TEACHING BY PROJECTS

A BASIS FOR PURPOSEFUL STUDY

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STATEMENT OF NEEDS

We need to organize knowledge into complete wholes or projects, looking toward well-conceived, purposive ends.

We need to discriminate in teaching between bare facts and constructive projects, around which facts are gathered and centered.

We need to economize time and avoid waste by organizing instruction.

We need to avoid what is vague and merely abstract.

We need a better basis, in large instructional units, for planning lessons and for executing class-teaching.

We need to consider knowledge not as formal and static but as progressive and dynamic, *i.e.*, as contributing to the growth of ideas.

We need to start out in every new subject with full, keen, relishable knowledge and, on this basis, to provide for steady growth and organization into large units.

We need to practice the use of knowledge at every turn, first by directing attention to what is serviceable and, secondly, by using it in the realization of projects.

We need to put a far richer meaning into common, familiar topics which are types for later growth and expansion.

We need to simplify, organize, and enrich every important topic or project until it reaches the stage of a complete achievement.

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CHAPTER I

PROJECTS IN THE SCHOOL

PROJECTS are of two kinds:

First, the child's project undertaken at his own behest when he is pressed by a felt desire or need, *e.g.* the bird house, the rabbit trap, a homemade telephone. **Two classes of projects**

Secondly, the projects of others which the child appropriates, into which he is easily drawn, and to which he gives his undivided attention, as the invention of the cotton gin, the planning of a canal lock, or improving the harbor of San Francisco; or he is absorbed in Crusoe's projects of cave-making, boat-building, and taming of animals.

There is a wide range to the first kind of self-chosen projects that a child falls upon, from doll dresses, sleds, tree-houses, or camping trips, to the dramatizing of a tale and even the writing of a story or poem. There is a still wider scope and bigness to the projects of the second class that he appropriates from without, and both sorts happily open the way into important school studies. Even a child's games show how easily he passes beyond his own small projects to those of his elders, as in hunting, gardening, and house building. He participates freely in the projects of men exploring new regions, as Boone and Frémont; or Fulton building and exhibiting the first steamboat; or Captain

Eads constructing the jetties to open a deep passage at the mouth of the Mississippi. These projects which men and women, active in the world, are pushing to completion, are appropriate and engaging subjects for young people who are just opening their eyes to the big things in life, as, Livingstone opening up Central Africa, the Red Cross busy in relief work, Cornell founding a university for the people, New York City constructing its huge aqueduct from the Catskills for supplying its vast population with water. Industrial and scientific projects in mining, in agriculture, and in sanitation are the choice enterprises for children. Even big government projects in irrigation and canal construction engage the mind in genuine thought problems.

In the impulse to adjust themselves to the larger world, children find themselves involved in these important projects whether developed in the past or now opening up in life about them.

Value of projects

Educationally considered, we believe a child is at his best when planning and executing his own projects, or at least those which engage his full powers. Adult men and women also in active undertakings are at their best when working out effectively important business and other projects. Even society, in its larger organizations, is at its best when engaged energetically in developing and executing social projects. In all these cases the project has the merit of a self-directed organization of mental and physical resources to achieve a well-considered result. The larger projects of adult life and of social and industrial progress have the additional merit that they tax the serious thought powers of children. They are real problems resting upon a practical basis of life experience.

They also stimulate and require a sustained effort in thinking.

Whether the child is engaged in his self-chosen project or makes his own some bold and difficult undertaking of another, the motive and energy of thought are much the same. The project itself is a natural summons to ambition and effort, an impulsive forward movement in purposeful thinking, and yet objective, and oftentimes even dramatic and spectacular. These project-problems, expressing the strain of thought and effort to master the forces of environment, lead more directly into life conditions as they are than any other studies.

There is a close and necessary connection between the self-chosen projects of the child's small world and the large projects of the life beyond. The smaller problems are a prelude to the major ones soon to follow, to which they are so closely akin in motive and in spirit. Children should be induced to work out as many of these self-chosen projects as may be feasible in order that they may take on the problem-solving attitude with respect to the larger, more complex problems whose solution may be thought out.

It is a truism of our educational creed that sensory impressions based on object lessons and motor response form the primary basis of thought in dealing with the later materials of knowledge. The project conceived and executed by the child on the ground of his own experience is a still better basis for our educational efforts because it sets up in children self-determination and purposeful activity in a complete, natural, and well-rounded unit of effort. This kind and quality of constructive thought can be carried forward into later studies and into life as a fundamental method of exploring, organizing, and using knowledge.

The object of a good course of study is to allow the children to grow into and identify themselves with the enterprising projects which men, past and present, have found most essential to their welfare and progress. The child's own little projects are very essential beginnings in this fundamental process of appropriating and using knowledge and experience directed by himself toward useful ends. The best devices of instruction may be turned into this channel where children are led to the self-appropriation of those larger projects in which wiser heads, active in the world, set their chief store.

