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Thinking in Education

1. The Essentials of Method

No one doubts, theoretically, the importance of fostering in school good habits of thinking. But apart from the fact that the acknowledgment is not so great in practice as in theory, there is not adequate theoretical recognition that all which the school can or need do for pupils, so far as their minds are concerned (that is, leaving out certain specialized muscular abilities), is to develop their ability to think. The parceling out of instruction among various ends such as acquisition of skill (in reading, spelling, writing, drawing, reciting); acquiring information (in history and geography), and training of thinking is a measure of the ineffective way in which we accomplish all three. Thinking which is not connected with increase of efficiency in action, and with learning more about ourselves and the world in which we live, has something the matter with it just as thought (See ante, p. 147). And skill obtained apart from thinking is not connected with any sense of the purposes for which it is to be used. It consequently leaves a man at the mercy of his routine habits and of the authoritative control of others, who know what they are about and who are not especially scrupulous as to their means of achievement. And information severed from thoughtful action is dead, a mind-crushing load. Since it simulates knowledge and thereby develops the poison of conceit, it is a most powerful obstacle to further growth in the grace of intelligence. The sole direct path to enduring improvement in the methods of instruction and learning consists in centering upon the conditions which exact, promote, and test thinking. Thinking is the method of intelligent learning, of learning that employs and rewards mind. We speak, legitimately enough, about the method of thinking, but the important thing to bear in mind about method is that thinking is method, the method of intelligent experience in the course which it takes.

I. The initial stage of that developing experience which is called thinking is experience. This remark may sound like a silly truism. It ought to be one; but unfortunately it is not. On the contrary, thinking is often regarded both in philosophic theory and in educational practice as something cut off from experience, and capable of being cultivated in isolation. In fact, the inherent limitations of experience are often urged as the sufficient ground for attention to thinking. Experience is then thought to be confined to the senses and appetites; to a mere material world, while thinking proceeds from a higher faculty (of reason), and is occupied with spiritual or at least literary things. So, oftentimes, a sharp distinction is made between pure mathematics as a peculiarly fit subject matter of thought (since it has nothing to do with physical existences) and applied mathematics, which has utilitarian but not mental value.

Speaking generally, the fundamental fallacy in methods of instruction lies in supposing that experience on the part of pupils may be assumed. What is here insisted upon is the necessity of an actual empirical situation as the initiating phase of thought. Experience is here taken as previously defined: trying to do something and having the thing perceptibly do something to one in return. The fallacy consists in supposing that we can begin with ready-made subject matter of arithmetic, or geography, or whatever, irrespective of some direct personal experience of a situation. Even the kindergarten and Montessori techniques are so anxious to get at intellectual distinctions, without "waste of time," that they tend to ignore - or reduce - the immediate crude handling of the familiar material of experience, and to introduce pupils at once to material which expresses the intellectual distinctions which adults have made. But the first stage of contact with any new material, at whatever age of maturity, must inevitably be of the trial and error sort. An individual must actually try, in play or work, to do something with material in carrying out his own impulsive activity, and then note the interaction of his energy and that of the material employed. This is what happens when a child at first begins to build with blocks, and it is equally what happens when a scientific man in his laboratory begins to experiment with unfamiliar objects.

Hence the first approach to any subject in school, if thought is to be aroused and not words acquired, should be as unscholastic as possible. To realize what an experience, or empirical situation, means, we have to call to mind the sort of situation that presents itself outside of school; the sort of occupations that interest and engage activity in ordinary life. And careful inspection of methods which are permanently successful in formal education, whether in arithmetic or learning to read, or studying geography, or learning physics or a foreign language, will reveal that they depend for their efficiency upon the fact that they go back to the type of the situation which causes reflection out of school in ordinary life. They give the pupils something to do, not something to learn; and the doing is of such a nature as to demand thinking, or the intentional noting of connections; learning naturally results.

That the situation should be of such a nature as to arouse thinking means of course that it should suggest something to do which is not either routine or capricious - something, in other words, presenting what is new (and hence uncertain or problematic) and yet sufficiently connected with existing habits to call out an effective response. An effective response means one which accomplishes a perceptible result, in distinction from a purely haphazard activity, where the consequences cannot be mentally connected with what is done. The most significant question which can be asked, accordingly, about any situation or experience proposed to induce learning is what quality of problem it involves.

