady rest

TROUBLE-SHOOTING CHART FOR THE LATHE, Cont'd

THE TROUBLE	POSSIBLE CAUSES	THE CURE
Sanding burns work	Excessive pressure	Sanding heats work quickly - apply lightly
	Excessive speed	change to slower rpm
Work loosens on screw center	Possible on very soft wood	Be sure screw is tight to begin with and do not cut too deep with turning tools
	Incorrect application	Mount work on screw center only when necessary -- when possible, mount between centers or on face-plate
Excessive vibration or chatter on faceplate work	excessive speed	slow down to correct rpm
	stock not prepared before mounting	cut round on jig saw or or band saw - remove corners with mitre cuts before mounting
	faceplate not centered on stock	scribe circle slightly larger than faceplate diameter on work then center faceplate in circle- vibration caused by slight misalignment will disappear

TROUBLE-SHOOTING CHART FOR THE LATHE, Cont'd

THE TROUBLE	POSSIBLE CAUSES	THE CURE
Excessive vibration or chatter on faceplate work, cont'd		as work is turned to true round
	mounting screws worked loose	check immediately at first sign of chatter -- re-tighten screws -- use heavier screws if necessary
Wood splinters when rough turning square to round	starting cut made at ends of stock	work from middle and out toward ends
	characteristic of roughing operation	minimize by removing as much waste material as possible beforehand by sawing
Motor labors when switch is turned on	usually caused by holding spindle turning too tightly	back off on quill just a little
Work stops turning as tool is applied	spur center not seated correctly	on hardwoods to be sure to cut diagonals for spur with saw
	spur works material away on soft wood	remove work from lathe, sand off damaged end and reset spur

Lesson VI

Specific Objectives:

1. Having completed the prescribed readings, the student will be able to set up on the lathe and demonstrate his understanding of faceplate turning by completing the assigned Worksheet #1.

2. Having completed the readings and having watched the instructor's demonstration, the student will be able to properly prepare a project and set it up on the lathe to be cut between centers as described in worksheet #2.

Worksheet #1 Faceplate turning

1. Select the project you would like to do.
2. Glue up stock to size required for project.
3. Remove from clamps and find center. (see diagram below)

4. Using compass mark out the diameter of the project.
5. Cut out on band saw.
6. Using 7/8 auger bit center faceplate and mount using screws located on lathe tool rack.
7. Mound faceplate and work on spindle and set up tool rest.
8. Have instructor check. (the instructor will ask you about the tools you will be using)
9. Turn out stock to desired project.
10. Sand with #80 paper followed by #150 and finish.
11. Remove from lathe, take faceplate off, and put felt on bottom.
12. Turn in for grading.

Worksheet #2 Turning Between Centers

1. Select the type of project you wish to turn.
2. Select stock and glue together so that it is a square. Be sure there are no knots and the wood is not checked.
3. After unclamping, examine stock to be sure there are no spaces or gaps. (If there are, check with instructor.)
4. Square both ends using mitre on the band saw.
5. Mark diagonals on both ends of stock (see diagram below).

6. On one end, use back saw and cut along diagonal lines about 1/8" deep.
7. On other end, use automatic drill and drill hole in center.
8. Mount stock between centers.
9. Position tool rest correctly near work.
10. Have instructor check work before you begin work.
11. Upon approval of instructor of step 10, the student will be asked about the tools he will use to turn the project.
12. Round stock and turn wood to desired project.
13. Sand project with #80 sand paper followed by #150.

14. Turn speed down and finish with DEFT.
15. Remove from lathe and saw off ends using back saw.
16. Turn in for grading.

Lathe Progress Answer Sheet

Self-Test #1

I.
1. Hand tools and Machines
2. Head Stock
3. Cup and Cone
4. Tool Rest
5. Automatic Lathe
6. Faceplate

II.
a. Headstock
b. Spindle lock
c. Tool rest
d. Tool post
e. Bed
f. Tail stock
g. Ram lock
h. Bed

Self-Test #2

I.
a. Gouge
b. Skew
c. Round nose
d. Diamond point
e. Parting tool

II.
e
c
d
a
b

III.
a. Ruler
b. Dividers
c. Outside calipers
d. Inside calipers

IV.
$2\frac{1}{2}$"
1"

Self-Test #3

I.
1. b
2. d
3. b
4. c
5. d

II.
1. false
2. true
3. true
4. false
5. false
6. false
7. false
8. false
9. false
10. true

Self-Test #4

I.
H
E
B
A
D
E
H
A
E
G
H

Post-Test Lathe

I. Fill in the Blanks

1. The part of the lathe that holds the dead center and moves along the lathe bed is called _____.
2. The part that fits on the bed and is used to support the long, narrow stock is called _____.
3. The two basic methods of turning are _____ and _____.
4. The _____is the proper tool to use for rough turning stock.
5. Woodturning combines _____and _____ to perform delicate cutting operations.
6. The common measuring tool used on the lathe is the _____.
7. When turning cups, bowls, the process is called _____ turning.
8. The two types of dead centers are _____and _____.
9. The center that fits into the headstock spindle is called _____center.
10. _____turning is done the work is held between centers.

