The Teachable Moment – A Pedagogical Journey

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ABSTRACT

Some teachers have no doubt found it difficult to predict exactly when and how learning takes place among individuals and groups. To grasp the "teachable moment" means to connect learning with experience. The author of this paper reviews the relevance of the work of the famous educator, John Dewey, to finding the "teachable moment" in science education, as well as some of the modern interpretations of the constructivist view of education. In the end, context and experience are vital to understanding the process of learning and may contribute to the process of preparing teachers to anticipate, and even predict, the timing of the "teachable moment."

Umwelt und Gesundheit Online, 2008; 1, 5-10.

Introduction

What is the "teachable moment"? Everyone who has ever had the experience of teaching – of assisting, facilitating and observing the learning of others – will have found that it is often difficult to foretell exactly when and in what forms learning takes place in different individuals and groups. To the extent that every individual learner is a unique human being, every learning process involves some degree of originality of experience that cannot be controlled from outside. Constructivist theories of teaching and learning suggest that there is no universal path for human learning (Reich, 2006). Neither is there a universal principle for educators to determine the "teachable moment." The best they can do is to be alert and sensitive for the growing experiences of their learners and try to approach those moments that may productively help to enhance their learning.

In the sense of approaching an ideal situation, the "teachable moment" is a necessary imagination in all education. It stands for occasions, means, resources and situations of constructive exchange that provide genuine opportunities for learning. The attempt to approach this moment seems to me to imply at least two necessary preconditions. First, educators must be attentive to the multiple and often complex contexts of their learners' experiences. Learning always begins in the middle of things, i.e., from within the contexts of experience that individual learners as well as groups of learners carry with them. These contexts involve their cultural background and life-worldly histories including interests, habits, biases, skills, linguistic preconceptions, and their knowledge and ways of understanding. Second, in approaching the "teachable moment," educators have to be open-minded about the originality of their learners. As John Dewey pointed out over seven decades ago, originality of learning is not to be measured by outer products. It is "rather an individual way of approaching a world that is common to us all." (Dewey, 1988a, p. 128) Being sensitive to the learning of others, therefore, means that educators must be ready to learn and have their own experience enlarged in the joint activities with their students. They must be willing to grow in connection with their learners' growing experiences.

To grasp the "teachable moment," means to connect learning with experience. That is my thesis for this paper, and I will try to embellish these initial remarks by journeying through some core concepts of educational constructivism in the wake of one of its classical proponents: the pragmatist philosopher and educator John Dewey (1859-1952). The end-in-view is not so much to define the "teachable moment," but rather, to argue that it is always embedded in necessary contexts of experience and action. These contexts have to be taken into account if one wishes to develop a reflective and critical understanding of the possibilities of "teachable moments."

Learning from Experience

We start with the basic concept of Dewey's whole philosophical approach, namely "experience." Dewey's use of this term must be distinguished from its entrenched understanding in the philosophical tradition, as well as from most forms of its use in common language. Experience, for Dewey, does not denote a merely subjective or "inner" process that responds to a supposedly given and experience-independent "outer" reality. Neither is it primarily a passive process of receiving and registering "sense impressions" or data from the outside world. Rather, the basic unit of experience is the act, "and the act in its full development as a connection between doing and undergoing" (Dewey, 1991a, p. 214). Experience, for Dewey, always contains active as well as passive components, and it is the very perception of the connection between doing and undergoing that "supplies meaning to the act" (Dewey, 1991a, p. 214; Dewey, 1985a, p. 146). The "experienced," in other words, cannot be isolated from the processes of "experiencing" without destroying its vital meaning. Experience is essentially characterized by interaction and continuity (Dewey,

1991b, p. 17). It is not merely a cognitive affair. In its "primary integrity" (Dewey, 1988b, p. 18), every experience is a comprehensive totality that comprises emotional and aesthetic qualities as well. It is full of implicit meanings and felt contexts always already there before we begin to analyze and dissolve it into specific and distinct parts – e.g., meanings to be learned and known.

