

Connecting Hand, Mind, and Community: Vocational Education for Social and Environmental Renewal

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Background/Context: *The main goal for vocational education at the secondary level has historically been the preparation of youth for the world of work. As a result, research, policy, and practice in this area have mostly focused on how to smooth this transition, address high costs, and ensure that there are positive economic returns to the individual and society. The focus on these goals, although important, has meant that other vital areas have not been addressed: namely, how to ensure that vocational education promotes a sense of empowerment, fosters a stronger sense of community, and seeks to protect the natural environment.*

Purpose and Focus of the Study: *This article stresses the importance of imbuing the theory and practice of vocational education with social justice and concern for environmental degradation at the local level. The approach to vocational education presented here proposes the use of productive learning as a foundation for a well-rounded education that breaks down the nefarious dualisms of contemporary education (i.e., the separation of mind from body, theory from practice, individuals from collectivity, and school from community) while exposing students to a critical pedagogy of work and to its potential for social and environmental renewal.*


Setting: *To illustrate the theoretical insights provided in the first two sections of this article, the author explores a public secondary school in northern Colombia that, under difficult social and material conditions, has developed a noteworthy vocational program.*

Research Design: *This analytic essay illustrates its main points with examples derived from a case study in which field observations, extensive in-person interviews, document analysis, and telephone conversations were conducted between 1997 and 2000.*

Findings and Conclusions: *The school helps to illustrate what a long series of writers from the late 18th century onward have stated: that productive work ought to be an intrinsic component of any responsible form of education. Moreover, it makes clear the importance of con-*

textualizing learning in authentic settings. Although some important inroads have been made in connecting vocational education to critical pedagogy, the connections with environmental sustainability are still in their infancy. Despite calls from international organizations such as the International Centre for Technical and Vocational Education and Training, a branch of the United Nations Educational, Scientific and Cultural Organization (UNESCO-UNEVOC) to link vocational education and training to sustainable development, much work still needs to be done in the areas of theory, policy, and practice.

In recent years, several scholars have sought to connect general academic schooling with social and environmental enhancement (e.g., Bowers, 2001; Gruenewald, 2003; Orr, 1992; Smith, 1992; Smith & Williams, 1999; Sobel, 2004). These scholars critiqued modern education's penchant for a form of pedagogy that fosters individualism, passivity, competition, separation of school from community and mind from body, and increasingly, a single-minded training for future employment. They proposed instead a pedagogy that grounds learning in a sense of place, supports curricular interdependency, critiques the cultural assumptions upon which modern industrial societies have been constructed, and offers experiential forms of learning that allow students to identify and improve their surroundings. This article joins this alternative pedagogy by offering vocationalism as a powerful strategy for developing an ethic of caring and providing practical skills needed to regenerate human and natural communities.

Vocationalism and its specific manifestation in schools in the form of vocational education programs have generally been defined and practiced as skill training for future employment.  not dismiss skill training as an important aspect of vocationalism; I believe that we need a more generous interpretation of vocational theory and practice, and we must couch it in terms of the personal (beyond the skill per se) and social service it can offer. This definition is akin to that offered by Norton Grubb and Marvin Lazerson (2004), who, following Dewey, argued that vocationalism is not just preparation for mere jobs but for occupations that enable a search for personal meaning, socioeconomic enhancement, and the pursuit of a fair and equitable Great Society. Historically, a lineage of notable writers have affirmed the practice of vocationalism along this vein. John Locke and Jean-Jacques Rousseau, followed by Heinrich Pestalozzi and Karl Marx, and later José Martí and John Dewey, to name just a few, all concurred in promoting vocationalism, and more specifically productive activities, as a means to advance the personal and social maturation of individuals while boosting community prosperity (von Borstel, 1991). This cause has been taken up in the last two decades by

observers of vocational education, who call for a critical pedagogy of work that analyzes critically with students their social and economic realities and exposes them to more humane alternatives in these spheres (e.g., Gregson, 1996; Lakes, 1994; Lakes & Carter, 2004; Simon, Dippo, & Schenke, 1991). More recently, other scholars have advocated the importance of environmental protection and of using less harmful and more holistic forms of economic production (e.g., Anderson, 2003; Arenas 2003a; Lakes, 2000). At the international policy level, a vital impetus to these efforts has been provided by the International Centre for Technical and Vocational Education and Training (UNEVOC), a branch of the United Nations Educational, Scientific and Cultural Organization (UNESCO) that in recent years has examined and disseminated information about the **connections** between vocational education and sustainable development—that is, the belief that productive activities should move away from the single priority of economic growth and profit and toward the integration of economic, social, and environmental goals (Arenas, 2005; UNESCO-UNEVOC, 2004).

