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Historically, project work has been a part of 4-H Club work. An exploration of the role of individual and group projects as planned learning experiences leads, hopefully, to a better understanding of their potential. In order to be of educative value, the project must be of immediate interest to the child, as well as be intrinsically worthwhile. The project should raise problems calling for research and review of related literature, and must cover a sufficient expanse of time to allow adequate exploration and execution. The project should be the primary basis for the uniqueness of 4-H in terms of the method by which the young people who are involved are taught. (DA)

AN EXPLORATION OF THE PLACE OF PROJECTS IN 4-H*

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Historically, project work has been a part of 4-H Club work. As a matter of fact, work with young people which preceded, and which is credited as the forerunner to 4-H, evolved around undertakings by young people that might legitimately be called "projects" (i.e., boys' activities in corn clubs and girls' activities in tomato canning clubs). Early efforts at working with young people of the nature that developed into 4-H gained impetus about the time many educators were voicing growing concern over the approaches to teaching used in public schools. It is a well established fact that much of the early efforts which developed into 4-H can be credited to educators who were part of the formal educational system.

Questions have been prompted regarding such factors as (1) the effectiveness of 4-H, (2) the proper role for 4-H in the lives of those involved, (3) its potential for many young people not presently involved, etc. Recent developments that may account for questions being raised include such matters as (1) expanding technology, (2) shifts in place of residence and in proportions of population by nature of residence, (3) efforts to critically examine Extension's program and its proper role and function in present society, (4) shifting interests of the population, and (5) debates regarding the quality and effectiveness of our educational agencies.

The project has been scrutinized from many standpoints. For example, such questions as these are currently being raised: What is appropriate content for 4-H projects? Must projects be restricted to subjects in agriculture and home economics? Are projects an essential component of a 4-H program? Can projects be developed from the social sciences? Can group projects supplant the individual project in some circumstances?

This paper will not attempt to deal specifically with such questions. However, some of the material presented will have obvious relationship to these questions. This paper will pull from the literature that information which will, hopefully, lead to a better understanding of certain ideas back of the project and what the potential for such educative efforts may be. This will be undertaken by, first, examining ideas that are basic to the project as an educational undertaking. Second, the project idea itself will be explored, incorporating what little related research evidence has been located and, third, an attempt will be made to interpret the information assimilated.

As the areas to be explored indicate the specific ideas discussed in this paper will be restricted largely to the educational potential inherent

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in projects per se. However, it is recognized that there are numerous possible "side effects" (i.e., potential for recognition, family involvement, pride of ownership, feeling of accomplishment, etc.). Exploration of these ideas could add an entirely different set of dimensions to the topic. So could a treatise on the place individual projects play in the utilization of volunteer leaders as teachers.

Questions regarding the school systems' approach to education are not unique to the 20th century. Thoreau was very specific in his appraisal. The following quotation from Walden is very much to the point of this exploration of the project as an educative device. Thoreau, addressing himself to students, was writing of his experience in building his own house at Walden Pond:

> The student who secures his coveted leisure and retirement by systematically shirking any labor necessary to man obtains but an ignoble and unprofitable leisure, defrauding himself of the experience which alone can make leisure fruitful. "But," says one, "you do not mean that the students should go to work with their hands instead of their heads?" I do not mean that exactly, but I mean something which he might think a good deal like that I mean that they should not play life, or study it merely, while the community supports them at this expensive game, but earnestly live it from beginning to end. How could youths better learn to live than by at once trying the experiment of living? Methinks this would exercise their minds as much as mathematics. If I wished a boy to know something about the arts and sciences, for instance, I would not pursue the common course, which is merely to send him into the neighborhood of some professor, where anything is professed and practised but the art of life;--to survey the world through a telescope or a microscope, and never with his natural eye; to study chemistry and not learn how his bread is made, or mechanics, and not learn how it is earned; to discover new satellites to Neptune, and not detect the motes in his eyes, or to what vagabond he is a satellite himself; or to be devoured by the monsters that swarm all around him, while contemplating the monsters in a drop of vinegar. Which would have advanced the most at the end of a month,--the boy who had made his own jackknife from the ore which he had dug and smelted, reading as much as would be necessary for this--or the boy who had attended the lectures on metallurgy at the institute in the meanwhile, and had received a Rogers' penknife from his father? Which would be most likely to cut his fingers? . . . To my astonishment I was informed on leaving college that I had studied navigation!--why, if I had taken one turn down the harbor I should have known more about it. Even the poor student studies and is taught only political economy, while that economy of living which is synonymous with philosophy is not even sincerely professed in our colleges.[1]

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1. Henry D. Thoreau, Walden and Selected Essays (Chicago: Packard and Company, 1947), pp. 47-48.

LEARNING BY DOING

Thoreau's idea of learning has been described as "learning by doing." The idea was much a point of discussion for educational philosophers around the turn of the century. Dewey explored it, with specific reference to the project, in relation to our thought process.