At first thought, it might seem as if usual school methods measured well up to the standard here set. The giving of problems, the putting of questions, the assigning of tasks, the magnifying of difficulties, is a large part of school work. But it is indispensable to discriminate between genuine and simulated or mock problems. The following questions may aid in making such discrimination. (a) Is there anything but a problem? Does the question naturally suggest itself within some situation or personal experience? Or is it an aloof thing, a problem only for the purposes of conveying instruction in some school topic?

Is it the sort of trying that would arouse observation and engage experimentation outside of school? (b) Is it the pupil's own problem, or is it the teacher's or textbook's problem, made a problem for the pupil only because he cannot get the required mark or be promoted or win the teacher's approval, unless he deals with it? Obviously, these two questions overlap. They are two ways of getting at the same point: Is the experience a personal thing of such a nature as inherently to stimulate and direct observation of the connections involved, and to lead to inference and its testing? Or is it imposed from without, and is the pupil's problem simply to meet the external requirement? Such questions may give us pause in deciding upon the extent to which current practices are adapted to develop reflective habits. The physical equipment and arrangements of the average schoolroom are hostile to the existence of real situations of experience. What is there similar to the conditions of everyday life which will generate difficulties? Almost everything testifies to the great premium put upon listening, reading, and the reproduction of what is told and read. It is hardly possible to overstate the contrast between such conditions and the situations of active contact with things and persons in the home, on the playground, in fulfilling of ordinary responsibilities of life. Much of it is not even comparable with the questions which may arise in the mind of a boy or girl in conversing with others or in reading books outside of the school. No one has ever explained why children are so full of questions outside of the school (so that they pester grown-up persons if they get any encouragement), and the conspicuous absence of display of curiosity about the subject matter of school lessons. Reflection on this striking contrast will throw light upon the question of how far customary school conditions supply a context of experience in which problems naturally suggest themselves. No amount of improvement in the personal technique of the instructor will wholly remedy this state of things. There must be more actual material, more stuff, more appliances, and more opportunities for doing things, before the gap can be overcome. And where children are engaged in doing things and in discussing what arises in the course of their doing, it is found, even with comparatively indifferent modes of instruction, that children's inquiries are spontaneous and numerous, and the proposals of solution advanced, varied, and ingenious.

As a consequence of the absence of the materials and occupations which generate real problems, the pupil's problems are not his; or, rather, they are his only as a pupil, not as a human being. Hence the lamentable waste in carrying over such expertness as is achieved in dealing with them to the affairs of life beyond the schoolroom. A pupil has a problem, but it is the problem of meeting the peculiar requirements set by the teacher. His problem becomes that of finding out what the teacher wants, what will satisfy the teacher in recitation and examination and outward deportment. Relationship to subject matter is no longer direct. The occasions and material of thought are not found in the arithmetic or the history or geography itself, but in skillfully adapting that material to the teacher's requirements. The pupil studies, but unconsciously to himself the objects of his study are the conventions and standards of the school system and school authority, not the nominal "studies." The thinking thus evoked is artificially one-sided at the best. At its worst, the problem of the pupil is not how to meet the requirements of school life, but how to seem to meet them - or, how to come near enough to meeting them to slide along without an undue amount of friction. The type of judgment formed by these devices is not a desirable addition

to character. If these statements give too highly colored a picture of usual school methods, the exaggeration may at least serve to illustrate the point: the need of active pursuits, involving the use of material to accomplish purposes, if there are to be situations which normally generate problems occasioning thoughtful inquiry.

II. There must be data at command to supply the considerations required in dealing with the specific difficulty which has presented itself. Teachers following a "developing" method sometimes tell children to think things out for themselves as if they could spin them out of their own heads. The material of thinking is not thoughts, but actions, facts, events, and the relations of things. In other words, to think effectively one must have had, or now have, experiences which will furnish him resources for coping with the difficulty at hand. A difficulty is an indispensable stimulus to thinking, but not all difficulties call out thinking. Sometimes they overwhelm and submerge and discourage. The perplexing situation must be sufficiently like situations which have already been dealt with so that pupils will have some control of the meanings of handling it. A large part of the art of instruction lies in making the difficulty of new problems large enough to challenge thought, and small enough so that, in addition to the confusion naturally attending the novel elements, there shall be luminous familiar spots from which helpful suggestions may spring.