Keeping this larger context in mind, I have divided this article into three sections. The first focuses on the relationship between vocationalism and social well-being. This part examines (1) the evolution of the ideas associated with vocationalism over the last two centuries, (2) the contributions of social theory in terms of demonstrating the participatory and contextual nature of learning, and (3) the connections between regular vocational programs and social justice. The second section studies the relationship between the economic system and environmental degradation, demonstrating that vocationalism has much to offer in terms of exploring alternative, more ecologically benign forms of economic production. The third section illustrates the application of these issues in a public secondary school in northern Colombia that has developed a remarkable vocational education program that deserves to be known internationally.

VOCATIONALISM AND SOCIAL RENEWAL

HISTORICAL UNDERPINNINGS

To understand the full potential that vocationalism could play today, it is useful to explore the ideas of earlier writers who connected manual labor to social change and justice. For the purposes of this brief historical introduction, I will focus on Jean-Jacques Rousseau, Karl Marx, and John Dewey, three influential writers who laid the foundation for understanding the intersection between vocationalism and community well-being.

Rousseau was one of earliest Western pedagogues to provide a full-fledged exposition of the importance of promoting manual work among youth to reduce social prejudices and enhance egalitarianism (von Borstel, 1991). In the third book of his well-known *Emile*, published in 1762, he wrote about the need to strive for equality:

A rich man doesn't have a bigger stomach than a poor man and doesn't digest better than him; the master doesn't have longer or stronger arms than his slave; a respected man is not more important than someone from the masses; and ultimately the needs of them all are the same, and so should be the means to satisfy them. (Rousseau 1762/1966, p. 251)

According to Rousseau, education should transmit to youth these "means to satisfy" their needs in order to help break down the artificial barriers among social classes. Equally important, these skills bring people closer to nature, especially in the case of agriculture, which was, he claimed, "the most honest, the most useful, and the most noble" activity (p. 254), and to a lesser extent in other occupations such as smithery and masonry. Rousseau's ideas directly and indirectly influenced those of the Utopian socialists, who in turn influenced the work of Karl Marx. Although Marx's writings on education were scant, his ideas did influence the theory and practice of vocational education. Swayed by the writings and practice of Robert Owen, Marx wrote on the subject in *Capital*,

From the factory system budded, as Robert Owen has shown us in detail, the germ of the education of the future, an education that will, in the case of every child over a given age, combine productive labor with instruction and gymnastics, not only as one of the methods of adding to the efficiency of social production, but as the *only* [italics added] method of producing fully developed human beings. (Marx, 1867/1999, chap. 15, sec. 9)

Marx's admiration for vocationalism was undergirded by his concept of praxis as a sociohistorical context for a materialist consciousness and ultimately for the making of history. One of our unique human qualities, he said, was the ability to use free, conscious activity to transform the physical world, not just the world of ideas (von Borstel, 1991, p. 34). Manual labor thus became a vital manifestation that gave character to the human species. As he explained in *Capital* (1867/1999, chap. 7, sec. 1), "Labour is, in the first place, a process in which both man and Nature participate, and in which man of his own accord starts, regulates, and controls the

material re-actions between himself and Nature. . . . By thus acting on the external world and changing it, he at the same time changes his own nature.”

The idea that people could transform themselves by using work to alter the social and natural world around them influenced John Dewey. Although frequently critical of Marxism and state socialism, he nonetheless employed Marxian concepts in his analysis and, later in his career, defended democratic socialism as a viable alternative to the excesses of capitalism (Westbrook, 1991). Although Dewey did not privilege social class as an organizing category and principle, as Marx did, he did believe that the intimate connection that had existed between humans and their occupations in preindustrial societies had been lost under the capitalist mode of production. Moreover, like Marx, he saw work as a means of fulfilling one’s humanness. As Dewey (1899/1976) wrote in “School and Society,” “The aim [of work] is not the economic value of the products, but the development of social power and insight” (p. 12).