All learning proceeds from the unity and integrity of what Dewey calls "primary experience" (Dewey, 1988b, p. 10). As far as our experience is in a state of balance or equilibrium, the connections between doing and undergoing seem straightforward. We do not think about them, but take them for granted. This endows our actions with the necessary stability. Again and again, however, we find ourselves involved in situations in which we encounter some novel and unfamiliar affair in our experience. Meanings so far taken for granted become precarious. An emerging state of tension partly disturbs the balance; there is a moment of insecurity and perplexity. According to Dewey, we are involved in a "problematic situation" that urges us to look for new and extended meanings, gain insight into connections not yet noticed, in order to construct a novel solution and restore equilibrium on a new and extended level. If the search is successful and the new found solution proves its worth in experience, we have learned something. We have moved in an "organic circle" (Dewey, 1975, pp. 96-109) from equilibrium of experience through disturbance followed by observation, reflection, and testing, back to experience balanced out again. Learning means that the result of the process remains as an increase in meaning implied in further experience – a potential resource for solving future problems (Garrison, 2004).

It is important to insist that learning, for Dewey, is not a merely cognitive affair. As a pragmatist, Dewey thinks that knowing is an instrument of acting. Cognition, therefore, represents a specific function *within* experience. It does not cover the whole field. Before thinking and reflection set in, we first have an intuitive feeling, an immediate aesthetic grasp of the experienced problematic situation in its integrity. Intuition "precedes conception and goes deeper" (Dewey, 1988c, p. 249). It directs our selective attention. "Intuition … signifies the realization of a pervasive quality such that it regulates the determination of relevant distinctions or of whatever, whether in the way of terms or relations, becomes the accepted object of thought." (Dewey, 1988c, p. 249) On this basis, a process sets in that Dewey calls "inquiry". The famous definition of inquiry that he gave in his 1938 book "Logic" clearly indicates the aesthetic component involved in the process: "Inquiry is the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to convert the elements of the original situation into a unified whole" (Dewey, 1991c, p. 108). Through intelligent acting, a situation that is felt as precarious, unsettled, contradictory, or perplexing is turned into one that is relatively stable and harmonious. This requires emotional sensibility as well as decisive reasoning in order to construct connections and continuities in experience (Garrison, 1998, p. 66).

Drawing on these ideas, Dewey has provided in several of his writings what may be called a five-step model of successful learning from experience. In the chapter on "Experience and Thinking" of his 1916 book *Democracy and Education*, he summarized the following five "general features of a reflective experience" (Dewey, 1985a, p. 157): (1) As we have already seen, for learning to take place there must first be an emotional response to the "*perplexity, confusion, doubt*" of being involved in an indeterminate situation. This is the basis for the intellectual response that follows and that consists of (2) the *formation of a tentative hypothesis* or interpretation of the given elements, "attributing to them the tendency to effect certain consequences", (3) a careful survey, examination, inspection, exploration, and analysis of "all attainable consideration which will *define and clarify the problem at hand*," and (4) a subsequent *elaboration of the hypothesis* to make it more precise, consistent, and comprehensive. The final step is a practical one, namely that of (5) *testing the hypothesis* "as a plan of action which is applied to the existing state of affairs … to bring out the anticipated result" (Dewey, 1985a, p. 157).

It deserves observation that these processes of experimental problem solving, especially the steps 2 to 4, are essentially constructive and critical in nature (Dewey, 988a). Besides emotional sensibility and decisive reasoning (like powers of observation, examination, inspection, and analysis) they require imagination for their successful conduct – a tentative stretch of imagination beyond what is obvious or already known. Maybe more than anything else, successful learning depends on the learners' powers of imagination in response to real situations arising within their experiences.