Growth from individual to social projects

While the larger projects of the world just outside of the school have a powerful attraction for children, it is of equal importance to repeat and emphasize the approach to these projects out of the child's experience so that the projects of his own making grow into the larger schemes of life. Contact with life at both ends is essential, first in a rich child environment, and secondly in a richer, better-organized social environment beyond the school walls. The world's experience and wisdom are gathered up and organized into these successful projects. They express the growing stages, the actual evolution of the main life processes in a practical world.

In plying his trade among school children the teacher must be a full master of both kinds of experience, the individual and the social, constantly playing back and forth between the two, establishing thus that steady continuity of growth into a larger experience which makes education all of one piece.

On this basis it is necessary for the teacher to study the big world and its dominating projects quite as closely as the child, his tendencies, and activities. This cannot be

called an easy program for the teacher. But it is at least an opportunity to sound the depths of our real problem of education and to turn our effort into the main current of progress in the teaching art.

The term *project* belongs in one sense to the language of business, — or of plans and schemes in active life. It is an echo from a noisy world, an intrusion upon the quiet of the school, like a sharp train whistle or a noisy street wagon. But our drowsy school work may need this influx of noise and disturbance from without. At any rate the school is being brought into sharp contact with real life. In the school program itself, the children are learning to understand and adjust themselves to life surroundings and to take in the full meaning of the schemes and forces that are shaping society outside of the school.

Projects reflect real life

In taking over these life projects and adopting them into a plan of instruction as units of thought and effort, we find in them two striking qualities that fit the needs of teaching. First, they are objective and practical, not theoretical and vague. Big projects like the power plant at Muscle Shoals, the Panama Canal, or the jetty improvements at the mouth of the Mississippi stand out as commanding objects of attention. They are worth an examination. Secondly, such a real undertaking establishes a center of purposeful effort which develops rapidly into a fruitful, progressive subject of study. Around this definite, tangible center the materials of knowledge begin to collect and organize and thought has plenty of stuff to work upon.

The term *project* as we are using it has a wide scope and is applicable to a variety of undertakings in several important studies. It may be worth while to particularize

in some detail the wide range of capital projects which the school may now find profitable as standard units of mental effort.

First: There are simple, objective projects of the hand-work type. We are familiar with them in the larger and smaller constructions of the shops, for example, in textile fabrics, in wood work, in book binding and printing, in pottery, and in many related home undertakings such as repairs, reconstructions, and sanitary appliances. To the same group belong plans for school and home gardening, agriculture and fruit growing, chicken raising, dairying, and other specialties. The household arts supply another group of definite projects in laundering, sewing, cooking, and millinery, in house decoration and furnishing. In some schools there is a tendency to extend school credits to these home enterprises and accomplishments. These shop-and-farm and household projects have both a marked educational value, and a clear, practical utility. They require a distinct forethought in planning and designing, resourcefulness in meeting new and untried situations, persistent purpose and industry in executing plans, and, finally, a proper use of the results or products. Not many school exercises of the old stripe combine in one strong series of efforts all these merits and advantages.

Shop and home projects

Secondly: The study of geography supplies a profusion of big, tangible projects of conspicuous importance in human affairs, as projects in bridge construction, in railroad engineering and mountain tunneling, in expensive mining operations, in the survey and building of canals, in dealing with extensive forest reserves, in planning city waterworks and reservoirs, in irrigation schemes on a large scale, in installing great water powers

Industrial and commercial projects

at dams and falls in rivers, in laying ocean cables, in building subways, in improving harbors, in regulating rivers by levees and jetties, in the drainage of swamp areas, in great corporations for the conduct of business on a vast scale, as steamship companies and railroad systems. We are now discovering that these large municipal, governmental, and industrial projects are in themselves complete and well-organized units of study, the best sort of standard topics for schoolroom instruction. The school can well turn its attention to these enterprises because they are so largely shaping life about us; they are dominant in their influence upon the occupations, the homes and surroundings of thousands and millions of our people. They are the things that children desire to know and understand. Experiments in the full school-treatment of these topics have also demonstrated that they have a peculiar suitability to the thinking power and interest of children.

In another and quite different way nature herself works out on a large scale projects which we study in geography, as the sculpturing of a river valley, the work of a mountain glacier, the course and influence of an ocean current, the regular circulation of winds and moisture upon the earth, the course and movements of a cyclonic storm. These may be called natural units of study, displaying nature's big patterns or designs, by which she works out her projects in making the earth a fit dwelling place for man.