Dewey also expanded on Marx’s critique of the pernicious effects of the dualisms of modernity: the separation of mind from body, theory from practice, individuals from collectivity, and school from community. By placing occupations at the heart of the curriculum, he believed that manual work could become a key mechanism for connecting schools to the larger social life of the community. As he wrote in *Democracy and Education*, published in 1916, “an occupation is the *only* [italics added] thing that balances the distinctive capacity of an individual with his social service” (p. 308). It is important to note that Dewey’s conception of occupational training was different from the narrow vocational education that reinforced and perpetuated class divisions. By occupations, he did not mean particular jobs or even training for a particular kind of work. Rather, he understood occupations as life activities that struck a balance between the intellectual and practical facets of existence (Boisvert, 1998). For instance, the goal of cooking instruction in school was not to prepare professional chefs, but more broadly to provide a socially useful activity into which to integrate academic content, such as biology, chemistry, and geography, and through which to bring together individual and collectivity.

Breaking down the artificial fragmentation within schools, and within modern life in general, was an essential aspect of democratic education. But this form of education could not be accomplished unless students were aware of the larger social and political dimensions that impinge on productive activity. Thus, a responsible education that passes on technical skills should

include instruction in the historic background of present conditions, training in science to give intelligence and initiative in dealing with material and agencies of production, and study of economics, civics, and politics, to bring the future worker in touch with the problems of the day and the various methods proposed for its improvement. (Dewey, 1916, p. 319).

In sum, for Dewey, democracy was the ideal state of community and could be realized only by a constant communion among all its members in transforming social and political realities. Occupations were an ideal strategy for reaching such communion.

SOCIAL THEORY

A more contemporary look at the relationship between vocationalism and learning comes from the work of Jean Lave and Etienne Wenger (Lave & Wenger, 1991; Wenger, 1998). Having explored the intersection among social science, cognitive science, and philosophy, they argued that learning is situational and can take place only as part of a social process. Lave and Wenger rejected the common definition (and practice) of learning as acquiring a discrete body of abstract knowledge within the individual mind and separate from its context. They argued that such separation violates the basic constitutive relationship among the individual, the process, and the world. In their words,

Learners inevitably participate in communities of practitioners and . . . the mastery of knowledge and skill requires newcomers to move toward full participation in the socio-cultural practices of a community. "Legitimate peripheral participation" provides a way to speak about the relations between newcomers and old-timers, and about activities, identities, artifacts, and communities of knowledge and practice. . . . [T]he meaning of learning is configured through the process of becoming a full participant in a socio-cultural practice. . . . This social process, includes, indeed it subsumes, the learning of knowledgeable skills. (p. 29)

Lave and Wenger (1991) demonstrated the interactive nature of learning through a series of ethnographic studies on apprenticeships (e.g., Yucatec midwives, navy quartermasters, meat-cutters). They emphasized that, although not all forms of apprenticeship are conducive to learning, apprenticeships can offer a radical and important contribution to learning. With their historically and culturally specific character, apprentice-

ships are ideal for showing the “indivisible character of learning and work practices” (p. 61). When people initially join a community of practice, they learn at the periphery. As they become progressively more competent, they move closer to the center of the particular community. Learning thus is seen less as the acquisition of knowledge by individuals than as a process of social participation. We can derive three propositions from the work of Lave and Wenger: (1) learning takes place in an appropriate context; (2) learning is participatory in nature; and (3) learning takes place in the students *and* in the process of social participation.

The research of social theorists supports vocational education as a means for revamping the individualized and decontextualized focus of traditional education. Vocationalism can place education in a real-life context that is meaningful, collective, and transformative. It can make learning not just a way of understanding the world but also of being a part of it. Finally, it helps us to recognize that person and activity influence each other and that learning “concerns the whole person acting in the world” (Lave & Wenger, 1991, p. 49).