"An ounce of experience is better than a ton of theory," writes Dewey (1985a, p. 151). Without vital connection to the experience of learners, learning soon degenerates into a merely symbolic procedure, because any theory only gains significance and verifiable meaning in its application to experience. Even a "very humble experience" is "capable of

generating and carrying any amount of theory," whereas "a theory apart from an experience cannot be definitely grasped even as theory" (Dewey, 1985a p. 151). Dewey thinks that it is crucial for education to provide learning environments that offer a sufficient amount of open spaces, occasions, and inspirations for the active reconstruction of the experience of learners (Dewey, 1985a, p. 82). We never educate directly, but indirectly through the environments we shape (Dewey, 1985a, p. 23). These environments – of which we ourselves as well as our learners as individuals in mutual relationships are an intrinsic part – represent the contexts of experience for education and learning. We cannot educate directly because we cannot vicariously have experiences for others. They themselves must have the opportunity of experimenting with their world (Dewey, 1985a, p. 147). Learning from experience basically means learning through one's own activities ("doing") and the activities of others (e.g., within a learning community or a classroom) in connection with an observation of the effects produced by the activities ("undergoing"). It is successful to the degree that it "adds to the meaning of experience" and increases the ability "to direct the course of subsequent experience" (Dewey, 1985a, p. 82).

It is this continual reorganization or reconstruction of experience that, for Dewey, constitutes growth as a crucial aim of education. Educational growth is a constructive process that develops from within experience. It feeds on interaction with others in a socio-cultural as well as natural environment. It can be furthered by others, but it cannot be imposed from outside. Growth depends on our ability to form habits (Dewey. 1985a, p. 46). "A habit means an ability to use natural conditions as means to ends. It is an active control of the environment through control of the organs of action." (Dewey, 1985a, p. 51) Habits endow experience with continuity and anchor it within the body (Alexander, 1987; Garrison, 1998; Kestenbaum, 1977). Their range extends from relatively passive "habituations" (i.e., adaptations to specific contexts of living that are largely taken for granted in every-day practices and seldom rise to the level of reflection) to "active habits" (i.e., dynamic and flexible forces of intentional control, manipulation, adaptation, and constructive organization of the environment). Although we can never completely transcend the habitual contexts of our experience, education as a process of continual growth depends on our ability to use habits as flexible resources in specific and changing situations and thereby partly to transform them in accord with the demands of the situation. This implies the extension or reorganization of old habits as well as the creation of new ones.

Dewey's belief that the educative process consists of a continual reconstruction of the experience of the learner and that "education is all one with growing" through successful action within the given socio-cultural contexts of learning brings him to the conclusion that education "has no end beyond itself. The criterion of the value of school education is the extent in which it creates a desire for continued growth and supplies means for making the desire effective in fact" (Dewey, 1985a, p. 58). Every specific educational aim must be developed and justified with regard to – or rather: from within – the concrete contexts and changeable situations of learning. It cannot be superimposed from outside without doing damage to the educational quality of the experience of learners. And, it must be sufficiently flexible in order to be modified and further developed along the very processes of learning. This principle applies even to more general educational aims like "natural development", "social efficiency," or "culture" (Dewey, 1985a, pp. 118-130).

If, then, it is "the aim of education … to enable individuals to continue their education" (Dewey, 1985a, p. 107), this idea ultimately expresses Dewey's belief in democracy which underlies his whole educational theory. In *Democracy and Education* (1916) he suggests that a fundamental criterion of democracy and all democratic communication consists in an appreciation of "the intrinsic significance of every growing experience" (Dewey, 1985a, p. 116). This point brings us to a consideration of the role of communication as a foundation of democratic education in Dewey's view. "Of all affairs," writes Dewey, "communication is the most wonderful. That things should be able to pass from the plane of external pushing and pulling to that of revealing themselves to man …; and that the fruit of communication should be participation, sharing, is a wonder by the side of which transubstantiation pales. When communication occurs, all natural events are subject to reconsideration and revision … Events turn into objects, things with a meaning" (Dewey, 1988b, p. 132). All genuine communication – communication which involves more than e.g., mere mechanical reeling off of verbal routines, mere passive absorption, or mere outlet of isolated impulsive utterances – has "educative power" (MW 9, 9). This point is true not only because it provides the participants within a mutually shared relationship with opportunities to learn from each other's experience, but also because it makes it necessary for them to take the perspective(s) of the other(s) with regard to their own actions and experiences (Dewey, 1985a, p. 8). The imaginative projection into the position of others leads to an extension of the

horizons of one's own experience – be it as far-reaching or as modest as the case may be.