How We Think

Dewey identified what he considered one of the chief causes for failure of the school to secure gain in ability to understand. He maintained that such failure was due to neglect in setting up conditions for active use as a means of bringing consequence to pass. He termed such understanding "a precious educational result" and attributed this neglect to failure in setting up projects that call out the inventiveness and ingenuity of pupils. "All routine and all externally dictated activity," he said, "fail to develop ability to understand, even though they promote skill in external doing."[2]

Dewey[3] maintained that subject matter is too often assumed to be understood when it has been "stored in memory" to be reproduced on demand. But he contended that nothing is really known except as it is understood. In this context he considered work, in the sense of <u>intelligent action</u>, to be highly educational:[4] It continually builds up meanings at the same time it tests these meanings by applying them to actual conditions. As a matter of fact, Dewey[5] argued that history reveals that man's scientific knowledge and technical abilities have developed, especially in their early stages, from the fundamental problems of life.

More specifically, Dewey said that:

> Intelligent consecutive work in gardening, cooking or weaving, or in elementary wood and iron, may be so planned that it will inevitably result not only in students' amassing information of practical and scientific importance in botany, zoology, chemistry, physics, and other sciences, but also (what is more significant) in their becoming versed in methods of experimental inquiry and proof.[6]

He identified four conditions that should be fulfilled in order for projects to be educative:[7]

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2. John Dewey, <u>How We Think</u> (Boston: D. C. Heath and Company, 1933), p. 147

3. <u>Ibid</u>., p. 148

4. <u>Ibid</u>., p. 212

5. <u>Ibid</u>., p. 216

6. <u>Ibid</u>., p. 217

7. <u>Ibid</u>., pp. 217-19

1. It should be of interest. Unless it offers an outlet for energy that has meaning to the individual and unless the activity appeals to emotions and desires, the participant may turn his mind to other thoughts even though he continues working.

2. The activity should be intrinsically worthwhile. Trivial activities of no consequence beyond immediate pleasure they may afford should not be considered.

3. In the course of development, a project should present problems that awake new curiosity and create demand for information. To be educative, regardless of how agreeable it may be, an activity must lead the mind into new fields.

4. A project must involve a considerable time span for adequate execution. In this respect it must be within the realm of possibility to develop the plan and the object to be attained--with one thing leading naturally to another. It is the place of the adult to look ahead and detect whether one stage of achievement will suggest something else to explore.

Doing and Learning

However, the learning by doing idea does not appear to be original with the progressive education movement of the early 20th century as typified by Dewey. According to Rich:

> The concept of "learning by doing" did not spring full-blown from twentieth century progressive education--its roots seem to lie in two areas: the emergence of sense realism with its emphasis on 'things before words,' and the naturalistic movement in education which believed in providing expression for the unfolding capacities of the child. The progressive movement, though it may not have been entirely cognizant of its legacy, set out afresh to release the child from the so-called authoritarian shackles of the traditional school. Progressives were able to call upon the new fields of child development and educational psychology to show that learning is not a passive affair of stuffing the cranium with pre-digested bodies of information (as they believed traditional education had done); instead, learning is an active process. And teaching is most effective when the child is actively involved in learning and a full-fledged participant in the learning process. Rigidity of classroom furniture, teaching materials, and the general classroom atmosphere must be altered, then, to provide the needed freedom of movement to facilitate the learning process.
>
> Thus, those who believed in "learning by doing" contended that pupils are alive, industrious, inventive, and they profit by organizing and assembling materials and carrying on enterprizes; therefore the active classroom is good because it provides the opportunity for direct experience with 'real-life situations' and it permits pupils to express themselves, to develop their creativity, and to practice democratic living.[8]

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8. John Martin Rich, "Learning by Doing: A Reappraisal," High School Journal, XL (May, 1962), pp.338-39.

For example, in a study of 4-H Club work in Virginia,[9] published in 1930, the author observed that home projects involved the principles of learning by doing generally recognized by educators to be the most effective method of instruction. Projects were viewed as (1) affording opportunity for creative self expression, (2) bringing personal responsibility for results to the fore, (3) linking instruction to problems of real life, and (4) bringing the home into partnership in the instructional process.

Two related trends in science education have been identified by Quisenberry and Seevers[10] as currently underway in the school system:

1. An effort is being made to upgrade the content of science curricula.

2. An attempt is being made to teach concepts and principles rather than the memorization of facts. This is being accomplished through "learning by doing." "Students study the processes of science by actually participating, thanks to new teaching methods, and by treating science as inquiry rather than a body of facts."[11]

In discussing science and education, Tyler identified factors which have been found in several investigations of careers of scientists and in institutions which have educated an unusually high percentage of able scientists. Among these is "tying together concrete manipulative activity with analysis, discussion, efforts to explain, efforts to relate various experiences to each other. This suggests projects, self-initiated laboratory and field work followed by efforts at interpretation."[12]

"Learning by doing is related to treating 'science as inquiry'," according to Quisenberry and Seevers. "Four-H has long stressed learning by doing and formal education seems to be moving toward this concept. Learning by doing is not the complete answer for stressing science. It is essential to help members think carefully while they are learning by doing."[13]

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9. William Edward Garnett, Young People's Organizations in Relation to Rural Life in Virginia with Special Reference to 4-H Clubs, Virginia Agricultural Experiment Station Bulletin 274 (Blacksburg: Virginia Polytechnic Institute, June, 1930).

