

THESIS

A QUANTITATIVE ANALYSIS
OF THE
ASPECTS OF VOCATIONAL
AND
MANUAL ARTS EDUCATION

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STATE AGRICULT'L COLLEGE
FORT COLLINS, COLO.

Submitted by

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In partial fulfillment of the requirements

for the Degree of Master of Science

Colorado Agricultural College

Fort Collins, Colorado

July 10, 1931

COLORADO AGRICULTURAL COLLEGE

GRADUATE WORK

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I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER
MY SUPERVISION BY Ozro Bruce Badger
ENTITLED A Quantitative Analysis of the Aspects of
Vocational and Manual Arts Education
BE ACCEPTED AS FULFILLING THIS PART OF THE REQUIREMENTS
FOR THE DEGREE OF Master of Science

In Charge of Thesis

Head of Department

Recommendation concurred in

Committee on
Final Examination

Approved by

Committee on
Advanced Degrees

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INTRODUCTION

PROBLEM

Today there is much confusion in the thinking of educators as to vocational education and manual arts education, due in large part to the fact that participating concrete experiences are common to both, but this confusion can be over-come by analyzing the objectives of both and by a critical study of their aspects.

This confusion of thinking has been harmful to both programs. If either or both programs are to be given their rightful place in the public school system then each will have to be so administered that their respective aims and objectives may be realized, which is not possible when educators are confused in their thinking.

In too many school systems there are courses operating under the name of a vocation, but in reality little vocational training is given. The students are often unselected; the equipment is antiquated, unqualified teachers are in charge, not sufficient time is allowed for training, and emphasis is wrongly placed.

The purpose of this thesis is to help clarify the thinking of educators in these two fields of endeavor, by pointing the educational value of partici-

pating concrete experiences, whether in the field of vocational education or in manual arts, by setting up the objectives of both programs, and an analysis of the similarities and differences, whether obvious or not.

Manual Arts education was introduced into this country following the Centennial Exhibition in Philadelphia in 1876. Its early growth was stimulated by Professor C. M. Woodward of St. Louis. His influence was felt throughout the country, particularly in the larger cities. His major objective was general education, - his ideal to tie up the abstract subjects with reality.

In this early period most of the work was Sloyd. The work passed from this stage into the Russian system where exercise projects predominated. Then there was a swing back to a combination of Sloyd and the Russian system. With this change came the introduction of machines in the manual arts shops and many educators were of the opinion that manual arts was more than general education. It was vocational education, due to the fact that the same machines were used in the schools that were used in industry. The majority of these men were honest in their opinion, for few had carefully analyzed the specific needs of industry and checked these needs against what the manual arts courses were producing or capable of producing under

the then existing school conditions. Their objectives may have been right but the practices, the students served, and teacher qualifications did not support their objectives.

METHOD OF PROCEDURE:

Letters were sent to twenty of the leading educators in several different fields to get their opinions of the educational value of concrete experiences. Replies were received from the president of a trade and vocational school, a specialist in vocational education, presidents of two teachers colleges, a president of a university, a director of educational research in a university, a professor of education in a university, a professor of industrial education, an editor of an educational magazine, a superintendent of a city school system, a director of a vocational school, and an assistant superintendent of public schools in charge of secondary education, all recognized leaders in their respective fields.

Quotations have been taken from the writings of the leaders among educational philosophers of the past and present, wherein they state their opinions concerning the educational value of concrete experiences.

The objectives of the two fields of vocational education and manual arts education were secured from current literature in the field of manual arts.

The objectives of the two fields, vocational education and manual arts education, were secured from current literature.

A group of occupationally trained teachers, all with varying degrees of institutional training, and experienced manual arts teachers with exceptional qualifications met with the writer and analyzed the various aspects of the manual arts and vocational programs,- rating each aspect.

Personnel of the Group

E. P. Chandler, Principal Continuation School, Tulsa, Oklahoma.

W. W. Graham, Vocational Printing Instructor, Central High School, Tulsa, Oklahoma.

R. V. Lulow, Teacher of Woodwork, Central High School, Tulsa, Oklahoma.

O. E. Gumm, Teacher of Electricity, Central High School, Tulsa, Oklahoma.

Later these aspects were re-checked and contributions made by:

Scott J. McGinnis, State Supervisor of Trade and Industrial Education, Oklahoma City, Oklahoma.

H. F. Rusch, City Director of Vocational and Manual Arts Education, Oklahoma City, Oklahoma.

L. K. Covelle, Teacher Trainer, Oklahoma Agriculture and Mechanical College, Stillwater, Oklahoma.

PART I

Educational Values of Controlled Participating Experiences in the Fields of Manual Arts and Vocational Education

The following letter was sent to a number of the leading educators in this country to get their opinions of the educational value of concrete experiences:

"I would like very much to receive a short terse statement from you on the educational value, or values, of controlled concrete experiences, with the privilege of quoting you."

The following replies were received:

"Man as a human animal lives in a world of reality. At least ninety-five percent of all the experiences he undergoes are concrete and not abstract. He gains all his information from the concrete experiences of himself and of his fellows, but most of it from the former. Since all he can do is to interpret concrete experiences, he gains most of his ideas from the experiences either of himself or of others. Most of the facts, the skills, and the ideas he really learns he gains from his own personal experience, which he supplements and widens through the experiences of others. As a being surrounded by the concrete phenomena of nature and as a social animal who must live with his fellows, he must go through a constant adjustment in order that he

may successfully meet new problems and the changing situations.

"There is very little abstract thinking in the world. Those who do think abstractly can only do so on the basis of concrete experiences. If they do not have the concrete experiences with which to think, they can not generalize. If they do generalize, the results are utterly unreliable unless they are based on adequate acquaintance with things and people and situations. The most inefficient man in the world is the man who generalizes most regarding matters with which he is not acquainted; about facts which he does not know; and about opinions which he has gathered in a superficial way from other people.

"The human mind is a switchboard and not an apartment house filled with general faculties. The faculty psychology and the doctrine of formal discipline are for all practical purposes utterly exploded today. Nothing is clearer than the fact that we build up our own associations, bonds, and mental habits through the experiences which we undergo. The reason that people differ from each other is largely because of the fact that they have gone through different experiences. This mental switchboard acts in response to experiences coming to it from the outer world. All the facts that we remember are tied up with experiences. All the thinking we do is the result of what our switchboard does with

the experiences that we have had.

"Undoubtedly everybody needs to learn to generalize, but the ability to generalize lies in constructive thinking with regard to concrete facts and ideas. What we need to do in school is to train children to think, not to remember and forget. They will forget everything except that which has been tied in with their experiences, either through thinking or doing. If anyone wants to have the ability to generalize, the only way he can secure it is by the mastery of the thinking process which Lord Bacon has laid down and which Dewey has approved.

"That process can easily be stated: Spot the problem; analyze it to find the functioning facts bearing upon it; take stock of the facts which you already know; get the functioning facts which you do not know; put them together as thinking stuff for the problem; mill this thinking stuff through your mind - weighing, comparing, contrasting, eliminating, and modifying until a decision or a series of decisions is made; if these decisions are to be carried out, organize them into a plan; put the plan over; and check the results. If the facts have been correct and adequate and the thinking straight, the results will be good; if the results are bad, it is due to wrong facts, missing facts, or the lack of straight thinking. These things can only be

done by learners who are put through participating experiences in order that they may learn how to think.

"We carry over from one experience in life to another only the bonds which we have established and into which are knit the skills, facts, and ideas which we have in some way gained either first hand or second hand. We carry over from one experience in life to another identical elements of facts and skills and ideas such as apply in some new field; our attitudes toward things and matters which, if they are at all reliable, are merely conclusions gained from our thinking and doing experiences; and ways of mental working, methods of using our minds. Only a method of mental working which has been developed through thinking with concrete experiences is sound. Such a method is also necessary for those who hope to acquire any capacity for generalization."