In one sense, it is a matter of indifference by what psychological means the subject matter for reflection is provided. Memory, observation, reading, communication, are all avenues for supplying data. The relative proportion to be obtained from each is a matter of the specific features of the particular problem in hand. It is foolish to insist upon observation of objects presented to the senses if the student is so familiar with the objects that he could just as well recall the facts independently. It is possible to induce undue and crippling dependence upon sense-presentations. No one can carry around with him a museum of all the things whose properties will assist the conduct of thought. A well-trained mind is one that has a maximum of resources behind it, so to speak, and that is accustomed to go over its past experiences to see what they yield. On the other hand, a quality or relation of even a familiar object may previously have been passed over, and be just the fact that is helpful in dealing with the question. In this case direct observation is called for. The same principle applies to the use to be made of observation on one hand and of reading and "telling" on the other. Direct observation is naturally more vivid and vital. But it has its limitations; and in any case it is a necessary part of education that one should acquire the ability to supplement the narrowness of his immediately personal experiences by utilizing the experiences of others. Excessive reliance upon others for data (whether got from reading or listening) is to be depreciated. Most objectionable of all is the probability that others, the book or the teacher, will supply solutions ready-made, instead of giving material that the student has to adapt and apply to the question in hand for himself.

There is no inconsistency in saying that in schools there is usually both too much and too little information supplied by others. The accumulation and acquisition of information for purposes of reproduction in recitation and examination is made too much of. "Knowledge," in the sense of information, means the working capital, the indispensable resources, of

further inquiry; of finding out, or learning, more things. Frequently it is treated as an end itself, and then the goal becomes to heap it up and display it when called for. This static, cold-storage ideal of knowledge is inimical to educative development. It not only lets occasions for thinking go unused, but it swamps thinking. No one could construct a house on ground cluttered with miscellaneous junk. Pupils who have stored their "minds" with all kinds of material which they have never put to intellectual uses are sure to be hampered when they try to think. They have no practice in selecting what is appropriate, and no criterion to go by; everything is on the same dead static level. On the other hand, it is quite open to question whether, if information actually functioned in experience through use in application to the student's own purposes, there would not be need of more varied resources in books, pictures, and talks than are usually at command.

III. The correlate in thinking of facts, data, knowledge already acquired, is suggestions, inferences, conjectured meanings, suppositions, tentative explanations: - ideas, in short. Careful observation and recollection determine what is given, what is already there, and hence assured. They cannot furnish what is lacking. They define, clarify, and locate the question; they cannot supply its answer. Projection, invention, ingenuity, devising come in for that purpose. The data arouse suggestions, and only by reference to the specific data can we pass upon the appropriateness of the suggestions. But the suggestions run beyond what is, as yet, actually given in experience. They forecast possible results, things to do, not facts (things already done). Inference is always an invasion of the unknown, a leap from the known.

In this sense, a thought (what a thing suggests but is not as it is presented) is creative, - an incursion into the novel. It involves some inventiveness. What is suggested must, indeed, be familiar in some context; the novelty, the inventive devising, clings to the new light in which it is seen, the different use to which it is put. When Newton thought of his theory of gravitation, the creative aspect of his thought was not found in its materials. They were familiar; many of them commonplaces - sun, moon, planets, weight, distance, mass, square of numbers. These were not original ideas; they were established facts. His originality lay in the use to which these familiar acquaintances were put by introduction into an unfamiliar context. The same is true of every striking scientific discovery, every great invention, every admirable artistic production. Only silly folk identify creative originality with the extraordinary and fanciful; others recognize that its measure lies in putting everyday things to uses which had not occurred to others. The operation is novel, not the materials out of which it is constructed.

The educational conclusion which follows is that all thinking is original in a projection of considerations which have not been previously apprehended. The child of three who discovers what can be done with blocks, or of six who finds out what he can make by putting five cents and five cents together, is really a discoverer, even though everybody else in the world knows it. There is a genuine increment of experience; not another item mechanically added on, but enrichment by a new quality. The charm which the spontaneity of little children has for sympathetic observers is due to perception of this intellectual originality.