10. Karl S. Quisenberry and Gary L. Seevers, A Study of the Possibilities of Expanding the Understanding and use of Science Through 4-H Club Work. (Washington, D.C.: National 4-H Club Foundation, April, 1963). p. 18.

11. Ibid.

12. Ralph W. Tyler, "Science and Education in Today's World," in Report of National Conference on Science in 4-H Club Work, held at Michigan State University, Sept. 20-22, 1959, pp. 17-18.

13. Quisenberry and Seevers, op. cit., p. 76.

Principles of Learning

The idea of learning by doing is embodied in many of the statements of principles or conditions of learning. Tyler[14] discusses them in terms of "conditions required for learning to take place." He says that for learning to take place the following conditions must be met:

1. If the learner is to carry on behavior there must be something that compels him to do it--some drive, some desire, some motive.

2. The learner must recognize that his present behavior is inadequate in some respect--that his way of feeling or acting is not satisfactory.

3. He must have some guidance to the new behavior in order to avoid trial and error.

4. The learner must have opportunity to practice the desired behavior, often meaning that having material to work on is necessary.

5. The learner finds some satisfaction in the desirable behavior.

6. The learner acquires standards of success that for him are high but attainable.

7. He must have some way of telling whether he is reaching his standards--how well he is doing.

Based on the idea that "one learns through his own activity, through what he does," Hammonds[15] identifies principles of learning in these terms:

1. "What is learned is what is practiced; continued practice or use is usually necessary for retention of learning." Learners learn what they do, not what they are told, what they read, or what they see others do.

2. "Satisfyingness or annoyingness of the practice promotes learning in so far as it makes for vividness of experience, and promotes or hinders learning in so far as it encourages or discourages further practice." Since most learning is for the sake of reaching a goal, one of the first steps in securing economical learning is for the learner to establish a goal in his mind.

3. "Experiences that occur together tend to recur together." This refers to the idea that seeing relationships is necessary in most learning--it makes learning easier and gives meaning to the thing, event, or situation.

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14. Ralph W. Tyler, "The Educational Potential of 4-H," Selected Readings and References in 4-H Club Work, (eds.) G. L. Carter, Jr. and Robert C. Clark (Madison: National Agricultural Extension Center for Advanced Study, 1961), pp. 13-14.

15. Carsie Hammonds, Teaching Agriculture (New York: McGraw-Hill Book Company, Inc., 1950), pp. 12-31.

Hammonds maintains that one acquires meaning through his experience. He states that "meanings do not reside in objects or in symbols. Even the meaning of a word (which is a symbol) depends on what it represents in our experience--what we have done with it, how we have used it, how we have reacted to it. The more we know about the learning process, the more we realize the need for experience by the learner."

Clements[16] identifies seven principles of learning:

1. Learning should be an active process--knowledge must be drawn out, not poured in. Learning occurs through active living rather than reading about it.

2. Learning should be meaningful. This involves understanding.

3. Learning should be useful with satisfaction "here and now" not just a promise of such in the future.

4. Learning should be interesting. Interest and curiosity leads to motivation.

5. Learning should be individualized with each person provided an opportunity to realize his potential.

6. Learning should be satisfying. Young people tend to repeat satisfying experiences and shun unpleasant ones. Such satisfaction must be both extrinsic and intrinsic--extrinsic because young people may not always have an adequate standard for judging intrinsic value. However, outside motivators should not become ends in themselves.

7. Learning should be unified--learning occurs through the physical, mental, and emotional.

THE PROJECT

"As early as 1828, the teacher of a boarding school in Butler County, Ohio . . . allotted parcels of land to his students and had them grow corn, cucumbers, radishes, tomatoes, shrubbery, and flowers. These boys of club age were learning by doing under the stimulus of competition, just as do the club boys of today."[17]

Dr. Liberty Hyde Bailey, Cornell naturalist, "wanted to counteract the idea that learning must be about remote things. He wanted to convince

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16. Stanley L. Clement, "Seven Principles of Learning," in Readings in Human Learning, (eds.) Lester D. Crow and Alice Crow (New York: David McKay Company, Inc., 1963), pp. 55-58.