C. A. Prosser, Director William Hood Dunwoody Industrial Institute.

"Emerson said: 'No man is worthy to promote the cause of education who is not able to share in that education which he seeks to promote.' One reason why our education is not more vital and effective is the fact, that too few teachers have any background of practical experience in that which they are teaching. It is really amusing to find instructors teaching the psychology of salesmanship who never sold anything; who have never worked a day as a salesman, yet they presume to teach

the psychology of salesmanship. What they are really doing is just repeating what somebody else wrote in a book about the subject, perhaps some one who knew as little about it as they.

"In our commercial departments we have men teaching business administration who have never administered anything themselves, yea, who could not administer any kind of business, and make a success of it, yet they very confidently teach our young men and young women business administration. And so on throughout the teaching program. No wonder our schools have been accused of being inefficient, and not actually preparing men and women for the practical work-a-day world.

"An ever-increasing body of men and women interested in vocational and industrial education are gaining ground from year to year in trying to make education more practical, and to enable those whom they teach to actually 'share' in the things which they have been taught. This can be most successfully done by the men and women who are able to share in that which they teach. The only way for one to be able to share in the thing he teaches is to have worked at it sufficiently to give him the practical slant of the subject. Other things being equal, the man who has a background of practical experience in the thing which he is teaching, will be the better, the more valuable teacher." W. A. Brandenburg, President, Kansas State Teachers College, Pittsburg.

"Things to be done are best learned by doing them intelligently. All knowledge is, and must be, based on experience. The more real and vital the experience, the better. If there is a sufficient amount of concrete experience, rightfully and justly interpreted, it may be possible to go far in the application of the principles to new concrete instances under similar, and even dissimilar, conditions. But each individual must gain his fundamental experience for himself--the more vital and real, the better, as already said. You remember the definition of experience given young Wilhelm Meister by the Baron: 'Experience is experiencing as other people experienced when they experienced their experience.'

"The beginnings of agriculture are best learned by working under intelligent direction in a shop. The beginnings of homemaking are best learned in an intelligent home where daughters work with their mothers, provided their mothers understand what they are doing and why.

"You remember the legend about Jesus and the man who was working on the Sabbath -- Jesus said to the man, 'Blessed are you if you understand what you are doing; but, if you do not understand you are damned.'

"We found in Denmark last summer that the industrial schools required for admission not less than four years of practical experience on a farm and the

household schools required practical experience in household work.

"In these Danish agricultural schools all the work is done by lecture and laboratory demonstrations. The schools usually have farms connected with them, but students do not have use of them in their study. This, however, would not be possible here, for the fact that all students have not had much experience on their farms under the direction of farmers who know the science and art of farming." - P. P. Claxton, President, Austin Peay Normal School, Clarksville, Tennessee, formerly United States Commissioner of Education.

"Everything that now exists in concrete form was first in mind in intangible form, the product of a creative imagination. Acquaintance with a situation, thing or process can best be acquired by the unacquainted mind through a controlled, concrete, sensory experience or illustration, because directed seeing and independent manipulation of a thing or living in an observed avenue of concrete experience aids in revealing the intricacies of the unknown and unlearned to the learner." - Merle Prunty, Superintendent, Tulsa Public Schools and President, North Central Association 1930-31.

"Concrete experiences in public schools are of value for the learning processes in two directions. They provide the illustrations from the experiences of children which give meaning to verbal concepts and

abstract statements; they provide the material. The control of concrete experiences through the use of theory is the ultimate goal of education." - W. W. Charters, Director Bureau of Educational Research, The Ohio State University.

"We learn only through experiences. The educational value of an experience depends upon the character and intensity of the individual reaction. Any experience which the individual recognizes as affecting the approach to a desirable goal is more likely to make a deep impression than the experience which, to him, has no particular significance in that respect." - R.W. Selvidge, Professor of Industrial Education, University of Missouri.

"In the early days of the development of our civilization, all education and training came through experiences. Gradually it was found that experience was a most costly and expensive teacher. With the development of printing, it became possible to record experiences of others and make them available so that everyone did not need to begin as an original, and go through all the experiences that innumerable others had passed through, in order to arrive at the same point.

"Then came the school, the agency for doing this thing - namely, profiting by the experience of others and creating experiences in sequential order. A great many people have come to feel that everything

worth while in an education comes through the school. This is not true. People still learn some of the most important lessons through their concrete experiences.

"Our schools have tended to become so abstract in the present day, however, that a great many people have come to overlook the tremendous illumination that comes from certain experiences. Experiences are like flashes of lightning in a dark room, making one conscious of things which he formerly did not appreciate, or of relationships of which he was not aware.

"Concrete experience at times makes strong a conviction that formerly was only weakly held.

"In so abstract a thing as language, people oftentimes have an experience that makes them never the same again. They become critical of their own language and the upgrading process begins, because they see a social, financial and cultural advantage in the improvement of their language.

"People may be slouchy in their dress, holding the Bobby Burns theory that 'a man's a man for a' that: and then through some experience find that after all, one's dress is a compliment to the other party; that it is a recognition of the fact that, unkempt and dirty, he is not as acceptable as he would be if he had a little more respect for other people. The realization comes to one, then, that he does not dress to be vain like a

peacock, but as a compliment to his friends whose good opinion he rightly desires.

"People believe, in a general way, in honor and truthfulness. They hold this conviction weakly, and are not exceedingly sensitive to it, violating it frequently in what they think are small matters. Then suddenly they have an experience and find that honor and truthfulness are things never again to be trifled with.

"People work in steel and learn they cannot lie to their metal. They must be accurate to ten thousandths of an inch. They get a new conception of what it means to be entirely truthful in dealing with their materials.

"And so one might illustrate almost without end the value of concrete experiences. I might add there are some people who cannot be started upon the road to learning in the detached abstract way in which most people can learn until they have proceeded along the line of concrete experiences, going from the concrete to the abstract just as the race has gone from the concrete to the abstract. Many people cannot progress in abstract mathematics who get on nicely when required to handle and measure materials.

"I shall relate to you a little fable.

"Once upon a time there were two small pieces of common steel. They had been neglected and cast aside because they lacked in the qualities that would give tensile strength or cutting edge.

"One of these pieces of steel was by accident submitted to a concrete experience. It fell into a fiery furnace where it was heated to approximately 2700 degrees, after which emotional experience it was seized by a pair of tongs and baptized in water. Instantly its tensile strength was increased a thousand fold. Its cutting edge quality was marvellously improved. Yet nothing had been added to it; nothing had been subtracted from it. It had merely had a concrete experience and a baptism, and it came out Christian, capable of a thousand uses for which, before that experience, it was entirely unfitted.

"I believe that human beings can be thus affected by concrete experiences, both for good and evil. Why should we so doubt the educational value of concrete experiences when we have always held the firm conviction that they are tremendously effective in the achievement of evil and mischief?" - R. L. Cooley, Director of Vocational Education, City of Milwaukee.

"Individuals learn with dispatch when experiences are vivid, challenging, real. Participation in life situations offers greater returns per unit of time than does a lecture describing said situations. Formal education, then, is most valuable to the extent that it can be organized as activity which is vital and genuine." - Galen Jones, Assistant Superintendent in Charge of Secondary Schools, Tulsa, Oklahoma.

"Concrete experiences give clear, vital, personal ideas of meanings. They give knowledge of reality as distinguished from knowledge about reality. One who has changed an automobile tire has a vividness of the meaning of it all which cannot be possessed by one who has not had the experience. Concrete experience has a grip on memory that does not hold for accounts of the experiences of others or even for one's own observation of the experiences of others. Concrete experience combines sensations, recognized meanings and inner feelings altogether different from those mental states produced through eye or ear alone. The concrete experience of making a bowl of clay is entirely different from the experience of observing a potter make a bowl. If one has himself made a bowl he will see and feel many things in observing the potter that one who had not made the bowl will not see. One who has himself made a product in wood will see realities in the work of the carpenter or the cabinet maker quite beyond the observation of one who has had no such first-hand experience. So for all other occupations and activities those who have not participated in them do not have knowledge of them - but only about them. When we act, we tend to act primarily on our experience with rather than our knowledge about.