Thirdly: A third group of projects has a more distinctly scientific origin. Inventions and discoveries based upon scientific principles are embodied in steam engines, wireless stations, power plants, great telescopes, electric motors, mining and smelting processes, lightning rods, hydrostatic presses, steam dredges,

Projects in applied science

and water filters. Scientific processes also are applied to the ventilation of buildings, to hospital and surgery practice, to the propagation of plants, the extraction and preservation of foods, to the fertilizing of soils, to the bacterial treatment of diseases, to quarantine and sanitation. Applied science is full of big, comprehensive projects for turning scientific knowledge into use in commerce, in war, in aviation, in agriculture, in animal husbandry, in navigation, in the extraction and use of metals, in electrical appliances, and in medicine.

It is in these very projects, objective and directly practical in their bearings, that children are best able to see the meaning and value of modern science in its influence upon life. What children in elementary schools need 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. What could be better for children than to allow them to see these tangible projects developing and working out their proper, practical influence upon the conditions of life that surround them? These are preëminently needful and instructive topics that should be given the right of way in the elementary curriculum.

Projects in biography and history

Fourthly: Many of the stories and undertakings described in biography and history are large personal or national projects in the full meaning of the term. For example, Columbus' first voyage, the Panama Canal, Alexander's first campaign into Asia, St. Paul's missionary journeys, Grant's movement against Vicksburg, the Lewis and Clark expedition up the Missouri and across the mountains, the voyage of the *Mayflower*,

Livingstone's explorations in Africa. In a large interpretation, history consists of an account of men's important projects in the building of cities, in the founding of states, in legislative programs, in reform movements, in founding institutions and societies, in warlike conquest, in territorial expansions, in the development of traffic routes and commercial policies. Especially in the story of leading historical characters do we find the personal impulse strong to execute some scheme or propagandist idea, some notion of progress, as illustrated in Hamilton's plan for funding the national debt, Field's project for laying the first Atlantic cable, Stanley's search for Livingstone, Howard's scheme of prison reform, Franklin's proposed Albany plan for the union of the colonies, Jefferson's purchase of Louisiana. The enthusiastic personal element that plays through these individual yet social projects lends an unusual strength to such topics. The man's life and energy are absorbed into and identified with the undertaking. He becomes a powerful and living exponent of a national or world idea. For instructional purposes such projects, thus reënforced by personal, objective demonstration, are of surprising value. We can afford to work out such projects descriptively and more or less exhaustively till we find a full background for the main idea, the completed purpose.

Fifthly: The masterpieces of literature are the outcome of thought projects conceived and elaborated in the minds of authors, for example, Plato's *Republic*, St. John's *Gospel*, De Foe's *Robinson Crusoe*, Shakespeare's *Macbeth*, Longfellow's *Building of the Ship*, Fiske's *Critical Period of American History*, Plutarch's *Lives*. A drama or novel or poem is the energy of the author's thought working itself out and

Masterpieces in literature considered as projects

projecting itself into a great thought-movement. It is active and stimulating, and yet is caught and held somehow in a permanent artistic form. A masterpiece is a tangible literary project, a rational undertaking looking toward a well-planned achievement. Literary products are the greatest projects of the human mind and as such they are the best examples of great thought units, of knowledge rightly organized and artistically grouped. As perfected, energized thought-movements, complete units of effort, they demand thoughtful, elaborate, progressive study. The outcome of such study is a full appreciation of their constructive, dynamic quality and their final unity.

By a survey and comparison of these various interpretations of the term *project* as seen in the several studies, we may conclude that it is a practical, untechnical word with which to designate a variety of big, vital topics. It lays stress upon the actual and objective in present and past experiences. It deals with an energetic, growing idea, concretely embodied, that expands into a strong, even, national influence. Projects force attention upon the main objects of study, the chief enterprises that make up the warp and woof of real life in our times.

A return to life and reality

At the present moment we need to be jolted out of our conventional, formal school phrases and to find terms better adapted to the educational needs and forces of the hour. The term *project* is a newcomer among educational phrases. It seems to suggest not the school but the shop, not the textbook but the busy mart, the industrial life, the unhallowed things of the schemer and the promoter. Perhaps this is its merit, that it forces attention upon things that have come to importance in life, things which need to break over the threshold into the

school. The project idea suits our present needs because it tosses aside our conventional abstractions and sets up a larger practical unit of knowledge as the basis of study. We have been dealing with things of minor import till we have lost sight of the centers of thought, the big object lessons. We have devoted ourselves to facts, mere facts, isolated facts, — yes, detached and meaningless facts. The children have been surfeited with facts. But it is time to stop making collections of blank cartridges and begin to gather only those things that have explosive material in them. Again, we have played with school phrases and generalities and summaries till they cease to express thought. It is time to cast out this mummery and to deal with live thoughts embodied in real projects.