17. Franklin M. Reck, The 4-H Story (Ames: Iowa State College Press, 1951), p. 5.

rural boys and girls that scholarship began in their backyards, in the grass underfoot, the tree that shaded the house, and the crops that grew in the fields. He used to say, 'There is as much culture in the study of beet roots as in the study of Greek roots'."[18]

History of Project

The use of the term "project" in the field of formal education came into popular usage just prior to 1920, as witnessed by the number of books on the topic published about that time.[19]

Writing in 1920, Stevenson[20] stated that historically the word "project" had been used for many years in business and in some specialized forms of education with rather vague meaning. However, he stated that it had been accepted more recently by the United States Department of Agriculture as an outline plan for carrying out a piece of cooperative work. R. W. Stimpson is credited with its first use. He used the expression "home project" in connection with an agricultural course of the Massachusetts vocational schools. Stimpson and others used the word "project" in 1908-10 in their report to the Massachusetts legislature.

Stevenson maintains that the following historical sketch can be accepted as authoritative:

> For many years the term "project" has been used to designate carefully planned investigations in agricultural science covering a considerable period of time, frequently demanding several years for their completion. Such plans, including aims and methods, have been submitted by the agricultural experiment stations of the several states and approved by the Office of Experiment Stations in the States Relations Service of the United States Department of Agriculture.
>
> More recently the same term "project" under practically the same conditions has been applied to the projects in demonstration work and extension teaching carried out under the Smith-Lever Act. The term carries with it the idea of a program of importance, of some duration, and an expectation of certain tangible and valuable results.

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18. Ibid, p. 8

19. For examples, see: Mendel E. Branom, The Project Method in Education (Boston: Richard G. Badger, the Gorham Press, 1919); John Alford Stevenson, The Project Method of Teaching (New York: The Macmillan Company, 1921); James Leroy Stockton, Project Work in Education (Boston: Houghton Mifflin Company, 1920); and Charles A. McMurry, Teaching by Projects (New York: The Macmillan Company, 1921).

20. Stevenson, op. cit., pp. 40-41.

> This term "project" was borrowed first by secondary school teachers of science and manual arts because its use by experiment stations suggested an idea of value in connection with the practical phases of teaching these subjects.
>
> In connection with the teaching of agriculture in secondary schools the idea of projects at home crystalized and took on the name of "home project" about 1908 in Massachusetts, receiving the sanction of the State Board of Education under suitable legislation in 1911. This plan, with modifications which do not change the principal points of the definition, had been adopted in most of the states which had constructive legislation on agriculture in the secondary schools previous to the enactment of the Smith-Hughes Act. In its work on secondary and elementary school agriculture, the United States Department of Agriculture had previously accepted the prevailing conception of the home project, issuing several publications on this basis.[21]

Definition

"Project" was defined and described by these early writers in various ways. Branom stated that:

> The project is concerned with four closely related parts. Four factors are related to the development of the child through the project method: (a) the macrocosm, or general world of knowledge; (b) the personal world of the child; (c) the movement of the child from his own world further into the larger world; and, (d) the personal world of the child after he has met the new situation.[22]

Stevenson defined project as "a problematic act carried to completion in its natural setting." He elaborated the definition by noting that:

> (a) there is implied an act carried to completion as over against the passive absorption of information; (b) there is insistence upon the problematic situation demanding reasoning rather than merely the memorizing of information; (c) by emphasizing the problematic aspect the priority of the problem over the statement of principles is clearly implied; and (d) the natural setting of the problems as contrasted with an artificial setting is explicitly stated.[23]

In discussing the project in home economics, Charters defined it as "an act carried to completion in its natural setting and involving the solution of a relatively complex problem."[24] He describes the idea of

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21. Ibid. pp. 41-42.

22. Branom, op. cit., p. 18.

23. Stevenson, op. cit., pp. 43-44.

24. W. W. Charters, "The Project in Home Economics Teaching," Journal of Home Economics, X (March, 1918), 114.

"carrying to completion" as actually doing and the "natural setting" as "an attempt to return to the concrete conditions of home education from the abstract isolation of school."[25] He identified the following advantages of the project:

1. The natural setting provides a strong motive.

2. The natural setting and the multi-problems with its coherent subordinate problems make the intellect function in a fuller tide of activity.

3. The acquisition of skill in carrying out processes in actual practice.

Project Characteristics

Snedden, who worked with Stimpson in Massachusetts was characterized as a man not only interested in agricultural education but one with an interest in and with contributions to general educational theory. Snedden is credited with using the term "project" to describe a unit of educative work in which the most prominent feature was some form of positive and concrete achievement. He identified the following as primary characteristics of the project:

> (a) the undertaking always possessed a certain unity; (b) the learner himself clearly conceived the practical end or outcome to be attained, and it was always expected that this outcome was full of interest to him, leading him on, as to a definite goal to be won; (c) the standards of achievement were clearly objective--so much so that the learner and his fellows could, in large part, render valuable decisions as to the worth--in an amateur or in a commercial sense--of the product; and, (d) the undertaking was of such a nature that the learner, in achieving his desired ends, would necessarily have to apply much of his previous knowledge and experience--perhaps heretofore not consciously held as usable in this way (e.g. art, science, mathematics, special tool-skill)--and probably would have to acquire also some new knowledges and skills.[26]

McMurry[27] identified two kinds of projects:

1. One undertaken by a child at his own behest when he is pressed by a felt desire or need.

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25. Ibid. p. 116

26. Stevenson, op. cit., p. 67.

27. McMurry, op. cit., p. 1.

2. Projects of others which the child appropriates, into which he is easily drawn, and to which he gives his individual attention.