"Education builds chiefly upon and chiefly by concrete experiences. Other experience, unless it be

vitally connected with that which is concrete tends to remain isolated and to be forgotten. The richer the concrete experiences of childhood and youth, the greater the possibility for efficient understanding and control of life experiences in the years of maturity.

"Here are two statements by Pres. Arthur Morgan of Antioch College which may be of interest in this connection.

'All thinking reflects experience. Laws or principles mean nothing unless illustrated by cases.'

'As we read books, descriptions mean nothing unless we interpret them by real experiences.'" -

F. G. Bonser - Teachers College, Columbia University, New York, New York.

"According to my way of thinking, our measure of the degree to which an individual is educated is the degree to which he is able to deal successfully with actual life situations. Educational value is therefore measured by the degree to which any educational process contributes to such ability. Granting these two premises it seems to me that the following statements are sound:

1. The great majority of human minds are only able to generalize after having experiences and dealt with a large number of concrete and specific situations. This appears to be a normal way in which most human minds work.

Hence, concrete experiences have the advantage, educationally speaking, or representing the form in which education has been secured in the whole history of the human race. In other words, concrete experiences represent the normal way in which we learn.

2. In the carrying on of the formal lesson, the second or demonstration step must of necessity be concrete. An abstract idea or an abstract principle cannot be demonstrated, but must be demonstrated in some concrete application. This is well illustrated by the fact that in conference work there is a continual tendency to resort to the quoting of specific concrete experiences in dealing with general principles or general ideas.
3. Generalization is always carried on by abstracting from a group of concrete experiences some one thing arbitrarily selected which they have in common in considering, for example, the formulae $S = 1/2 gt^2$, expressing a generalized law for falling bodies, nature of substance appearance, weight, etc., which are all ignored and the one common fact or

property that they all fall toward the earth with the same theoretical velocity is the only one which is considered.

"Such a process of abstraction runs contrary to ordinary human experience, which is all concrete. Hence, it is very difficult for the average human mind to acquire such a habit of abstraction or generalization. Consequently, the educational value of attempts to do this are bound to be relatively low except in the case of individuals with a wide range of concrete experiences, and possibly in the case of a few individuals who seem to be capable of acquiring this power of abstraction or generalization on a very small concrete experience basis, such as certain great mathematicians, but they are rare birds in the human tribe.

"Lastly, since all human experiences are concrete, any abstraction or general principle or generalization has to be translated into concrete terms before it becomes usable in actual life. Generalizations in themselves are therefore worthless for any practical purpose, hence they have no educational value as such. What is of value is the ability to recognize in a concrete experience the application of a generalization. But this can only be acquired where the human mind has first worked from a large group of concrete experiences to a generalization by the process of abstraction

described above and then reverses the process recognizing in the new experience the thing common to the group on which that particular generalization has been developed.

"If I were to sum up the above statement, I would put it somewhat in this way. The old boy who said, 'Experience is the best teacher' was right because he recognized that that is the way we learn. Consequently, concrete experiences are the actual educational media through which we learn and when we try to short circuit that process in any way we are just working against the way in which the average human mind is constructed and consequently we get into trouble." - Charles R. Allen, Educational Consultant, Federal Board for Vocational Education, Washington, D. C.

"Man is a product of all the influences that come into his life. The most enduring influences of life result from vital experience. A man who can profit most by his daily experiences is the one who is most likely to get on well and succeed." - W. B. Bizzell, President of the University of Oklahoma.

"One of the great educational values of concrete experiences, such as are gained through well-taught courses in shopwork, drawing, and laboratory work in the sciences, is that they pull knowledge out of the realm of the abstract and general and organize it for daily use. They minimize the difficulties of applying

what is taught from books and from oral statements. Using another figure, they provide centers around which may be grouped in useful pattern a great variety of facts and information. They help to start the pupils out in life with ability to 'steer themselves.' They lead on toward the goal expressed by Froebel when he said that man understands thoroughly only that which he is able to produce." - Chas. A. Bennett, Editor, Manual Arts Press, Peoria, Illinois.

PART II.

Educational Values of Participating Concrete Experiences as Expressed by Educational Philosophers

To read through the writings of the recognized educational philosophers of the past and present there is to be found abundant evidence to support the theory that participating concrete experiences are the best mediums for true education. With the introduction of text books it was made much easier to administer the schools and at a reduced cost. Influence to use text books has been brought to bear on school officials with such force by publishing companies and their authors, that it has been difficult to combat the movement, even when some educators are aware that too much training is being given through the book medium. Others have confused knowledge with the art of thinking while still others think too little about the fact that boys and girls are not adults and have only a limited amount of experience upon which to build true education.

The father of Charles W. Eliot, for years the President of Harvard University, recognized the weakness of too much learning through books. Doctor Eliot appreciated his father's point of view, judging from his statement taken from his auto-biography!

"At ten years of age I was transferred to the Boston Latin School, where the course of study contained nothing but Latin and Greek, a little mathematics, and a little ancient history. It offered boys from ten to seventeen years of age no modern languages, no systematic training in English and no science, drawing, or music. It gave a strenuous training of the memory through language and literature, forced its pupils to apply themselves to work as well as was possible when the work had little or no interest, and got them handsomely into the Harvard College of that day.

"Seeing the grave deficiencies of the Latin School's programme, my father took pains to procure for me lessons in carpentering and wood-turning, and provided me at home with tools, a carpenter's bench, and a lathe. He also furthered a desire I felt - in common with a fellow pupil at the Latin School - to set type and issue a four-page weekly paper, each page about six inches square. We seldom wrote anything for this paper, but we did set type, work the hand press, and correct the proofs. In these various ways I got some good training of eye and hand, for which the programme of my school made no provision whatever. Till I was twenty years old I had no practice in drawing, either mechanical or freehand - a serious loss."¹

1 - Eliot, G.W. "A Late Harvest" Chap. I, pp. 4-5

Doctor John Dewey expresses in no uncertain terms the educational value of concrete experiences when he says: "Sufficient direct experience is even more a matter of quality; it must be of a sort to connect readily and fruitfully with the symbolic material of instruction. Before teaching can safely enter upon conveying facts and ideas through the media of signs, schooling must provide genuine situations in which personal participation brings home the import of the material and the problems which it conveys. From the standpoint of the pupil, the resulting experiences are worth while on their own account; from the standpoint of the teacher, they are also means of supplying subject matter required for understanding instruction involving signs, and of evoking attitudes of openmindedness and concern as to the material symbolically conveyed."²

"The changes which are taking place in the content of social life tremendously facilitate selection of the sort of activities which will intellectualize the play and work of the school. When one bears in mind the social environment of the Greeks and the people of the Middle Ages, where such practical activities as could be successfully carried on were mostly of a routine and external sort and even servile in nature, one is not surprised that educators turned their back upon them as

unfitted to cultivate intelligence. But now that even the occupations of the household, agriculture, and manufacturing as well as transportation and intercourse are instinct with applied science, the case stands otherwise. It is true that many of those who now engage in them are not aware of the intellectual content upon which their personal actions depend. But this fact only gives an added reason why schooling should use these pursuits so as to enable the coming generation to acquire a comprehension now too generally lacking, and thus enable persons to carry on their pursuits intelligently instead of blindly.

"The most direct blow at the traditional separation of doing and knowing and at the traditional prestige of purely intellectual studies, however, has been given by the progress of experimental science. If this progress has demonstrated anything, it is that there is no such thing as genuine knowledge and fruitful understanding except as the offspring of doing. The analysis of rearrangement of facts which is indispensable to the growth of knowledge and power of explanation and right classification cannot be attained purely mentally - just inside the head. Men have to do things when they wish to find out something; they have to alter conditions. This is the lesson of the laboratory method, and the lesson which all education has to learn. The laboratory is a discovery of the conditions under which labor may become

intellectually fruitful and not merely external productive. If, in too many cases at present, it results only in the acquisition of an additional mode of technical skill, that is because it still remains too largely but an isolated resource, not resorted to until pupils are mostly too old to get the full advantage of it, and even then is surrounded by other studies where traditional methods isolate intellect from activity."¹

In their day Pestalozzi, Froebel and Rousseau were considered educational heretics, but today we recognize that their philosophy, in most part, is sound. It is through controlled concrete experiences that the best education of man comes, according to their views.