SOCIAL JUSTICE

The praxis of bringing together youth labor and social responsibility is not new. Notable examples throughout the 20th century include the work of Celestin Freinet in France; efforts in the former Soviet Union led by Anton Makarenko; the Botswana Brigades (thanks to the work of Patrick van Rensburg); the Sarvodaya Shramadana Movement in Sri Lanka (founded by A. T. Ariyaratne); and the Schools to the Countryside in Cuba. Some other countries, mostly in northern Europe, also have a well-established tradition of combining work education with personal and communal well-being (European Centre for the Development of Vocational Training [CEDEFOP], 2004; Hickox & Lyon, 1998). Features common to all these examples include a focus on meaningful work, political empowerment, egalitarianism, cooperative learning, and reciprocal responsibility.

Despite these vital efforts, however, the main goal of vocational education in most countries today continues to be mere functional empowerment—that is, to instill in students the technical and human relations skills they need to fulfill their responsibilities in future employment. Although acquiring these skills is undoubtedly beneficial, they should not be obtained at the expense of other vital skills, such as the necessary language, conceptual knowledge, and political skills to awaken students’ moral and civic responsibilities. As educators influenced by Marx, Dewey, and Habermas have stated in their critical pedagogy of work education

(Gregson, 1996; Grubb & Lazerson, 2004; Kincheloe, 1995; Lakes, 1994; Simon et al., 1991), two key principles with which vocational education programs should be imbued are “emancipatory knowledge” (Habermas, 1971) and meaningful participation in all aspects of the design and production process.

In terms of the first principle, Jurgen Habermas (1971) distinguished between technical knowledge and emancipatory knowledge. Technical knowledge has to do with the world of facts and material things that can be verified by looking at documents or asking authorities. In contrast, emancipatory knowledge calls into question existing cultural traditions that conceal relations of domination. Emancipatory knowledge has the power to address oppressive forces in society. For educators, imparting emancipatory knowledge means presenting students with a language that helps them identify conditions in the world they live in and then transform them. As Henry Giroux (1992) wrote, what students need is “a language that actively acknowledges and challenges those forms of pedagogical silencing which prevent us from becoming aware of and offended by the structures of oppression at work in both institutional and everyday life” (p. 8). Such commonly used concepts as employment, knowledge economy, economic productivity, and global competition all mask realities of oppression that must be uncovered. For instance, traditional vocationalism generally does not draw a distinction between jobs that help the community (e.g., working as a nurse) and those that contribute to its destruction (e.g., working for a weapons manufacturer; Arenas, 2003b). Thus, students must be able to dissect these concepts to understand the multiple meanings that they harbor. Another key aspect of emancipatory knowledge is introducing students to a historical context that includes alternative economic systems. Given that most countries in the world today have embraced market capitalism and large-scale industrialization, students should be made aware of the genealogy of capitalism and industrialization, the transformation of work into labor, and the undermining of small and self-sufficient economies that were based on arts and crafts and small-scale agriculture. Equally important is to learn about the rise of unions and organized labor in the 19th century and the systematic attempts to reduce their power over the succeeding decades. (See Simon et al., 1991, chap. 9, for an example of how to introduce this history into the curriculum.) Finally, and more contemporarily, it is useful to explore the shift from national economies to transnational ones in which the production process is moved around the world in search of cheaper sources of labor.

The second principle is to offer students opportunities for meaningful and equal participation in the production process. Cooperative problem

solving and decision making allow students to learn the value of teamwork. Consistent with social theory, learning occurs as a result of the group experience itself and in the individual. Active participation and dialogue allow students to experience more significant encounters that may lead to the creation of mutually dependent networks that challenge existing structures of power and domination. Student participation should not be restricted to the actual process of production but should also include input into what is produced. This allows students to envision new products and services that truly enhance community life.

Applying the preceding two principles can transform current practices of vocational education into a process of student empowerment that supports a democratic community. Without denying the importance of technical skills (which should be an essential aspect of a critical pedagogy), all students, but poor ones in particular, are at a distinct disadvantage when joining the workforce if they have not been exposed to a critical analysis of the social and political relations of production.