He maintained that the project has "the merit of self-directed organization of mental and physical resources to achieve a well considered result."[28] It suggests a return to life, to business, to applied science, to daily duties and common human needs, to forces operative in the concrete world, What elementary school children need, he said, is "not abstract scientific principles, not the systematic study of any or all the sciences (an impossible thing), but simple, objective, convincing demonstrations of the main ideas and uses of science in the home and neighborhood and in the larger world beyond."[29]

McMurry stated that:

> The project well worked out is simply a big object lesson in the process of learning--demonstration of the right method of collecting, organizing, and mastering knowledge. It might be called an explanation of the natural learning process. In executing a real project, a child almost loses sight of the fact that he is gaining knowledge. He is mainly absorbed in reaching results. As an active voluntary agent he has his eye fixed on the end to be reached. Struggling to achieve this purpose, he finds himself in the midst of a world of knowledge waiting to be put to use. The best way to acquire knowledge is to get after some important aim which compels us to learn what is necessary as a means of reaching this aim.[30]

Branom emphasized the importance of physical projects, arguing that they serve a purpose no other type of project can serve. He identified the following advantages:

> (a) The child has direct contact with concrete, objective materials which act as stimuli in increasing the child's consciousness of being and experiencing. (b) The use of the imagination is minimized, or at least is developed in relation to material realities. (c) The physical nature of the child is given opportunity for development. (d) A certain amount of muscular skill in the use of tools, and in the manipulation of material things is secured. (e) A firm foundation is laid for the development of the mental and aesthetic life. (f) The fundamental dependence of man upon material things and his necessary relations to material things is emphasized. (g) Since the physical projects are part of the world's work in dealing with materials, the child comes to see the dependence of group upon group. (h) The numerous relationships established through the material directly and indirectly prepare for individual and social efficiency.[31]

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28. Ibid., p. 2.

29. Ibid,. p. 8.

30. Ibid., p. 60.

31. Branom, op. cit., p. 173.

Present Project Situation

Appraisals of 4-H such as the following are often repeated:

> . . . we find the club program when considered from the standpoint of educational methodology has a number of weaknesses. The lack of separation between the different age groups as well as the lack of grading in the project work is a violation of pedagogical principles as well as of the principles of adolsecent psychology. Furthermore, the home project as a rule is not utilized to the limits of its full potentialities. The tendency is to let the home project be primarily a matter of acquiring certain skills with relatively little attention being paid to the underlying principles. In other words,there is little systematic instruction, except for a relatively small percentage, in the great body of knowledge related to the project and demonstration endeavor, and with which there should be some acquaintance if we are to have the best country life.
>
> The question of literature used in club work is closely related to the matter of instruction methodology. On the whole . . . club literature is very well adopted to the purposes for which it is designed. . . . However, it could at points be improved by better grading, and by an increased utilization of this problem method of developing the thought presented. In other words, in preparing this literature the 4-H Club workers could to advantage make more use of the job analysis and needed related information type of presentation. . . . The weakest place in club literature, however, is the almost total lack of anything dealing with other than production questions for the boys; and the physical aspects of homemaking for the girls.[32]

The same author also states that "county agents have not as yet worked out any such definite progression of projects, though the older members are encouraged to pursue more advanced work in the different lines."[33]

The interesting thing is that these preceding quotations are taken from a bulletin published in 1930 which reports the results of a rural sociologist's study of 4-H conducted in Virginia.

In the recent Science in 4-H Study, Quisenberry and Seevers noted that "while most 4-H projects are based on science and on the results of research, these facts were not emphasized until recently. Thus 4-H projects tend to be largely 'how-to-do-it' rather than 'why'."[34] They also point out that young people join 4-H for many reasons--one of which is an interest in projects. The authors say "it is agreed that projects make 4-H an

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32. Garnett, op. cit., p. 51

33. Ibid., p. 11

34. Quisenberry and Seevers, op. cit., p. 70.

educational program rather than just another youth organization."[35] In identifying general recommendations from this study Quisenberry and Seevers identified the following ways the 4-H program should complement and supplement, rather than duplicate, formal science training received in school:

1. Provide a "field laboratory" in which members may apply theory learned in school. For example, principles of physics might be investigated as they relate to tractors, automobiles or other engines.