Rousseau says: "As all that enters the human understanding comes there through the senses, the first reason of man is a sensuous reason; and it is this which serves as a basis for the intellectual reason. Our first teachers of philosophy are our feet, our hands, and our eyes. To substitute books for all these is not to teach us to reason, but to teach us to use the reason of others; it is to teach us to believe much and never to know anything."²

"A man should know many things whose utility a child could not comprehend; but must and can a child

1 - Dewey, John "Democracy & Education" Chap.XX pp.321-322

2 - Rousseau's "Emile" Book II, p.90

learn all that it is important for a man to know? Try to teach a child all that is useful for one of his age, and you will discover that his time will be more than filled. Why will you, to the prejudice of studies which are adapted to him today, apply him to those of an age which he is so little certain to reach? But you will say: 'Will there be time to learn what one ought to know when the moment shall have come to make use of it?' I cannot say; but what I do know is that it is impossible to learn it sooner, for our real masters are experience and feeling, and a man never really feels what is befitting a man save in the relations where he has found himself. A child knows that he is destined to become a man, and all the ideas which he can have of man's estate are occasions of instruction to him; but of the ideas of that state which are not within his comprehension, he ought to remain in absolute ignorance. My whole book is but a continual proof of this principle of education."¹

"Reader, do not pause here to see the bodily training and manual dexterity of our pupil, but consider what direction we are giving to his childish curiosity; consider his senses, his inventive spirit, his foresight; consider what a head we are going to form for him; in everything he sees, in everything he does, he will wish to know everything, and understand the reason of everything; from instrument to instrument, he will always ascend to

1 - Rousseau's "Emile" Book III pp. 155-156

the first; he will take nothing on trust; he will refuse to learn that which can not be understood without an anterior knowledge which he does not possess. If he sees a spring made, he would know how the steel was taken from the mine; if he sees the pieces of a box put together, he would know how the tree was cut; if he himself is at work, at each tool that he is using he will not fail to say to himself: 'If I did not have this tool, how should I go to work to make one like it or to do without it?'¹

"If I have been understood thus far, it ought to be plain how, with the habitual exercise of the body and labor of the hands , I insensibly give to my pupil a taste for reflection and meditation in order to counter-balance in him the indolence which would result from his indifference for the judgments of men and from the repose of his passions. He must work as a peasant and think as a philosopher in order not to be as lazy as a savage. The great secret of education is to make the exercises of the body and of the mind always serve as a recreation for each other."²

Each writer expresses it as his opinion that there is great educational value of training children through concrete experiences. These experiences have a very definite place in our educational scheme. They are

1 - Rousseau's "Emile" Book III pp. 168-169

2 - Rousseau's "Emile" Book III p. 184

used for general education in both manual arts and vocational education. In the latter case they have an added value in that habits are formed which makes it possible for the students, upon completing the course, to enter the occupation at a given, predetermined level as a wage earner.

PART IIIManual Arts and Vocational Education Objectives -
a ComparisonOBJECTIVES OF VOCATIONAL EDUCATION:

There is only one major objective of vocational education. It is to train a person for a given occupation up to a predetermined level, or to give additional specific training to one already in employment which will increase his efficiency on the job.

There is one major goal toward which all training should lead. Much of the training has general educational values, but only as a by-product.

OBJECTIVES OF MANUAL ARTS EDUCATION:

Those educators who have thought through the problems of manual arts have considered it only for the purpose of its general educational nature. The minor objectives are numerous, and what may be a minor objective with one person may be a major objective with another.

Dean M. Schweikhard¹ bases the objectives of manual arts upon the Seven Cardinal Principles of Secondary Education, - health, fundamental processes, worthy and economic home membership, vocational, civic and social, leisure and recreation, and ethical character.

1. Schweikhard, Dean M. Industrial Arts Education,
Chap. VII - pp. 136-156 1929

These objectives are very broad, and due to their breadth it is questionable whether some of them can be achieved, at least with the services of our present day manual arts teachers.

His statement of manual arts objectives are as follows:

1. "Develop and establish in the lives of the pupils the methods and processes of performing manual activities which are in greatest accord with the conservation of human strength, the gaining of muscular skill and control, and the assurance of safety of life and health."
2. "Make constant use of the innumerable situations requiring application of what are considered the fundamentals of education, in order that those may be more firmly fixed by a tangible relationship, and that their valuable assistance may be realized in the practical fields."
3. "Encourage the fulfillment of home needs by means of the school-shop facilities, thereby developing ability and resourcefulness which will function about the home itself."
4. "According to the theory contained therein

industrial arts should result in:

(1) appreciation of the significance of vocations to the community; (2) some conception of desirable relationships between vocational groups; (3) the discovery of one's interests and probable capabilities by means of experiences in typical manipulative activities; (4) subsequent vocational selection as a result of which the individual may prepare for and enter the vocation which will best enable him to '(a) secure a livelihood for himself and those dependent on him, (b) serve society through his vocation, (c) maintain right relationships toward his fellow workers, and (d) as far as possible find in that vocation his own best development', and (5) the acquisition of skills and abilities practically and technically correct, which may serve as a foundation for later vocational training.

5. "Undertake group and community activities as a valuable means of developing an unselfish spirit of individual contribution to the general good."

6. (1) "Foster in each individual one or more special avocational interests."

Industrial arts offers opportunity for such fostering in: (a) manipulative activities, (b) experiments, (c) special readings, (d) observation, and (e) enjoyment of the products and performances of others. In addition, toward the further realization of this principle as an objective, industrial arts may: (2) develop a love for that which is beautiful; and (3) promote a desire for that which is artistic, appropriate, and harmonious in one's surroundings.

7. "Develop valuable personal traits, such as the habit of industry, responsibility for a task, and the ethical integrity illustrated so unquestionably by the manner in which every finished concrete article reveals the character of material and workmanship which have gone into its construction."

Snedden and Warner¹ state: "A careful study of the literature in the field of Industrial Arts Education, and an attempt to follow the trends in the country as a whole, will indicate, in so far as purposes are concerned, that the trend is somewhere within the follow-

¹Snedden & Warner "Reconstruction of Industrial Arts Courses" Chap. I p. 10

ing range of objectives:

"Primary Controlling Purpose: Developmental experience through manipulative and other activities introductory to the various accessible phases of the world's industrial work.

"Secondary Aims, Objectives or Values in greater or less degree:

1. Exploratory or finding studies for the detection or discovery of interests and aptitudes.
2. General guidance values through broad occupational contacts and studies.
3. Consumers' or utilizers' knowledge and appreciations; the better choice and use of industrial products.
4. Household mechanics or the development of "handyman" abilities.
5. Avocational activities of adolescent youth in the pursuit of hobbies, and in the construction of things to possess either permanently or temporarily.
6. Vocational purposes in the definite preparation for a future occupation (applicable to from 0 to 15 percent of the average junior high school group.)
7. Correlation with other studies and interests both in and out of school.

8. The forming of social habits; development of social values (moral, civic, etc.) possible in every activity of junior high school, but particularly in the industrial arts because of the socialized setting possible."

The writer believes that the following objectives which were formulated with the aid of J. R. Holmes, Superintendent of Schools at Okmulgee, Oklahoma and W. M. Chambers, Superintendent of Schools at Sapulpa, Oklahoma, for the Junior high school manual arts course of study of Oklahoma, are absolutely fundamental and possible of attainment. Our major thesis was that since the great majority of one's life is concerned with concrete experiences that the major objectives of manual arts were really those pertaining to those things material as they affect one's life. These objectives are much more restricted than those given by either Schweichard or Snedden and Warner. They are objectives which can be achieved in any good school system.

The major objective of manual arts is to develop ability to do constructive thinking in relation to one's contact with material things.

The minor objectives are:

1. To develop ability to correlate and evaluate cause and effect in situations

which arise in the material world.