VOCATIONALISM AND ENVIRONMENTAL RENEWAL

Of all educational programs, the one most closely associated with the economic system has historically been vocational education. Since John Locke's *Plan for Working-Schools for Poor Children*, originally published in 1696, vocational education has ostensibly been linked to national economic development through the promotion of good working habits and productive skills (von Borstel, 1991). Particularly in the 20th century, national ministries of education in both highly industrialized and less industrialized countries have implemented vocational and technical education, believing it to be an effective means of addressing the economic needs of low-income families. For the purposes of this section, I will not dwell on the connections between vocationalism and the economic system hypothesized in human capital theory. Instead, I will analyze these connections in terms of how they affect the natural environment. This impact is seldom studied in conventional vocational programs, yet any form of production involves a transformation of natural resources that leaves an imprint on nature. Before exploring this relationship, it is useful to identify some of the links between the economic system and the environment.

CONNECTING THE ECONOMY AND THE ENVIRONMENT

Any form of economic production or service delivery involves an exchange of matter and energy, which inevitably carries with it an envi-

ronmental impact, ranging from air pollution to biological impoverishment of the soil, erosion, water contamination, loss of flora and fauna, or the destruction of whole ecosystems (Costanza, Cumberland, Daly, Goodland, & Norgaard, 1997). Given that we live on a planet with limited natural resources, it stands to reason that the smaller the impact on planetary resources of a production process, the greater the benefit to humans. With regard to the relationship between the environment and modes of production, two fundamental questions arise: First, how concerned should people be about a product's environmental impact? Second, what is the relationship between a product and quality of life? Neither of these questions is answered explicitly under free-market capitalism, the most prevalent economic system worldwide, but they are embedded within the assumptions of conventional economics.

The answer to the first question can be deduced by observing how conventional economics minimizes the importance of the environmental consequences of a production process. One typical assumption is that when a natural resource is so depleted that its continued exploitation becomes economically unfeasible, another resource can substitute for it. Julian Simon (1996), a proponent of this view, argued that natural resources "are not finite in any economic sense. . . . [I]f history is any guide, natural resources will progressively become less costly, *hence* [italics added] less scarce, and will constitute a smaller proportion of our expenses in future years" (p. 6). Although most economists do not share Simon's optimistic view, they perhaps unwittingly support it by not considering the full environmental costs associated with economic transactions—or more precisely, they consider them by assuming that a combination of government regulations, market approaches, and technological innovations will provide the final solution. For instance, a company that pollutes more than a certain amount can be assessed higher taxes or a fine. This sends a signal to the market to come up with a technological solution (e.g., a filter that minimizes pollution) that the company would do well to invest in. Undoubtedly, these strategies should be a part of the solution, but a critical missing piece is a radical reformulation of society's moral and ethical guiding principles as to how we should live in harmony with nature while still satisfying our basic material needs (Daly, 1980).

Conventional economics answers the second question of the relationship between products and quality of life by assuming a principle of non-satiation—namely, that rational humans always tend to want more, not less, of a commodity. College textbooks on economics repeat this mantra unquestioningly. Consider, for instance, how two popular textbooks discuss this basic assumption of consumer behavior. One states, "Scarcity exists simply because it is human nature for people to want to have more

than they can have” (Ruffin & Gregory, 1990, p. 3). The other asserts, “Goods are assumed to be desirable. Consequently, consumers *always* [italics added] prefer more of any good to less. In addition, consumers are never satisfied or satiated; more is always better, even if just a little better” (Pindyck & Rubinfeld, 2005, p. 66). Notice how both sets of authors ascribe to human nature an insatiable desire for material things. Advanced industrial technologies have enabled a relatively large percentage of the world’s population to have access to common household goods at a modest price. Even luxury items are seen as indispensable. Consider the following “wish list” taken from one of the economics textbooks (Ruffin & Gregory): “One person’s list of wants might include a luxury car for each day of the week, a 10-bedroom and a 7-bathroom home in the best part of town, a 15-room ski lodge in Colorado or in Switzerland, a full staff of 25 servants . . . the only limits to wants are time, imagination, and appetite” (p. 30).