The joy which children themselves experience is the joy of intellectual constructiveness - of creativeness, if the word may be used without misunderstanding. The educational moral I am chiefly concerned to draw is not, however, that teachers would find their own work less of a grind and strain if school conditions favored learning in the sense of discovery and not in that of storing away what others pour into them; nor that it would be possible to give even children and youth the delights of personal intellectual productiveness - true and important as are these things. It is that no thought, no idea, can possibly be conveyed as an idea from one person to another. When it is told, it is, to the one to whom it is told, another given fact, not an idea. The communication may stimulate the other person to realize the question for himself and to think out a like idea, or it may smother his intellectual interest and suppress his dawning effort at thought. But what he directly gets cannot be an idea. Only by wrestling with the conditions of the problem at first hand, seeking and finding his own way out, does he think. When the parent or teacher has provided the conditions which stimulate thinking and has taken a sympathetic attitude toward the activities of the learner by entering into a common or conjoint experience, all has been done which a second party can do to instigate learning. The rest lies with the one directly concerned. If he cannot devise his own solution (not of course in isolation, but in correspondence with the teacher and other pupils) and find his own way out he will not learn, not even if he can recite some correct answer with one hundred per cent accuracy. We can and do supply ready-made "ideas" by the thousand; we do not usually take much pains to see that the one learning engages in significant situations where his own activities generate, support, and clinch ideas - that is, perceived meanings or connections. This does not mean that the teacher is to stand off and look on; the alternative to furnishing ready-made subject matter and listening to the accuracy with which it is reproduced is not quiescence, but participation, sharing, in an activity. In such shared activity, the teacher is a learner, and the learner is, without knowing it, a teacher - and upon the whole, the less consciousness there is, on either side, of either giving or receiving instruction, the better. IV. Ideas, as we have seen, whether they be humble guesses or dignified theories, are anticipations of possible solutions. They are anticipations of some continuity or connection of an activity and a consequence which has not as yet shown itself. They are therefore tested by the operation of acting upon them. They are to guide and organize further observations, recollections, and experiments. They are intermediate in learning, not final. All educational reformers, as we have had occasion to remark, are given to attacking the passivity of traditional education. They have opposed pouring in from without, and absorbing like a sponge; they have attacked drilling in material as into hard and resisting rock. But it is not easy to secure conditions which will make the getting of an idea identical with having an experience which widens and makes more precise our contact with the environment. Activity, even self-activity, is too easily thought of as something merely mental, cooped up within the head, or finding expression only through the vocal organs.

While the need of application of ideas gained in study is acknowledged by all the more successful methods of instruction, the exercises in application are sometimes treated as devices for fixing what has already been learned and for getting greater practical skill in its manipulation. These results are genuine and not to be despised. But practice in applying

what has been gained in study ought primarily to have an intellectual quality. As we have already seen, thoughts just as thoughts are incomplete. At best they are tentative; they are suggestions, indications. They are standpoints and methods for dealing with situations of experience. Till they are applied in these situations they lack full point and reality. Only application tests them, and only testing confers full meaning and a sense of their reality. Short of use made of them, they tend to segregate into a peculiar world of their own. It may be seriously questioned whether the philosophies (to which reference has been made in section 2 of chapter X) which isolate mind and set it over against the world did not have their origin in the fact that the reflective or theoretical class of men elaborated a large stock of ideas which social conditions did not allow them to act upon and test. Consequently men were thrown back into their own thoughts as ends in themselves.