Following Dewey, we can speak of a principle of shared activities (Dewey, 1985a, p. 18) that is of fundamental significance for education and learning. According to this principle, education occurs in every-day life-worldly practices as a side effect of shared activities with others – activities that are experienced by the learners as sufficiently meaningful and rewarding to engender a vital interest in their joint execution. The resultant communities of action are a precondition for all genuine social life. Dewey insists that there is more than a merely verbal connection between the words "common," "community," and "communication": "Men live in a community in virtue of the things which they have in common; and communication is the way in which they come to possess things in common" (Dewey, 1985a, p. 7). These things – like common aims, beliefs, hopes, knowledge, and understanding – cannot be transmitted directly (physically, as it were) from one to another. They depend on communication as an educative process of active involvement in shared activities that entails like emotional, intellectual, and practical habits in those who participate.

Dewey believes that even in highly complex societies many basic learning experiences occur through such direct forms of participating in the social life of a culture. He speaks of "indirect or incidental education" (Dewey, 1985a, p. 21) – elsewhere he even uses the more modern term "socialization" (Dewey, 1985a, p. 88) – to denote processes through which our experience is always already embedded and interwoven through communication with the experience of others. "Active connections with others are such an intimate and vital part of our own concerns that it is impossible to draw sharp lines, such as would enable us to say, 'Here my experience ends; there yours begins" (Dewey, 1985a, p. 194). Formal education in school or other educational institutions should connect with this educational potentiality of communication. Because of their larger and richer life-experience teachers and educators have the responsibility to supply the necessary resources for the growing experience of learners which will enable them to develop their own activities in viable directions of culturally relevant learning. The viability of these resources (like information, knowledge, skills, values) is measured by the extent in which learners can put them into service of their own constructive learning processes. "The place of communication in personal doing supplies us with a criterion for estimating the value of informational material in school. Does is grow naturally out of some question with which the student is concerned? Does it fit into his more direct acquaintance so as to increase its efficacy and deepen its meaning?" (Dewey, 1985a, p. 194). Information is educative if it meets these two requirements. Communication, in school as outside, must be mutual in order to be educative. This even implies the possibility of role change so that, in shared activity, the teacher becomes a learner and the learner becomes, "without knowing it," a teacher (Dewey, 1985a. p. 167).

Dewey thinks that in a pluralistic and complex world like our own the perception and appreciation of diversity in human experiences is of central significance for the difficult task of democratic living-together. "To cooperate by giving differences a chance to show themselves because of the belief that the expression of difference is not only a right of the other persons but is a means of enriching one's own life-experience, is inherent in the democratic personal way of life." (Dewey, 1991d, p. 228) To communicate across differences is always a risk, but it also provides us with unique opportunities for growth and can enrich our constructive powers of learning (Garrison & Neubert, 2005). According to Dewey, democratic communication and education must, among others things, release the imaginative powers of learners and apply them through constructive exploration of new possibilities of action and experience. "Imagination is the chief instrument of the good," he writes in an allusion to Shelley (Dewey, 1989, p. 350), because only imaginative vision "elicits the possibilities that are interwoven within the texture of the actual" (Dewey, 1989, p. 348).

Learning through Occupations

In accord with his overall concept of experience, it is a basic assumption of Dewey's pragmatic understanding of education that "[e]very educative process should begin with *doing something*; and the necessary training of sense perception, memory, imagination and judgment should grow out of the conditions and needs of what is being done" (Dewey, 1983a, p. 185). Rather than an arbitrarily imposed task, the starting point for learning should be joint activities with other learners that appeal to them as inherently significant and worthwhile. This is the way in which learning of itself takes places even before any specific instruction and schooling sets in. Formal education in school should connect with these informal learning processes by providing learning environments – a "miniature world" (Dewey, 1983a, p. 186) – that appeal to the natural life functions of pupils and offer them diverse opportunities for active and constructive learning experiences.