2. To develop the ability to apply theoretical knowledge to practical, concrete situations, and things material.
3. To further develop mechanical aptitude, thereby enabling one to better meet the situations of modern life which are so largely mechanical in their nature.
4. To widen the pupil's experience in mechanical things and thereby reveal to him his inclinations and abilities or lack of them, as well as to reveal to him in such measure as is possible opportunities in the mechanical world and advantages and disadvantages inherent to certain lines of activities.
5. To furnish an avocational outlet.
6. To provide a form of activity which will appeal to and interest large groups of adolescent pupils.
7. To develop ability in the consumer to judge and appreciate qualities and values.
8. To provide a place for the application of science, mathematics and other subjects.
9. To develop a knowledge of the common tools of the household and acquire some degree of skill in their use.

10. To develop mental and physical coordination through the use of hand tools and materials.

Snedden and Warner's major objective is faulty, in that it is not specific. They do not state the particular kind of developmental experience for which they propose to strive. The meaning of those two terms are hazy, - abstract. Having such a general meaning, the objective is difficult to determine whether it is socially sound, whether it is measureable, whether it meets a real need, and being abstract it does not serve as an effective guide.

Schweickhard gives no major objective against which to check his minor objectives, and as a result his objectives are confusing. They do not serve as an effective guide for either the teacher or the school administrator. Where there is no outstanding beacon towards which all teachers may work, it weakens the program, for one teacher is striving towards one goal and other teachers toward other goals.

The major objective set up by the writer is specific. Being specific, it can be checked against the accepted rating factors:

1. Is it feasible?
2. Is it measureable?
3. Is it concrete?

4. Is it socially sound?
5. Does it meet a real need?

When the major objective is specific all minor objectives can be checked against it.

The major portion of one's life is in dealing with concrete situations. Therefore, the major objective set up by the writer, meets a real need, since it meets a real need, it is socially sound. All people need to be trained to do constructive thinking about the material things of life. Tests can be set up by which to check and see if the objective is being reached since we are dealing with concrete situations. The program of manual arts can be directed as it should be, as there is but one major goal.

Some of the minor objectives of manual arts can be carried over, and often are, into the field of vocational education and can be applied just as effectively. However, the major objectives are entirely different.

The length of training varies in the two fields in a given subject. In manual arts, from a general educational point of view, it is desirable that a child have experiences in many activities and therefore his time is limited to any one field. To build up the right habits of procedure, skill, trade judgment, and to acquire the necessary technical information requires much more time in the field of vocational education in the same

given activity. To some educators the length of training does not enter into their thinking.

PART IV

A Comparative Analysis of the Aspects of Manual Arts
and Vocational Education

The following chart shows the aspects of both programs; and wherein they are similar and where they differ. In some respects their similarity and differences are obvious, but in others, a study is necessary to detect the similarities and differences.

These aspects are rated from naught to five, five being high or of greatest importance. If an aspect has equal value it is rated five in both columns. If an aspect is emphasized to any degree in one field and not in the other the ratio is five to naught. If emphasized more in one than the other the ratio is five to one; five to two; five to three, etc. No attempt has been made to rate the aspects vertically or, in other words, the relative value of each.

Table 1 - Aspects

	<u>Voca- tional Educ.</u>	<u>Manual Arts</u>
<u>GENERAL</u>		
Objectives	Different	Different
Length of Training	5	1
<u>MECHANICAL</u>		
Tool processes (Trade)	5	5
Machine Processes (Trade)	5	5
Type of Equipment (Industrial)	5	3
Use of Commercial Projects	5	2
Use of Jigs and Fixtures	5	1
Use of Exercises	1	5
<u>METHODS OF INSTRUCTION</u>		
Demonstration	5	5
Lecture	3	5
Illustration	5	5
Experimental	5	3
Individual	5	3
Group	3	5
Class	1	5
<u>STUDENTS</u>		
Selection	Selected	Non- selected
Age	Older	Younger
Placement	5	0
Follow-up	5	0

	Voca- tional Educ.	Manual Arts
<u>SPECIAL EMPHASIS</u>		
Thinking process	5	5
Planning process	5	5
Manipulative skill	5	2
Speed	5	2
Trade judgment	5	3
Related Specific Technical Information	5	3
Related General Information	1	5
Cost Elements	5	2
Educational Guidance	5	3
Vocational Guidance	2	5
Safety	5	5
Occupational Environment	5	1
Length of Class Period	5	1
<u>SHOP AND CLASS MANAGEMENT</u>		
Students' Records	5	3
Organization for Experience	5	1
Discipline	5	1
<u>TEACHERS</u>		
Professional Training (Methods & Psychology)	5	5
Specific Technical Training	5	3
Related General Information	1	5
Practical Experience	5	2
Age at Beginning of Teaching	Older	Younger
Personality	5	5

TOOL PROCESSES (Trade)V.E.
5M.A.
5

It is evident that tool processes must be taught to the student in the vocational class in the same manner that they are used in the trade. The tradesman has learned by experience the best methods of handling the tools from the standpoint of speed, accuracy, safety and ease of operation. If the tradesman's method is best from the standpoint of safety and ease of operation it is certain the boys in the manual arts course should be taught the use of the tools in the same manner. This is particularly true if the manual arts boys have reached the age of the boys in the vocational classes, however, if the boys are younger and they do not possess sufficient strength, then using the tools in a different manner, providing it is in a safe way, is feasible and sufficiently educational from the standpoint of the objectives laid down for manual arts.

TYPE OF EQUIPMENT (Industrial)V.E.
5M.A.
3

The type of equipment used in a shop plays an important role as to whether the course is vocational or is merely general education. To train vocational students on equipment which is obsolete in industry is to develop in them habits which must be broken down when they secure employment. When this is done there is an added cost in that these same students

must be retained with a loss of time. Certainly we could not say that vocational education is given when antiquated equipment is used.

In manual arts where one of the major objectives is to create and develop the habit of thinking in terms of the concrete, modern up-to-date equipment is not so important, although the more modern the equipment the greater the results. In many instances the tools the boys have in their homes and which they use for avocational purposes in making repairs around the home are, in most instances, tools which have been purchased years before. In the home, one tool will often have to perform several operations, due to the limited number usually found.

USE OF COMMERCIAL PROJECTS

V.E.	M.A.
5	2

"Any habit should be practiced correctly from the start." If this axiom is true then every project in a vocational shop should be one upon which the processes and operations will be similar to those the trainee would be required to perform upon leaving school and entering his vocation. The vocational student during training is doing more than merely creating. He is developing trade skill and trade judgment, learning the degree of accuracy demanded upon such work, the correct procedure, and learning the use of the tools or machines which will produce

the greatest efficiency upon that particular character of work. The technical information with which he will be concerned on the job will be found in such projects.

In manual arts the training is general, not specific. Therefore, if the problems are not those made in a commercial plant the major objectives in manual arts have still been met.

USE OF JIGS AND FIXTURES

V.E. M.A.
5 1

In industry the most efficient plants use jigs and fixtures extensively. A student being trained as a skilled mechanic needs to be taught their construction and their use if the course is to be truly vocational. To achieve this requires considerable time, skill, and ingenuity. From a general educational point of view the students in manual arts need to know what jigs are and their use, but they do not need to be trained to the point of dexterity in their construction.

USE OF EXERCISES

V.E. M.A.
1 5

The use of exercises in a shop can scarcely be countenanced whether they are used in training vocational students or used by the regular manual arts students for general educational purposes. An exercise piece has very little motivating effect on the student. In most instances the exercises are too far removed from reality. Exercises in a shop are in the same category, as far as training is concerned, as the theory of

faculty psychology. In the training process, however, there are times when it is better to have the student practice on an exercise piece just preceding the making of a real object. It will often save the waste of costly material and at the same time develop some degree of skill.

The use of some exercise work can be more nearly justified in the manual arts program than in a vocational one, due to the time element, but even then their use is limited.