II. Multiple Choice

_____1. The tool rest is positioned as close to the work as possible and a) is just above center

b) just below center c) on center d) none of these.

_____2. When the dead center smokes and squeals this is an indication that a) the speed is too fast b) the dead center is dull c) the work is too tight d) none of these.

_____3. One of the few stationary parts on the lathe is a) tailstock b) headstock c) tool rest d) dead center.

_____4. The size of the lathe is determined by the a) length of stock that can be turned between centers b) the size of the faceplate c) the largest diameter to be turned d) both a and c e) none of these.

_____5. When faceplate turning the inside of a bowl a) use a gouge and cut from center to outside b) use a round nose and cut from outside to center c) use skew and cut from outside to center d) use round nose and cut from center to outside.

III. Matching. Match Group B with Group A.

A	B
_____Skew	A. Tailstock
_____Gouge	B. Headstock
_____Faceplate	C. Large metal disc
_____Outside calipers	D. Rough turning
_____Excessive pressure	E. Sanding burns
	F. Locks headstock spindle

A (cont.)

_____Spindle lock

_____Cup center

B (cont.)

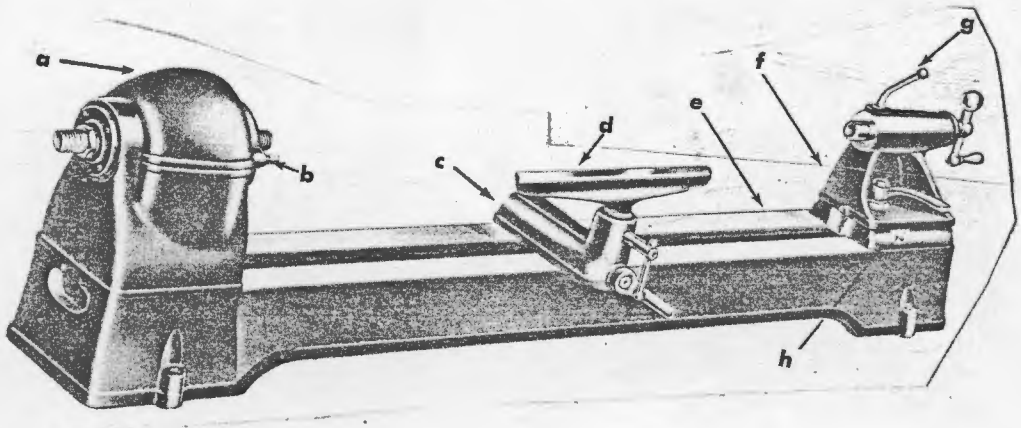
G. Dead center

H. Finish work

I. Measure outside diameter

J. Cone centers

IV. Lathe Identification



A. _____

B. _____

C. _____

D. _____

E. _____

F. _____

G. _____

Post-Test Answer Sheet

I.
1. Tailstock
2. Steady rest
3. Cutting scraping
4. Gouge
5. Hand tools and machine
6. Calipers
7. Faceplate
8. Cup, cone
9. Spur
10. Spindle

II.
1. B
2. C
3. B
4. C
5. D

III.
1. H
2. D
3. C
4. I
5. E
6. F
7. G

IV.
a. Head stock
b. Spindle lock
c. Tool rest base
d. Tool rest
e. Bed
f. Tailstock
g. Ram lock

CHAPTER IV

DATA INFORMATION

At the beginning of Chapter III, the experimentation conducted in the Woodshop courses on band saw and wood lathe was explained.

The tables indicate the results.

Wood Lathe

1. Test score.....maximum.....100 points
   (a) Comprehensive section..maximum.....80 points
   (b) Machine Identification..maximum.....20 points
2. Project.....maximum.....100 points
3. Worksheet.....maximum.....50 points

Band Saw

1. Test score.....maximum.....100 points
   (a) Comprehensive section..maximum.....80 points
   (b) Identification.....maximum.....20 points
2. Worksheet #1.....maximum.....30 points
3. Worksheet #2.....maximum.....30 points

On a one-to-one comparison, it has been concluded that the students generally achieved higher scores on the tests when done one an individual basis.

On the wood lathe the group whose Intelligence Quotients came between 100 and 120 achieved significantly

better test scores in Group B than Group A.

Generally the project and/or worksheets were also more successfully accomplished by Group B.

In both groups, students of Intelligence Quotients between 120 and 127 achieved successfully with a slight difference favoring Group B.

On the band saw, there was a significant difference between test scores, favoring individualization in the group whose Intelligence Quotients were between 93 and 100.