How these wants affect the larger ecosystem appears to be of little consequence to these economists. It is assumed that in the name of civilization and progress, nature becomes a legitimate site for exploitation, with little foresight as to the effects on present and future generations.

THE GREENING OF VOCATIONAL PROGRAMS

Although social justice concerns have been gaining strength in vocational education programs, it is still rare to find programs and theoretical approaches at the secondary level that address environmental conservation and protection (for exceptions, see Anderson, 2003; Arenas, 2003a; Dippo, 1998; Lakes, 2000). A case in point is found in two recent publications that examine the challenges faced by the vocational education programs of nine African countries and the United States (Lauglo & Maclean, 2005; McGrath et al., 2006). Whereas Lauglo and Maclean’s book explores what it calls “vocalionalization” -that is, the using of vocational subjects to bolster general academic education-McGrath and colleagues’ article focuses on programs that use general academic courses to bolster vocational training. Even though both publications provide excellent overviews of the current condition of vocational education programs-by exploring such themes as finance, equity, and access; system coherence; teacher preparation; and economic returns-neither publication ever mentions the importance of environmental protection or the relationship between vocationalism and environmental sustainability. Notwithstanding the failure to make this connection in the literature, there is an urgent need to offer environmental education to future engineers, mechanics, agronomists, industry technicians, architects, builders,

carpenters, and cooks, to name just some of the more common vocations taught in schools today. Each of these occupations transforms raw materials and manufactured parts into a finished product. If teachers assist students in making connections between the production process and the environment, and add to their program's mission statement the importance of environmental renewal, these steps will go a long way toward increasing the environmental consciousness of future workers and managers alike. This sentiment was expressed at UNESCO's Second International Congress on Technical and Vocational Education, held in South Korea in 1999, the final document of which stated that "social and economic trends predicate the need for a new development paradigm which holds a culture of peace and environmentally sound sustainable development as its central features. Accordingly, the values, attitudes, policies and practices of TVE [Training and Vocational Education] must have their foundations in this paradigm" (UNESCO, 1999).

The following four objectives could be addressed in vocational education programs: (1) Discuss with students environmental problems related to the production process and the end product of the vocational program. For example, if the program focuses on the training of automotive mechanics or engineers, teachers and students could discuss environmental problems caused by automobile use, such as air pollution from car exhaust, depletion of nonrenewable resources such as oil, and lead contamination from car batteries. In an agricultural program, students could learn about the consequences of capital-intensive farming, such as erosion, deforestation, contamination of waterways, soil infertility, and reduction in biological diversity. In a construction program, students can learn about pollution generated by energy consumption, construction waste, and release of harmful chemicals from construction materials. (2) Implement, whenever feasible, environmentally friendly alternatives in the production process. Students in the automotive program could explore the use of fuels from renewable resources, gasoline-efficient engines, and nonlead batteries, as well as the recycling and reuse of solid waste from cars, particularly steel and aluminum components. The agriculture program might involve experimenting with labor-intensive, low-input farming methods, including the use of cover crops, crop rotation, and biological controls to enrich the soil and control weeds, harmful insects, and disease organisms. And students in construction programs can use energy-efficient building materials, such as aerated and insulated concrete block, cement mixed with fly ash (a waste product from coal-fired powered plants), and energy-saving cooling and heating equipment. (3) Use production processes that have value from a local, histori-

cal, or indigenous perspective. Focusing on community-based environmental knowledge is an important mechanism for ensuring the preservation of valuable traditions. It is very difficult to integrate community-based knowledge into modern production processes such as those in the automobile industry. Given that cars are an invention of the modern era, they defy any form of production other than capital-intensive mass assembly. In contrast, agriculture and construction do lend themselves to the systematic incorporation of noncommodified forms of knowledge. In the case of agriculture, most forms of organic farming are based on centuries-old traditions passed on from generation to generation within peasant communities. In the case of construction, the use of traditional techniques and materials (e.g., adobe or bamboo) that respect the surroundings can ensure the continuation of culturally significant and ecologically aware knowledge. (4) Discuss with students the role of consumerism in modern societies and the difference between wants and needs. As the preceding review of conventional economics showed, current patterns of mass consumption (particularly in highly industrialized societies) have a dumbfounding disregard for the well-being of social and environmental systems. Vocational programs are in a privileged position either to reinforce that disregard or to assist students to be conscientious producers and consumers in meeting their basic needs.