2. Acquaint members with subjects before they are studied in school. This might be learning principles of nutrition or plant reproduction which would prepare youth for school subjects on these topics and make their formal study more meaningful.

3. Provide comprehensive training in subjects which the members do not receive in school due to inadequate curricula or because they are not enrolled in the science courses. This is especially true in schools where science curricula do not include subjects such as entomology or human behavior.[36]

To improve the present 4-H program a combination of the following has been recommended:[37]

1. Use science as one tool for the enrichment of present projects. Not all projects are equally adaptable to such improvement.

2. Where there is a need and adequate resources, prepare new projects that are science oriented.

Pease states that "projects have been the core of the 4-H Club program. They provide real work experience, not make-believe or busy work."[38] However, he says that we need to develop a better graded project program in terms of the teaching content of instruction related to the project.[39] Other aspects and possibilities for the project are discussed in the same paper (i.e., the significance of projects to non-farm youth, providing more decision-making experience, etc.).

The California state 4-H Club staff identifies the approved project as the basis of state-wide 4-H Club programs. They enumerate the following as areas of consensus regarding project work:

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35. Ibid.

36. Ibid., p. 71

37. Ibid., p. 73

38. Wilbur F. Pease, "Youth Development in the 1960's: The 4-H Club Contribution" (Ithaca, N.Y.: The New York State Colleges of Agriculture and Home Economics at Cornell University, 1962, mimeographed), p. 16.

39. Ibid. p. 21

1. The primary purpose of 4-H Club work is to develop the boy and girl.

2. The project is unique as a learning experience and is required for membership in the 4-H Club program.

3. The project carried by the member is basic to 4-H Club work. It must be in a field of agriculture or home economics or an area related to them.

4. Those communities with established 4-H programs which are faced with the impact of a population shift into rural areas should be permitted to continue 4-H Club work as long as the people desire the program, will support it, and supply the leadership. The members must meet the project requirements of the program.

5. Eligibility for membership should be based upon ability to handle recognized projects.

6. The 4-H projects should be designed to provide a challenge to all 4-H members.[40]

Tyler's ideas of the potential in 4-H has direct bearing on the use of project work.[41] He says that 4-H can:

1. Provide meaningfulness to learning that otherwise may be unreal to students.

2. Tie together concrete observations and experiences of children with explanations of why these things happen.

3. Provide for producing objects and carrying on activities where accomplishments can be seen directly.

4. Provide for relating to adults in the community beyond his own parents and teachers that may be unlike any other relationship otherwise available.

5. Provide freer career exploration than is normally possible within the home and school.

6. Provide opportunity for greater orientation to the world beyond the immediate community.

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40. California State 4-H Club Staff, "Areas of Consensus on 4-H Club Work in California--1963" (mimeographed).

41. See Ralph W. Tyler, Selected Readings and References . . ., op. cit., pp. 12-16; and "Some Thoughts on Extension's Programs in the Years Ahead," in Report of National Conference on Science in 4-H Club Work, pp. 55-56.

7. Provide for emphasizing inquiry.

8. Provide opportunity for a wider range of voluntary choices than is possible in the school (more flexibility of learning activity).

Related Research

Christensen[42] studied the effects that selected factors in a student's supervised farming program might have upon the acquisition and retention of learning in vocational agriculture classwork (as measured by pre-test, post-test, and retention test). He selected swine as the enterprise for study. The study was conducted with a random selection of 40 of the 280 high school vocational agricultural departments in Wisconsin, involving the entire sophomore classes (449 boys) within these departments. The relationship of ownership and experience with swine upon the acquisition and retention of information covered in the course of study on swine was examined.

Acquisition

Christensen found that students with personal ownership of swine had higher total acquisition scores than those who may or may not have had swine on the home farm, but did not personally own any. Also those with the highest experience scale score had higher total acquisition scores than each succeeding lower experience group.

Students with a larger number of swine personally owned as part of their supervised farming program had higher total acquisition scores than those owning fewer or none. However, owning one was apparently of more benefit to higher acquisition than owning none.

Acquisition of knowledge in terms of (1) facts and figures, (2) science and technology, and (3) problem solving was examined. Acquisition was significantly related to extent of experience with swine in all three areas. Acquisition of facts and figures was significantly related to ownership and to the number owned (those with 10 or more had higher acquisition scores than those owning nine or less). Those owning 10 or more also had significantly higher problem-solving acquisition scores than those owning nine or less.

Retention

Those students who personally owned swine had higher total retention scores than those not owning swine. This held true for retention of facts and figures and science and technology, but not for problem solving.

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42. Virgil E. Christensen, "Factors Influencing Acquisition and Retention of Learning in Vocational Agriculture" (unpublished Ph.D. dissertation, University of Wisconsin, 1964).

Those with highest measured experience scale scores had highest total retention scores. This also held true in terms of retention of facts and figures and science and technology, but not for problem solving.