The term *project* suggests a return to life, to business, to applied science, to daily duties and common human needs, to forces operative in the concrete world. The school is absorbing into itself as fast as it can the big things of life, the schemes that men and women are chiefly concerned about, and these are becoming our school topics. The project accentuates this demand for the practical and demonstrable. By a proper extension of the term it includes several groups of big, constructive units of study in history and geography and science, and culminates in the masterpieces of literature and works of art, as poems, buildings, sculptures, and paintings, because these at their best are great designs worked out by artists to express the mind's boldest flights into the world of experience, the supreme purposes and projects that men have conceived.

The project, as such, is an apt device for teaching, because it touches off any important enterprise at its most interesting crisis, namely, at that juncture where it is in

the initial process of being brought into shape in the mind. Pedagogically, we might call this "the nick of time" in thinking out any enterprise. At this point it shows itself in its freshness and newness, its expectation, its purpose. Its growth from this initial stage should be natural and progressive. Let the project develop in its own way, revealing its ugly form or its pleasant aspect as it will. The succession of problems will follow in due order. The important project is always a problem and a mother of problems. The demand of the hour is to have a chance to think, to knit the brow in thought problems, to struggle with a difficult and critical situation till a solution of the problem is discovered. Live projects, wisely selected, not only set up serious problems, but they draw in their wake the knowledge materials required for the understanding and solution of the problems involved. Big projects are deeply rooted in the strong knowledge elements of the important studies. A deeper and richer scholarship inevitably clusters and organizes itself around the main projects. This is so because our modern social and industrial problems have sprung directly out of a full field of scientific, historical, and economic knowledge. These deep, abundant sources of knowledge are our necessary tools in working out our projects. Extensive and up-to-date knowledge is requisite to work out and understand these practical projects. One proof of this need for depth and richness of knowledge in discussing these projects is the fact that even trained experts in the various special lines are required in all these big, practical enterprises.

The project, a scheme in the making

We have been discussing the word *project* as denoting something objective and concrete. But back of this, its real meaning lies in an idea, in something thought out and

clearly conceived, first as a mental product, later to be worked over and transformed into a concrete reality. The synonyms of the word *project* are *scheme, plan, design.* In this sense the project is first of all a clear, clean-cut, intellectual grasp of a whole complex situation. It corresponds to the well-worked-out design of the architect which expresses the plan of a great building. The project is a strongly, wisely organized body of thought focused upon an important center of practical knowledge with a definite purpose. It is the intellectual formulation and mastery of a problematic situation as a preparation for its practical execution. It leads on through a series of wisely controlled actions. In the idea of the project lies also the impulse to realize it, to carry out the purpose clearly conceived, for example, the sinking of a shaft for the purpose of exploiting a coal bed. This demand for clear thinking as a basis for later action, leading on naturally to a complete accomplishment, makes the project an ideal basis for teaching and for lesson planning. The project sets up something clear and complete in thought but lacking in fulfillment. It sets up the demand for full realization, and this is a dynamic quality which energizes effort in the right direction.

The project, a mental concept to be realized

Standing out prominently, almost objectively, as a clearly thought plan to be converted into reality, the project contains the most important elements of a standard unit of mental effort. First, it is an important whole. Secondly, it is dynamic in its essential forward movement. Thirdly, it organizes and uses knowledge on the basis of a definite purpose. Fourthly, it sets up a series of problems requiring continuous, rational effort. Fifthly, it works out a practical result which is embodied

Standard elements in a project

in a concrete object or situation in real life. Sixthly, as an end result of the whole movement, from original conception to final objective realization, it leaves in the mind a knowledge product which serves to introduce and explain other kindred projects. It has a future as well as a past and connects up between the two. Thus it contributes to the continuous organization of knowledge.

Important projects, therefore, carefully selected in the various studies, are the practical units of thought, the organizing centers, where knowledge is collected and incorporated into those powerful agencies which carry on the world's business. Thinking out and understanding these projects puts the student into the stream of action, into the current of life. We demand that education be a preparation for life, but it can be this only by identifying itself with the main enterprises going on in life, that is, with enterprises which have developed under life conditions. Many of these enterprises are now active agencies, organizing and directing the social and industrial forces of the world. Others have grown up in the past and have created institutions which are still powerful as life centers. Still others are mainly historical, but carry important lessons to us from past experience. The building and equipment of a monastery in medieval times was in those days a vital, living project. Hannibal's march across the Alps to attack Rome was a well-matured project. Hercules' scheme for cleansing the Augean stables was a true project in the modern sense. Joseph's far-sighted scheme for dealing with the wheat crop of Egypt during the seven full years was a great project.

School projects express and interpret life

But it is the projects of modern life and society that most concern us. In the short period of school life children