FROM THEORY TO PRACTICE: A VOCATIONAL SCHOOL IN NORTHERN COLOMBIA

To illustrate the themes explored thus far, I present qualitative data from the Ecological School Tomás Herrera Cantillo, a public secondary school in the department (equivalent to a province) of Magdalena in northern Colombia. The descriptive data presented here were generated through field observations, extensive in-person interviews, document analysis, and telephone conversations collected between 1997 and 2000. The underlying motivation for my research was to present as a case study a vocational education program that having few material resources and serving a poor socioeconomic status (SES) population could nonetheless exhibit a predominance of features that support social justice and environmental protection. The school presented here does not constitute a model implementation of the theoretical approach provided in the first two sections of this article. Instead, it serves to illustrate one way in which these theoretical insights can be enacted in an authentic setting. For specific details of the qualitative research methodology used at this school, and for an expanded treatment of the evidence, see Arenas (2003a).

THE SETTING

The school is located in Peñoncito, a small town of about 2,000 people where homes lack indoor plumbing, streets are unpaved, there is no health center, and there are few telephone lines. Fifteen minutes away by boat is the town of Mompóx, one of Colombia's colonial gems, and separating the two towns is the Magdalena River, Colombia's longest waterway. Two socioenvironmental factors mark this geographic area. First, the northern region of Colombia, particularly the departments of Magdalena, Bolivar, Cordoba, Sucre, and Antioquia, has witnessed intermittent but protracted violence since the 1950s as a result of the struggle between left-wing guerrillas and the Colombian army, a struggle that reached new levels of violence with the emergence of right-wing paramilitary groups in the 1980s. In fact, the school itself was named after one of the founders' brother, who was assassinated in the 1980s. Second, the natural area around Peñoncito comprises one of the largest networks of *cienagas* in the country, the Momposina Depression, a succession of inland freshwater marshes with a high degree of biodiversity. The Momposina Depression has been overexploited and degraded in recent decades through deforestation, conversion to croplands, expansion of cattle ranching, fishing with dynamite, and the effects of war. Community leaders are well aware of these factors and have hoped that the school can serve as a civic space where these problems can be aired in a constructive manner. A community leader told me, "We're not so naïve to believe that our school will solve the problem of violence in the region, but frankly it's the only neutral site that we have where we can try to come up with alternatives."

The school, Tomás Herrera Cantillo (hereafter Peñoncito, after the name of the town where it is located), is a poor rural vocational institution with about 180 students and with grade levels from 6 to 11 (11th grade is the highest grade in Colombian secondary schools). From its founding in 1988, the school has been a continual exercise in vocational activity. When a local landowner donated a hectare of barren land for the school grounds, administrators, teachers, parents, and students participated in the construction of some of the classrooms, following the local architectural style of comfortable bungalows with thatched roofs. The school community also planted dozens of trees that included more than 30 species of hardwood, fruit, medicinal, and ornamental species, creating lush vegetation throughout the campus. When I conducted this research, the beauty of the campus stood in sharp contrast to its lack of basic services. Heading the list of deficiencies was the absence of running water. The only source of water was an artesian well in the school com-

pound that was inadequate to meet the needs of a school specializing in agriculture and stock-raising. Moreover, the school had no teachers' lounge, no cafeteria, at most one textbook per classroom, insufficient desks for all students, and only two makeshift toilets.

Peñoncito was initially conceived as a private community initiative to offer local children schooling beyond primary education, given that the closest secondary school was too far away for most local children to attend. The original teachers, all of whom were from the locality, had obtained their teaching certificates in other parts of Colombia and had returned "to be of use in the town that saw us grow," said the foreign language teacher. Since its inception, teachers and community leaders wanted a school that not only offered a secondary degree but also, just as important, that followed a pedagogy of peace and environmental sensitivity. Given that violence and environmental degradation have been widespread in the region, they felt that a school that focused on these issues could teach lessons of tolerance for difference, of resolving conflict without resorting to violence, and of protecting the region's natural heritage.