Those owning 10 or more had significantly higher total retention scores than those owning nine or less. There was also a relationship between the number owned and the retention of facts and figures and science and technology, but not problem solving.

This study dealt only with acquisition and retention of knowledge. Christensen recommends that additional studies should consider measuring other concerns such as leadership ability, mechanical and non-mechanical skills, and student interest in the subject.

Even though a number of questions can be raised as to the application of these findings to project work in 4-H, they do suggest that ownership and experience do have an influence on the acquisition and retention of testable knowledge. Whether this would hold true with other types of enterprises or under other circumstances is not answerable. It appears from the findings that ownership and experience may be so closely related to each other that the extent of influence of one or the other on acquisition and retention of knowledge may be difficult to measure conclusively. However, the results of this well planned and well executed study suggest that the opportunity to own or experience something under study and the opportunity to practice or apply knowledge influences both the acquisition and retention of knowledge.

These conclusions are in keeping with the conclusions arrived at by Tyler in a study of the retention of knowledge in terms of the use made of the information. He examined the propositions (1) that information gained in a course which was seldom needed thereafter would in general be forgotten more quickly, and (2) that, on the other hand, explanations which can be commonly applied to the everyday happenings of life and methods of thinking which are frequently used might be expected to be retained with much less loss. He found that in tests requiring generalizations from given facts, there was little or no loss in ability to explain everyday phenomena and in the ability to generalize from given facts. He concluded that high school students "may forget information which is little used thereafter, but it is quite possible that they retain those methods of thinking in a given field for which there is more frequent occasion for use."[43]

Limitations to "Learning by Doing"

With the learning by doing idea so widely accepted it may be appropriate to ask if all learning involves doing or if all doing results in learning. According to Rich,[44] if we consider doing as some activity of the organism, then all learning involves doing. However, this does not mean that all doing is learning. Rich identifies such activity as exercise and play and random,

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43. Ralph W. Tyler, "What High School Pupils Forget," Educational Research Bulletin, IX (November 19, 1930), pp. 490-92.

44. Rich, op. cit., pp. 339-40.

non-purposive movements as not necessarily resulting in learning. He also raises the question as to whether changes in behavior necessarily represent learning, suggesting that changes in behavior may result from the use of drugs or from fatigue. In such cases no learning may be involved.

If we accept this analysis, the question arises as to how we determine what activity is conducive to learning. Rich suggests the following criteria:

> First, activities should emanate from organized units of knowledge which, in themselves, demand further exploration. Activities divorced from organized units of knowledge as a reference point for the activities become less meaningful.
>
> Second, activities should be purposive and, therefore, goal-directed. There are some activities participated in for their own sake, but in order to maximize learning possibilities, activities not only should have intrinsic worth, but should exhibit the complementary component of instrumental purposefulness. This component would provide activities with goal-direction. The quality of purposefulness, itself, can be re-related to the original organized unit of knowledge and, thus, guide subsequent exploration.
>
> Third, activities must be meaningful or take on meaningful qualities. For this quality to be a characteristic of activity, the activity must be reflective. To be reflective, thinking would play a pervasive role in directing the activity. Thinking would arise from a consideration of selected problematic aspects of the organized unit of knowledge; the purposive nature of the process would emerge as thinking would begin to alter the selected problematic aspects of the organized unit of knowledge from an indeterminate to a more determinate and meaningful situation. The activity, then, with reflection as a qualitative characteristic, would clarify relations in the organized unit of knowledge and in the purpose of the activity.[45]

INTERPRETATION

The purpose of this paper has been to identify and discuss literature that relates to the place of the project in 4-H Club work, with emphasis on the learning potential inherent in the project per se. The assignment has been approached by extracting from and synthesizing literature (in the field of education) and the meager research findings that have a specific relationship to the project as a basis for learning. The essence of the literature deals primarily with the idea of learning by doing. The idea of learning by doing appears to have been the basis of the project as originally conceived.

"Learning by doing" in a planned or structured situation has been engrained into 20th Century educational philosophy, and it appears to be

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45. Ibid., p. 340-41

unquestionably accepted. Even though some writers have identified limitations to the idea and pointed out that it does not cover the gamut of all possible learning, it has been accepted and utilized as the basis for much recent effort directed toward providing educative experiences for youth and adults alike.