DEMONSTRATION METHOD

V.E.	M.A.
5	5

The methods of instruction are very important regardless of the field in which instruction is given. In industry the foreman must frequently use the demonstration method when teaching a new process, or operation. From the standpoint of habit the vocational student should be similarly instructed. Another important reason for the use of this method is that the students see real tools and real machines and full sized material being used in the proper manner. One should never lose sight of the fact that the major part of what the normal person learns comes through the eye and the use of the demonstration provides this opportunity of learning.

Apparently the use of this method requires more time, but the slower method of teaching gives the student ample time to absorb the correct procedure, hence the instruction is more effective and ultimately less time is

needed. This same argument holds true in the field of manual arts.

LECTURE METHOD

V.E.	M.A.
3	5

The lecture method with either group can be used more and more as the student becomes familiar with the technical and trade terms, tools, machines, and operations. However, the lecture method can best be given in the study of general information which is for the manual arts students. The vocational student is chiefly concerned with specific technical information and in teaching this very little lecturing need be done. Specific skills are being developed in the vocational student and little lecturing should be done for this type of instruction. Breadth of training is emphasized in the field of manual arts, hence more of the lecturing method can be used effectively.

ILLUSTRATION METHOD

V.E.	M.A.
4	5

When it is desirable to use the illustration method it is just about as important in both fields, however, since "doing" ability is stressed more in the vocational shop and more time is available the illustration method will not be needed so extensively. In the manual arts shop more material can be covered by using the illustration method. This is one of the functions of the manual arts program, - extensive training.

EXPERIMENTAL METHODV.E.
5M.A.
3

Due to the wide range of shop activities which the average city provides in the field of manual arts the experimental method has no place as an instructional device. The student works such a short period of time that he can not develop the skill necessary to carry on on an experimental basis. However, in the vocational shop the student develops sufficient skill and learns sufficient technical information so that near the end of his training he will be competent to assume an assignment where he will carry the responsibility of working out processes and operations. A certain amount of this is important for the training of a well developed mechanic, for when he enters industry, he is often thrown upon his own resources and this training develops in him a sense of responsibility and a habit to think for himself. A resourceful worker is always an asset. The manual arts student would profit from this type of instruction. However, there are other objectives of a general educational nature in manual arts which are considered by educators more valuable than this.

INDIVIDUAL INSTRUCTIONV.E.
5M.A.
3

In an efficient program of vocational education every student is encouraged to progress as rapidly as his ability will permit. This being true most of the

instruction will of necessity have to be individual in nature. Another factor is that due to individual differences the longer a group of students stay in one shop the farther apart they will become in accomplishment. In the manual arts program, due to large classes, the time element, and the fact that the majority of students are doing the same things at the same time only a limited amount of individual instruction is possible.

GROUP INSTRUCTION

V.E.	M.A.
3	5

Group instruction in the shop where vocational students are being taught is seldom feasible. The students are usually working on different machines and on different projects at the same time. It is too costly in most classes to have enough machines of the same kind to have all students working on the same problem and mastering the same processes during a given period. Due to individual differences between students and longer periods devoted to training it is not long after the class starts training until they are widely separated. Where there is a group of students ready to perform the same process or operation time is saved by calling them together and giving them instruction as a group. Most of the manual arts work is done at individual benches. The providing of benches, all equipped alike, is possible from a cost standpoint and highly desirable. Manual arts students differ in ability the

same as vocational students, but due to the limited time they spend in a shop they do not vary so much in accomplishment, hence group instruction can be used more advantageously than in a vocational shop.

CLASS INSTRUCTION

V.E.	M.A.
1	5

Class instruction is almost impossible in a vocational class except in the beginning. Some class instruction can be given in discussing safety, cost factors, the study of technical information, etc., but to teach operations and processes by the class method is inefficient for the same reason as mentioned for group instruction. Much more class instruction is possible for the manual arts students, at least in the unit activity shops and in the early courses offered in manual arts, where all students are working on similar projects and which are designed much alike.

SELECTION OF STUDENTS

V.E.	M.A.
Selected	Non-Selected

It is desirable that all boys have experiences which the manual arts provide, hence they are unselected. Selection however, must be made in vocational education. According to Dr. C. R. Allen in a class statement, "Training should be given to only those who want it, who need it, and who can profit by the training." This means that they must be carefully selected if the training meets the needs of vocational education. To take in a vocational shop an unselected group of students who are not fitted

by nature, who will probably never enter that particular type of work, and who are not interested is a waste of the students' time and of public money.

AGE OF STUDENTS

V.E.	M.A.
Older	Younger

Age is a factor in both manual arts and vocational education, but more-so in vocational education. The boy in vocational education should have the physical strength to handle the tools and operate the machines and the maturity of mind to grasp the problems of the projects selected and to develop trade judgment. He should also be of an age at the completion of his training that the occupation will select him. This being true the student will be somewhat older than the majority of students taking manual arts. The early adolescent period is the time that the students profit most from courses offered in the manual arts. It is at this time that they are physically active - they are interested in creating and making things, not so much from the standpoint of skill in the use of tools and machines, but from the pleasure derived therefrom.

The experiences gained in manual arts gives him an apperceptive base to better interpret the training which he should pursue. The major function of a junior high school is for the purpose of exploration and it is during this period that manual arts functions to its highest degree. The majority of the boys in the

junior high schools are too young to pursue a vocational course.

As the boy grows older he thinks more about his future vocation and whether he should pursue his vocational course or continue his academic training.

PLACEMENT OF STUDENTS

V.E.	M.A.
5	0

Dr. Chas. R. Allen says that a vocational course is efficient in proportion as it places its product. This being true, placement is one of the major functions of a vocational program. Using placement in the same sense, manual arts education does not train for a vocation, hence it is not an aspect of the program.

FOLLOW-UP OF STUDENTS

V.E.	M.A.
5	0

Dr. Allen also says that a vocational education program is efficient in proportion as there is adequate follow-up to see that the student is making good and to bring him back, if necessary, for additional training. With the manual arts student not being placed on a job there is necessarily no follow-up.

THINKING PROCESS

V.E.	M.A.
5	5

It is just as important to train the vocational student in correct habits of thinking as it is to train the manual arts student. One of the major objectives of the "doing" subjects for general education purposes

is to develop in the students the right habits of thinking in terms of concrete experiences. Dr. Charles R. Prosser says that 90 percent of our experiences deal with the concrete. Certainly vocational students who expect to devote their lives largely to industry need to have the right habits of thinking properly developed, that is, sense the problem, list, at least mentally, all of the functioning factors, classify them, analyze them, draw conclusions, and then act. Working with the concrete gives the best opportunity for doing this.

PLANNING

V.E.	M.A.
5	5

Planning is a result of thinking. Students in both groups should be given the opportunity to plan their procedure in the shop as far as their ability will permit, and each group should be given equal training in this important phase of education.

MANIPULATIVE SKILL

V.E.	M.A.
5	2

Manipulative skill is the ability to do a job with speed and accuracy. This manipulative skill is developed through repetitive practice. In a school vocational shop there are only a few trades in which the skill of the student can be brought to the level of a skilled mechanic. However, the student's skill must be brought up to a point which will permit the student

to enter employment at a level above that of a beginning apprentice who has had no training, otherwise the training in this particular trade does not function. Relatively speaking, a vocational course to be justified in a training program, the student should have at least 50 percent of the skill demanded of the skilled workers engaged in that particular vocation.

In manual arts the only skill necessary to develop is that which is needed to perform satisfactorily the operations which are to follow in order that the student may derive true education from the course he is pursuing. This being true, manipulative skill is not the major emphasis in manual arts.

SPEED

V.E.	M.A.
5	2

Speed is a part of the manipulative skill and the vocational education student who succeeds in after life must meet the competition of speed as he finds it in industry, hence it should be developed to the highest possible degree.

In the field of manual arts speed should be emphasized, not as a necessary element of manipulative skill, but for the appreciation of it. Experiments have been made which show that when anyone is required to work at his maximum speed he concentrates on his job and the fact that he is forced to concentrate is decidedly educational in nature. Therefore, manual arts

students should be trained in speed but for a different reason than that of the vocational student. The vocational student is trained in the habits of speed to meet future competition and also to develop in him the power of concentration while the manual arts student is trained in speed primarily for the educational value of concentration.