The more intellectual aspects of education, too, should develop out of the needs and potentialities of these joint activities. The necessary contents of learning, the ideas and principles, the store of information and knowledge, as well as the necessary habits of deliberation and reflection should be organically connected with the learner's activities. Writes Dewey (1983a, p. 187): "All thinking at its outset is planning, forecasting, forming purposes, selecting and arranging means for their most economical and successful realization." Instead of being "driven into pupils" and accumulated in isolation just for the purpose of schooling (Dewey, 1983a, p. 187), information should cluster about what Dewey calls "occupations." This didactical concept stands for activities whose significance transcends the mere context of schooling. The primary aims lie in the activity itself and its respective motifs, objects, ends and requirements. Learning takes place as a side-effect because the activity cannot be successfully fulfilled without extension of the horizons of the learners' experience and knowledge. It is a by-product of solving real and relevant problems. Therefore, occupations must be sufficiently complex, comprehensive, stimulating and suggestive for multilayered and continuously growing experiences. Drawing on the experiences of his own famous school experiment, the Laboratory School at the University of Chicago (1896-1904), Dewey gives us examples like gardening, horticulture, cooking, weaving and shop work with different materials (Dewey, 1983a, p. 189) – activities that, he insists, afford manifold opportunities for scientific, geographic, historical, economical, societal learning as well as affective, aesthetic and artistic dimensions of human experience (Dewey, 1983b). But one may also think of theater projects, ways of participation in the self-administration of schools, explorations into local neighborhoods and production spheres, activities in the reconstruction of school life or in the construction of club houses for pupils (see the broad array of examples given in MW 8, 205-404). Today, we might add e.g., learning projects in which students produce their own TV news program and thus learn to engage constructively and critically with the social production and proliferation of news through modern mass media (Reich, 2005, pp. 118-145).

Dewey thinks that the educational significance of such occupations lies, among other things, in the fact that they inspire learning through one's own explorations, inventions, constructions and applications and thus educate learners to take an experimental attitude towards their own learning. They learn to treat ideas, theories and principles as "working hypotheses" for the solution of problems and not as fixed and dogmatic truths, established one and for all, whose validity is to be accepted without question from some form of higher authority. "An education based upon the pragmatic conception would inevitably turn out persons who were alive to the necessity of continually testing their ideas and beliefs by putting them into practical application, and of revising their beliefs on the basis of the results of such application" (Dewey, 1983a, p. 188).

I think that science education, among other fields, offers a great number of opportunities for occupational education and learning in the sense sketched here. The different aspects of "environmental health" discussed at this conference may provide viable pathways for connecting science learning with students' experience. In this paper I have tried to indicate some of the necessary contexts that should be observed in trying to find the "teachable moment" – in science education as well as in other fields of learning. I have done so from the perspective of Deweyan educational constructivism. Therefore, I should like to close with a word on Dewey's ideas about the role of science education in modern society. As Garrison (1994, p. 65) observes: "Dewey believed that the aim of education in a democratic society was to free the intellect to sustain scientific inquiry and, when necessary, reconstruct facts, theories and sometimes society itself." Rather than merely providing the learner with specialized skills and technical information, science education, for Dewey, has a broader liberal and humane dimension – namely, that of preparing students for the complex task of democratic citizenship and participation in a largely scientific and technological culture (Hickman, 2001). In this connection, science education as a way of acquiring the attitude of experimental problem solving is more important than just learning 'a science.' It should never be conceived too narrowly from the standpoint of organized and already highly specialized disciplines (Dewey, 1985a, p. 227). Instead, it should be seen as a chance to connect the students' experiences with trans-disciplinary and multimodal ways of learning and educational growth. Garrison (1994, p. 67) quotes from Arthur Wirth who argues that training "with a single-skill focus is not adequate for the work world" of today. "Workers need general thinking, communications, mathematical, scientific, and technical skills that can be tapped and expanded to confront what is new and problematic" (Wirth, cited in Garrison, 1994). To educate students in the practices of scientific experimentation and research first of all means to educate them in a necessary and indispensable dimension of the relevant practices of the culture in which they live (Garrison, 1997).

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An earlier version of this paper was presented in December 2007 at the inaugural meeting of the International Consortium for Interdisciplinary Education about Health and the Environment, Cologne, Germany.