The idea of learning by doing appears to have evolved initially from revolts against classical education. This revolt was first voiced, in literature cited in this paper, by Thoreau in the mid-19th Century. This viewpoint appears to have influenced, at least to some extent, establishment of the Land-Grant College idea, with its subsequent research and extension adjuncts. Learning by doing has been the core for the functioning of the Cooperative Extension Service from its beginning. Seaman A. Knapp voiced it in this manner: "What a man hears, he may doubt; what he sees, he may also doubt; but what he does, he cannot doubt."[46] Knapp is credited with making learning by doing the guiding principle of his farm demonstration work.[47]

Principles of learning, as outlined in this paper, have been generalized from research related to learning. These findings point specifically to the idea of learning by doing. Conception of the idea is connected with what is known of how we think, as represented by the philosophy of Dewey and by statements of other educators such as the following by Glenn Frank, former president of the University of Wisconsin:

> We learn to do by doing, rather than by talking about doing.
> We learn to think by thinking, rather than by memorizing what someone else has taught.
> We learn to live by living, rather than by having someone tell us how to live.[48]

One big problem arises in appraising the exact place of the projects in 4-H. Since there are some ideas and evidence that all learning is not accomplished "by doing," it can be appropriately asked: What aspect or aspects of a young person's education should Extension assume as its appropriate role? Should Extension attempt the total educational effort or should it restrict itself to the area or areas for which it has been and is presently best equipped to handle? Is there a role in education for the school and other agencies--agencies that can more adequately handle teaching responsibilities that do not encompass the learning by doing idea?

As Tyler points out, there may be areas of responsibilities in the education of young people for all agencies--none can do the total or an

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46. R. K. Bliss (ed.), The Spirit and Philosophy of Extension Work (Washington, D. C.: Graduate School, U.S.D.A. and Epsilon Sigma Phi, 1952), p. 189.

47. Ibid., p. 24.

48. Ibid., p. 337.

adequate job.[49] In comparing the potentialities of Extension's contributions to the education of young people with that of other educative agencies, should the fact that, in large measure, Extension's work is accomplished through volunteer leaders have a bearing on what is appropriate for Extension to teach and how such teaching can best be accomplished? A thorough examination of present thinking and evidence might shed light on what responsibility for the education of young people Extension should appropriately and legitimately undertake.

Fleming has summarized research findings on how children learn in these terms:

1. They learn what they live.
2. They learn what they do.
3. They learn with others.
4. They learn as they are helped to clarify purposes.
5. They learn as they have rewards.
6. They learn as they have teachers who are guides.[50]

Implications

The burden of the argument of this paper is that the project is the primary basis for the uniqueness of 4-H in terms of what young people who are involved are taught. It could be argued that the content of projects and the relationship of content to the "real life" situation of the young people involved have been major factors in the success of 4-H over the years. It could further be argued that the potentialities inherent in the traditional scope of Extension's subject matter (identified by law and practice) which has become incorporated into its program for young people, in one form or another, offers a most significant possibility for Extension to have a marked influence on the education of young people. Even though such arguments relate specifically to the "content" of what is taught, they have implications for how the teaching occurs. For example, has there been a relationship between the content of project work and the fact that much of the teaching has been accomplished through volunteer leaders? Such notions have been explored in some detail in "A Conception of 4-H".[51]

The nature of the content (natural and domestic sciences and related areas) lends itself most effectively to the project idea. The fact that present project offerings, their organization and conduct, do not repre-

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49. Ralph W. Tyler, "Educational Objectives of American Democracy," The Nations Children: Development and Education, (ed.) Eli Ginzberg (New York: Columbia University Press, 1960), pp. 70-92.

50. Robert S. Fleming, "How Children Learn," presentation to Nutrition Education Conference, January 30, 1962, Federal Extension Service, 4-H 36, p. 3 (mimeographed).

51. G. L. Carter, Jr., "A Conception of 4-H," Journal of Cooperative Extension, I (Fall and Winter, 1963), 167-75 and 229-38.

sent the ideal should not be taken as evidence of lack of potentiality. As pointed out, as far back as 1930 research evidence indicated that projects being offered were failing (1) to utilize what was known of the developmental needs and interests of young people and (2) to maximize the potential of the science (why) inherent in the subject matter.

This possibility may be worthy of consideration: Evidence indicates that present projects do not approach the potential for what is now known about the subjects involved--especially in terms of science, management, career opportunities, etc. Evidence from research conducted at the State University of Iowa[52] reveals that young people are stimulated by the actual content of their subjects and that they can learn much about human behavior through a study of the natural sciences. If this is true, in determining the content of its program for young people should Extension give first priority to exploring the possibilities of strengthening projects in the areas of agriculture, home economics, and related areas before launching into remotely related fields? If Extension is to continue making a unique contribution to the development of young people, perhaps it can best be done by the use of subject matter for which Extension is uniquely qualified to handle through volunteer leaders. Incorporated in this suggestion is the idea that the less tangible aspects of 4-H work (leadership, citizenship, personal development, etc.) can effectively be built into a program with such a content base in a fashion that will permit non-professional lay leaders to comfortably and confidently function.

Such an approach is believed to represent an effective means of dealing with current thought in education regarding fulfilling individual potentialities.[53]

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52. Ralph H. Ojemann, et al., "The Effects of a 'Casual' Teacher-Training Program and Certain Curricular Changes on Grade School Children," Journal of Experimental Education, (December, 1955), 95-115.

53. The ideas of "conditions for self actualization" are discussed in Carter, "A Conception of 4-H," op. cit., pp. 233-37.