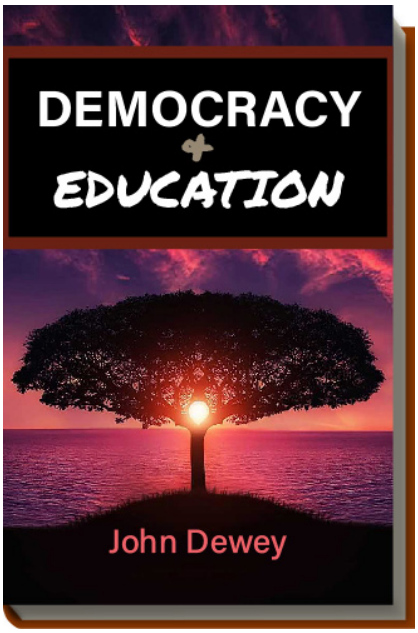
However this may be, there can be no doubt that a peculiar artificiality attaches to much of what is learned in schools. It can hardly be said that many students consciously think of the subject matter as unreal; but it assuredly does not possess for them the kind of reality which the subject matter of their vital experiences possesses. They learn not to expect that sort of reality of it; they become habituated to treating it as having reality for the purposes of recitations, lessons, and examinations. That it should remain inert for the experiences of daily life is more or less a matter of course. The bad effects are twofold. Ordinary experience does not receive the enrichment which it should; it is not fertilized by school learning. And the attitudes which spring from getting used to and accepting half-understood and ill-digested material weaken vigor and efficiency of thought.

If we have dwelt especially on the negative side, it is for the sake of suggesting positive measures adapted to the effectual development of thought. Where schools are equipped with laboratories, shops, and gardens, where dramatizations, plays, and games are freely used, opportunities exist for reproducing situations of life, and for acquiring and applying information and ideas in the carrying forward of progressive experiences. Ideas are not segregated, they do not form an isolated island. They animate and enrich the ordinary course of life. Information is vitalized by its function; by the place it occupies in direction of action. The phrase "opportunities exist" is used purposely. They may not be taken advantage of; it is possible to employ manual and constructive activities in a physical way, as means of getting just bodily skill; or they may be used almost exclusively for "utilitarian," i.e., pecuniary, ends. But the disposition on the part of upholders of "cultural" education to assume that such activities are merely physical or professional in quality, is itself a product of the philosophies which isolate mind from direction of the course of experience and hence from action upon and with things. When the "mental" is regarded as a self-contained separate realm, a counterpart fate befalls bodily activity and movements. They are regarded as at the best mere external annexes to mind. They may be necessary for the satisfaction of bodily needs and the attainment of external decency and comfort, but they do not occupy a necessary place in mind nor enact an indispensable role in the completion of thought. Hence they have no place in a liberal education - i.e., one which is concerned with the interests of intelligence. If they come in at all, it is as a concession to the material needs of the masses. That they should be allowed to invade the education of the elite is unspeakable. This

conclusion follows irresistibly from the isolated conception of mind, but by the same logic it disappears when we perceive what mind really is - namely, the purposive and directive factor in the development of experience. While it is desirable that all educational institutions should be equipped so as to give students an opportunity for acquiring and testing ideas and information in active pursuits typifying important social situations, it will, doubtless, be a long time before all of them are thus furnished. But this state of affairs does not afford instructors an excuse for folding their hands and persisting in methods which segregate school knowledge. Every recitation in every subject gives an opportunity for establishing cross connections between the subject matter of the lesson and the wider and more direct experiences of everyday life. Classroom instruction falls into three kinds. The least desirable treats each lesson as an independent whole. It does not put upon the student the responsibility of finding points of contact between it and other lessons in the same subject, or other subjects of study. Wiser teachers see to it that the student is systematically led to utilize his earlier lessons to help understand the present one, and also to use the present to throw additional light upon what has already been acquired. Results are better, but school subject matter is still isolated. Save by accident, out-of-school experience is left in its crude and comparatively irreflective state. It is not subject to the refining and expanding influences of the more accurate and comprehensive material of direct instruction. The latter is not motivated and impregnated with a sense of reality by being intermingled with the realities of everyday life. The best type of teaching bears in mind the desirability of affecting this interconnection. It puts the student in the habitual attitude of finding points of contact and mutual bearings.

Summary

Processes of instruction are unified in the degree in which they center in the production of good habits of thinking. While we may speak, without error, of the method of thought, the important thing is that thinking is the method of an educative experience. The essentials of method are therefore identical with the essentials of reflection. They are first that the pupil have a genuine situation of experience - that there be a continuous activity in which he is interested for its own sake; secondly, that a genuine problem develop within this situation as a stimulus to thought; third, that he possess the information and make the observations needed to deal with it; fourth, that suggested solutions occur to him which he shall be responsible for developing in an orderly way; fifth, that he have opportunity and occasion to test his ideas by application, to make their meaning clear and to discover for himself their validity.



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