BAND-SAW

COMPARATIVE ANALYSIS TABLE

Group A	Test Score	Compre-hensive	Machine Identifi-cation	Worksheet #1	Worksheet #2	Group B	Test Score	Compre-hensive	Machine Identifi-cation	Worksheet #1	Worksheet #2
* 1	58	44	14	10	10	* 1	75	57	18	21	18
* 2	63	48	15	18	15	* 2	74	57	17	24	20
* 3	78	59	19	17	20	* 3	85	65	20	28	24
4	75	55	20	28	29	4	68	56	12	20	16
5	81	61	20	25	21	5	71	56	15	25	24
6	81	61	20	24	20	6	84	65	19	30	28
7	85	65	20	30	28	7	80	69	20	30	24
8	83	65	18	30	24	8	87	67	20	30	28
9	74	59	15	21	15	9	68	54	14	18	18
10	78	60	18	24	26	10	84	66	18	29	25
11	93	73	20	30	29	11	88	68	20	29	27
+12	91	71	20	29	29	+12	98	78	20	30	30

* Intelligence Quotient 93-100
\+ Intelligence Quotient 120-127

BAND-SAW

COMPARATIVE ANALYSIS TABLE, Cont'd

Grade A	Test Score	Compre-hensive	Machine Identifi-cation	Worksheet #1	Worksheet #2	Group B	Test Score	Compre-hensive	Machine Identifi-cation	Worksheet #1	Worksheet #2
+13	99	79	20	30	30	+13	91	79	20	29	30
+14	90	72	18	28	24	+14	96	76	20	30	28
+15	94	69	15	24	20	+15	94	75	19	28	24
---	---	---	---	---	---	---	---	---	---	---	---
Mean	81	63	18	24	22		82	65	18	26	24

WOOD LATHE

COMPARATIVE ANALYSIS TABLE

Group A	Test Scores	Comprehensive	Machine Identification	Projects	Worksheets	Group B	Test Scores	Comprehensive	Machine Identification	Projects	Worksheets
* 1	65	49	16	75	37	* 1	64	46	18	79	44
* 2	67	52	15	76	32	* 2	71	51	20	81	41
* 3	71	53	18	72	26	* 3	78	60	18	84	39
4	73	54	19	78	40	4	81	65	16	83	41
5	79	59	20	88	47	5	82	64	18	81	40
6	76	56	20	84	45	6	88	68	20	82	43
7	82	62	19	75	40	7	90	70	20	89	46
8	21	65	16	78	39	8	82	64	18	93	43
9	83	66	17	80	37	9	82	66	17	90	42
10	68	54	14	72	32	10	85	54	19	92	44
11	92	72	20	89	44	11	68	74	14	68	38
+12	93	73	20	91	42	+12	94	74	20	92	48

* Intelligence Quotient 93-100
+ Intelligence Quotient 120-127

WOOD LATHE

COMPARATIVE ANALYSIS TABLE, Cont'd

Group A	Test Scores	Comprehensive	Machine Identification	Projects	Worksheets	Group B	Test Score	Comprehensive	Machine Identification	Projects	Worksheets
+ 13	71	68	13	72	36	+ 13	93	69	19	93	45
+ 14	89	69	20	83	43	+ 14	89	72	20	94	45
+ 15	97	77	20	92	48	+ 15	99	79	20	95	48
Mean	81	61	18	80	39		89	65	19	86	43

CHAPTER V

CONCLUSION

Although the experimentation which was necessarily limited because there were only two groups upon whom the results are based, there seems to be evidence that the learning packets, as utilized on an individual basis, have proved more successful. It has been discovered that the students of higher Intelligence Quotients moved more rapidly and were generally more successful when on the individualized learning packets than the students of comparable Intelligence Quotients on the traditional method. It seems significant to mention that a quality which the writer noticed which was not measured quantitatively was the evidence of personal motivation and response from the students on the individualized program.

Recommendations

The learning packets on the band saw and wood lathe were designed to fit one particular situation. Possibly it would be worthwhile to have no given time limit on either the traditional or the learning packet procedure of teaching these two units. Another suggestion would be to include a pre-test in the learning packets. In this case, it was assumed that these students were in their introductory industrial arts courses without previous experience in a

wood shop.

Perhaps other units in the introductory course in Woodworking could be chosen to be done on an individualization basis. One of the first aspects of woodworking, hand tools, would lend itself to individualization. This could serve a double role. It would basically be woodworking, and an introduction to individualization as it is somewhat unique to industrial arts. Though the student has had learning packets in other subjects, it will be somewhat different in industrial arts.

A team-teaching approach could be added to individualization. Two or three teachers could work cooperatively if their students were on learning packets. With specialization there could be more meaningful sequence such as wood carving with one teacher, silk screening with another. Without time limits, students would be at different packets in a meaningful sequence.

Summary

Education is in a constant flux. Historically, education has provided a system varied enough to meet the needs of a people both economically and geographically. The beginnings of the nineteenth century found America had given education a priority in its nationwide programs. The foundations were set. They needed only expand to meet the demands of a changing and growing nation.

Throughout America's history, she has always had individuals dedicating their lives to the study of programs varied enough and hopefully progressive enough to meet society's educational needs.

Today's educators have pointed out an obvious fact. Previously education has geared itself to groups. Having accepted the fact that the human potential has infinite variety, educators have concentrated on meeting those individual needs. With the thrust being on learning packets and individualization, the field of education probably becomes the broadest it can possibly become, at least presently. It seems that the only real limitations of learning packets are the inherent limitations with the writer or writers of learning packets. With the numbers of possibilities of obtaining appropriate learning packets, even a student's potential should be limited only by his personal and motivational limitations.

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