TRADE JUDGMENT

V.E.	M.A.
5	3

By trade judgment is meant the ability to make correct decisions on problems affecting the job on which instruction has not been given, either written or orally, or where faulty instruction has been issued, or to meet particular situations when thrown on one's own resources.

For students to acquire this ability it requires performing the operation many times and in different situations. Often the student must be thrown on his own resources for the development of this trait. It is possible for the vocational student to have this undirected experience, particularly as he develops more skill and technical information. This ability on his part will, in a large measure, determine his success or failure when he enters his trade. Some trade judgment can be developed by the student of manual arts, but the opportunity is limited due to the lack of skill which he develops and the limited amount of time he spends in any

one activity. Judgment can only be developed through participating experiences. The degree of judgment developed will depend on the number of experiences through which the student passes - plus native ability.

RELATED SPECIFIC
TECHNICAL INFORMATION

V.E.	M.A.
5	3

In industry related technical knowledge is almost indispensable to the successful mechanic to meet the demands placed on the worker due to the scientific methods used in manufacturing and to cope with the new discoveries which are constantly changing the processes and operations. His ease of adjustment will depend in a large measure on his knowledge of adequate specific technical principles and information. Since the manual arts student has not selected his vocation the functioning specific technical information is not known hence less of it should be taught him.

RELATED GENERAL INFORMATION

V.E.	M.A.
1	5

The manual arts student having not yet selected his vocation the general technical information he receives in the shop needs to be more general than specific. The manual arts shop gives the student an insight into the application of science and many of life's situations and should stimulate him to further study. His related specific technical information will be secured when his vocation has been selected. On the other hand, the

vocational student has already selected his vocation and time will not permit him to study much of the general technical information available, regardless of how valuable from a general educational point of view it may be.

COST ELEMENTS

V.E.	M.A.
5	2

When a student enters a vocation he is constantly confronted with the cost of materials, supplies, machines, and operations. Often he must keep his own records of some of the costs, therefore, training in the study of costs is a valuable asset to him when the employment is secured. He will appreciate and know the cost of time and materials and will be more cooperative in seeing that the institution in which he is employed operates economically.

It is extremely valuable for the manual arts student to acquire an appreciation of the cost factors, but lack of time will not permit training to the point of developing skill in finding costs.

EDUCATIONAL GUIDANCE

V.E.	M.A.
5	3

The vocational director or teacher is vitally concerned in the subjects studied by the vocational student other than those which are strictly vocational. The amount of time available for the academic studies is so limited that the student will have to be well guided if he pursues those subjects which will function best in

his life. The great majority of vocational students receive no further general education after completing a vocational course. This statement holds equally true with all subjects they pursue.

The manual arts teacher is not concerned in a large way with the educational guidance of his students. The student's program is usually made out by his principal or some one designated for that purpose. The manual arts teacher only incidentally influences his students in the selection of other subjects studied, due to the limitations placed on him by existing conditions.

VOCATIONAL GUIDANCE

V.E.
2

M.A.
5

Vocational guidance has been largely completed with the vocational student before he enters training. His decision to enter a certain vocation may have been influenced by his own experiences, talks with his parents or friends, observation, reading, or previous school experience. It is true the vocational director and vocational teacher may bring some influence to bear on his decision. The greatest guidance service which the vocational teacher can render to the student entering his course is to point out to him that in any particular field there are many special trades within it and the teacher should point out the advantages and disadvantages of these special fields. For instance, a student studying to become a machinist - little additional

training will prepare him for a tool or die maker, or he may become a special operator on any given machine.

Students taking manual arts, in the majority of cases have not selected their vocation, therefore, vocational guidance is of utmost importance to them and more time should be given than is now allotted, during their experiences in the various shops, in a study of the opportunities and disadvantages of the many industrial vocations.

SAFETY

V.E.
5

M.A.
5

All boys should have a thorough knowledge of the safe practices in the operation of machines and tools. Accident prevention should be instilled into each individual until it becomes a fixed habit. The vocational student will make greater use of this knowledge after entering employment, but this training is just as necessary to the manual arts student for their protection while in regular class work.

OCCUPATIONAL ENVIRONMENT

V.E.
5

M.A.
1

Failure on the part of students who have been trained in vocational schools often is attributed to the fact that the school did not provide training in an industrial environment. As a result when the trainee entered industry he experiences difficulty in adjusting himself to the new environment, that is, length of working hours, attitude of foremen versus that of the teacher, etc.

The environment of the vocational school should be as typical of that found in industry as is humanly possible.

An industrial environment is almost of negative importance to the manual arts program in order that it may realize its objectives. In other words, there is as little reason to have an industrial environment in the manual arts shop as there is in the science laboratory. However, if there is an attempt to realize in manual arts the objectives of vocational guidance then the environment of the manual arts shop should approach as near as possible that of the commercial shop.

STUDENTS RECORDS

V.E.	M.A.
5	3

Attendance records are kept by all teachers regardless of the group of students being served. Most manual arts teachers keep records of the materials used, their cost, the total amount of time it takes to make a project and other minor details. These records are essential to operate a shop economically and to assist in giving grades at the end of the semester. These same records are just as essential for the vocational teacher, but in addition records must be kept showing the cost of each operation, estimating and determining the cost of materials used. The vocational student will be confronted with cost factors when he enters employment and he should be trained to a given level of efficiency in record keeping.

A progress chart will show both teacher and student whether the vocational student possesses adequate speed to succeed. Other records are necessary to show the movement of operation from one machine to another to insure the student receiving an all-round training.

Personality records are desirable for the manual arts students if the school has an accumulative record system, but for the vocational student these personality records are imperative. It is only from these records that the youth can be successfully placed when questions are asked concerning his cooperativeness, adaptability, etc. Periodical checking of these factors will aid the student to overcome some of the undesirable traits during his period of training.

ORGANIZATION FOR
EXPERIENCE

V.E.	M.A.
5	1

When a student enters employment he usually becomes one of a "gang" or a crew, he works under a "straw" boss, or foreman and he is subject to the rules of such organization. Working in a "gang" in the school shop will assist him in making his adjustment later on in industry and with an average of two years' training, which the vocational student receives, some important habits will be developed.

For a trainee to act as a foreman will give him an appreciation of some of the problems facing all foremen.

Working in a crew gives the student training in cooperativeness. With this training, adjustments should be easier in the commercial plant.

This kind of training is also valuable to the manual arts students, but again only a limited amount can be accomplished, due to the short laboratory period.

There are other educational values to be derived from the manual arts program which are more pertinent at this period and which require less time. Training in this particular factor can come later in the boy's life, particularly after he has chosen his vocation.

DISCIPLINE

V.E.	M.A.
1	5

By discipline is meant the conduct on the part of the student while in the shop. The conduct of the vocational student as compared with that of the manual arts student is usually much better, due to the fact that the vocational student has a more serious purpose in mind. He has selected his life's work and the length of time he can spend in preparation for this vocation is short, which he often realizes. In a well organized vocational shop he is working on commercial projects and he sees in the operation or process something that will aid him in his life's work. In other words, the vocational student has a very definite goal.

The student in the manual arts shop is not often conscious of the value of the training received.

To him it is a shop where there is freedom of activity, a place for the purpose of just "making things." With many students it is a recreational hour, while with others it is directed play. The impression should not be left that discipline is a serious problem in a manual shop, but relatively speaking it is more of a problem than in the vocational shop for the reasons mentioned.

<u>LENGTH OF CLASS</u>	V.E.	M.A.
<u>PERIOD</u>	5	1

The length of the class period for vocational students must be sufficiently long so that after time has been employed for assembling materials, setting-up machines, and other necessary routine, there will be adequate time for the organization of the shop on an industrial basis. Ample time can be given for the development of manipulative skill which includes accuracy and speed, also it will be possible for a student to carry through to completion many of the initiated processes and operations. In a vocational shop mere information is not enough, "doing ability" must be developed on the part of the learner.

Information and attitudes are the major factors desired in the manual arts shop. Therefore, less time is required per day to achieve these goals.

<u>PROFESSIONAL TRAINING OF TEACHERS</u>	V.E.	MA.
	5	5

A teacher is a teacher regardless of whom he

may be teaching. Effective instruction, assuming he knows his subject, depends upon his knowledge of the psychology of people, the correct methods of teaching and the use of the best instructional devices. A vocational teacher is in need of this just as much as is a teacher of manual arts. It does not necessarily follow that formal courses should be studied by teachers of either group so long as the individual possesses this knowledge. A vocational teacher, if he has been occupationally trained, may have secured his professional training through experience, particularly if he has been a foreman. At present the manual arts teacher usually gets his professional training in an organized manner.

<u>SPECIFIC TECHNICAL TRAINING</u>	V.E.	M.A.
<u>RELATED GENERAL INFORMATION</u>	5	3
	1	5

A vocational student to succeed must have specific technical information directly related to his job. Practically all of this information must come through his shop teacher. Hence, his teacher must possess this knowledge. If the teacher has not acquired it through his practical experience then he must get it through special training and the training needs to be direct and specific.

On the other hand, the manual arts students are in the courses for the purpose of general training, therefore, the manual arts teacher must be trained more widely in technical fields in order that he may make

wider application.

PRACTICAL EXPERIENCE

V.E. M.A.
5 2

The vocational teacher must be occupationally trained. It is only the man who has had actual participating experiences in a vocation who knows the degree of skill demanded, the trade mathematics necessary, the extent to which science affects the job, the speed and accuracy required, the special methods used and hundreds of other things which the student must learn if he is to go out properly equipped.

The more practical experience a manual arts teacher has, all things being equal, the better shop teacher he will be, but usually the manual arts teacher cannot spend four years at a trade and then four years in college before entering his vocation. His economic needs will not permit him. Also, his general training is more valuable to the student than is narrow specific training. He is more concerned in broadening the information of his students and developing attitudes than in giving narrow, specific training.

AGE AT BEGINNING OF TEACHING

V.E. M.A.
older younger

By the time a vocational teacher has served his apprenticeship and has proved his success in a trade he is older than the manual arts teacher who only completes a high school and college course. The vocational teacher needs maturity to deal effectively with

prospective employees, through the setting up of an industrial environment and developing in the students those attributes which are known to make for success in a particular vocation.

PERSONALITY

V.E.
5

M.A.
5

Students, regardless of the course they pursue, require teachers with strong personalities. A strong personality attracts, holds and inspires students to do their best.

CONCLUSION

Educators, past and present, who have made a serious study of the educational value of participating concrete experiences are all of one accord that these experiences should be used in the development of youth. They recognize that the nature of youth demands such education. However, present practice reveals the fact that many school administrators have only given "lip service" to such a program in the educational growth of the youth under their supervision. However, Dr. Harold Rugg, Dr. William H. Kilpatrick, Dr. Charles A. Prosser, Dr. C. A. Allen, Dr. John Dewey, and others have made their influence felt for this type of education in some of the most progressive school systems.

This study points out many more aspects of both programs than are usually considered by school men and it is necessary that educators and school administrators take into consideration all of these aspects and study the ratio of importance of each if they are to clarify their thinking. Even where the ratios are 5 to 0 or 1 to 5 they need to give more attention, and particularly so where the ratio is less, 5 to 2 or 3 to 5, critical analyses needs to be made so that proper emphasis may be made depending upon whether the work is in the field of vocational education or manual arts education.

The fact that participating concrete experiences are common to both is a justification for a more careful consideration of the objectives of both programs; the length of training; students to be served; methods of instructions; teacher qualifications; class and shop management; shop equipment; and the special aspects.

This study shows that if right values are to be set up for vocational education and manual arts education programs, with the proper conception of the scope, the limitations, and functions of each, the confusion of thinking among educators must be clarified which can be done thru the analyses similar to this one.

A QUANTITATIVE ANALYSIS OF ASPECTS
of
VOCATIONAL AND MANUAL ARTS EDUCATION

Summary

Problem:

Today, there is much confusion of thinking of educators as to vocational education and manual arts education, due in large part to the fact that participating concrete experiences are common to both. However, this confusion can be overcome by analyzing the objectives of both fields and by critical study of the aspects. The only way that educators can clarify their thinking in these two fields of endeavor is by studying the educational value of participating concrete experiences, whether in the field of vocational education or manual arts education, by setting up the objectives for both programs and an analysis where similarities and differences exist, whether obvious or not.

In too many school systems, there are courses operating under the name of a vocation but in reality, little vocational training is given. Students are often unselected, the equipment is antiquated, unqualified teachers are in charge, insufficient time is allowed for training, and emphasis is wrongly placed. This confusion

of thinking has been harmful to the manual arts program, as well as to the vocational education program. If either is to be given its rightful place in the public school system, each will have to be so administered that its respective aims and objectives may be realized, which is not possible when educators are confused in their thinking.

Procedure:

To determine the value of participating concrete experiences, letters were sent to twenty of the leading educators in several different fields, to get their opinion of the educational value of concrete experiences. Quotations were taken from the writings of the educational philosophers of the past and a few of the present. The objectives for both programs were secured from current literature in the field of manual arts and in addition, the writer set up some objectives of his own; then compared those of his with the ones he found.

A group of occupationally trained teachers, all with varying degrees of institutional training, and trained manual arts teachers, met with the writer and discussed the various aspects of the manual arts and vocational education programs, in rating each aspect. These aspects were later checked by the director of vocational education in a city with a population of 200,000, the state supervisor of trade and industrial

education, and the teacher trainer for vocational education.

Contents and Conclusions:

The replies received from these leading educators and a study of the educational literature of the educational philosophers point out conclusively that participating concrete experiences should be used in the development of youth. They recognize that the nature of youth demands such education. However, present practices reveal the fact that many school administrators have given only lip service to such a program in the educational growth of the youth under their supervision. However, Dr. Charles A. Prosser, Dr. C. R. Allen, Dr. John Dewey, Dr. Harold Rugg, Dr. William H. Kilpatrick and others, have made their influence felt for this type of education in some of the most progressive school systems. A study of the objectives set up by the various writers in the field of manual arts are so numerous and so abstract that it is difficult to measure them against those factors which are used as an acid test of the validity of the objectives:

1. Concrete vs. abstract.
2. Are they socially sound?
3. Are they measurable?
4. Are they feasible of attainment?
5. Do they serve as an effective guide for teachers?

6. Do they meet a real need?

In most instances, however, only a few of them set up a major objective against which the minor objectives could be checked. The writer has attempted to set up a major objective which is specific. Being specific, it can be checked against the rating factors; also all minor objectives can be checked against the major.

Where there is no outstanding beacon toward which all teachers may work, the program is weakened; for one teacher strives toward one goal, and other teachers toward other goals.

This study points out many more aspects than are usually considered by school men and it is necessary that educators and school administrators take into consideration all of the aspects and study the ratio of the importance of each, if they are to clarify their thinking. Even where the ratios are 5 - 0, or 1 - 5, they need to give more attention, and particularly so, where the ratios are less--5 - 2, or 3 - 5. Critical analyses need to be made, in order that proper emphasis be placed, depending upon whether the work is in the field of vocational education or manual arts education. The fact that participating concrete experiences are common to both is a justification for more careful consideration of the objectives of both programs; length of training; students to be served; methods of instruction; teacher qualifica-

tions; class in shop management; shop equipment; and the special aspects.

This study also shows that if right values are to be set up for vocational education and manual arts education programs, with a proper conception of the scope, the limitations and functions of each, the confusion of thinking among educators must be clarified; which can be done through analyses similar to this one.

AN ANALYSIS OF ASPECTS
of
VOCATIONAL AND MANUAL ARTS EDUCATION

The Value of Concrete Experiences
Objectives of Vocational and Manual Arts Education
Comparative Study of Aspects

Submitted by
Ozro Bruce Badger

for the
Degree of Master of Science

Colorado Agricultural College
Fort Collins, Colorado

July 1931

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