In the early 1990s, Peñoncito teachers and community leaders decided to convert the school into a public institution to take advantage of the intense decentralization process started by the Colombian Ministry of Education (MEN) and to ensure the long-term sustainability of the school, given that it was too onerous for local parents to pay for tuition and fees. The decentralization process granted more autonomy and curricular flexibility to public schools around the country (Hanson, 1995; PREAL Fundación Corona, & Corpoeducación, 2003). Among the new initiatives sponsored by MEN was to have each school adopt an institutional educational project (PEI) to serve as the pedagogical framework on which key school activities would center. Given that MEN encouraged schools to use the themes of peace, democracy, and environment in their PEIs, Peñoncito saw its socioenvironmental efforts legitimated and decided to make them an integral part of its PEI.¹

In terms of academics, as measured by the scores from the ICFES examinations (tests that students generally take during the last year of secondary school), in 2004 Peñoncito was considered a low-performing school (ICFES, 2004), a situation that has remained unchanged over the years. However, in the Magdalena department as a whole, 85% of all schools whose students took the ICFES exams were also ranked as low performing in 2003-2004 (MEN, 2004). In fact, Peñoncito's ICFES scores are very similar to those of the two other secondary schools in the municipality (Centro Educativo Artesanal José de la Luz Martínez and Colegio Nacionalizado de Bachillerato Lázaro Martínez Olier). In 2004, the aver-

age ICFES score for Peñoncito was 5.9 (of a possible 10 points), that for José de la Luz Martínez was also 5.9, and that for Lázaro Martínez Olier was 5.7 points (ICFES, 2004). In other words, in terms of academics, Peñoncito falls within the norm for the department as a whole, which is important for the school given that it wants to maintain its alternative pedagogical system without compromising its academic component. As the principal told me,

While our main focus is vocational, we still need to show results in the area of general education. We also want our students to go to college, if possible. If the scores are too low, they won't be able to do so. By the same token, we probably won't be able to increase those scores too much in part because of lack of resources, but also because to do so we probably would have to sacrifice the vocational component of the school, and that we don't want to do.

THE VOCATIONAL PROGRAM

The curriculum of the school is divided into vocational projects focused on agriculture, stock raising, and fish farming. There is one project per grade level, and teachers and students ensure its sustainability. The vocational program consists of the following activities: Grade 6-gardening focused on medicinal plants; Grade 7-gardening and rabbit-raising; Grade 8-maintaining a greenhouse and offering veterinary services; Grade 9-producing vermiculture and compost; Grade 10- practicing aquaculture; Grade 11-practicing aquaculture.

The entire vocational program follows practices of organic agriculture and husbandry, and the projects are designed to be interdependent: The organic waste from the orchard and greenhouse is used in rabbit-raising, vermiculture, and aquaculture; the compost from vermiculture is used in the garden; and the cycle repeats itself. The programs teach children valuable practical and entrepreneurial skills that they can use to help their families improve socioeconomically.

Each vocational project exemplifies a "community of practice" (Lave & Wenger, 1991; Wenger, 1998). At each grade level, students start a new form of production (or a new aspect of the production, in the case of aquaculture) at the periphery, and as they become better versed in the various aspects of production, the teacher gives them more responsibilities and teaches them more complex tasks. (In some cases, students have used the skills and knowledge acquired at school to start their own independent businesses.) All the activities are contextual in that they take place in a real setting, and they are inherently participatory because,

although the projects are small in scale, they are large enough to require the participation of several students to succeed. Given that the region's main economic sector is farming and livestock, students gain a better understanding of their social reality and have inevitably transformed themselves through the actions of doing and learning. As an 11th grader said, "The projects have allowed me to better understand my parents and the difficulties they have endured to support us. I can now even see that I have the power to create new and important things."

SOCIAL RENEWAL IN PRACTICE

Comparing the theory of a critical pedagogy of work with Peñoncito's vocational program reveals many parallels. The school's commitment to social well-being in general and social justice in particular starts with its mission statement and its three overall themes: democracy, environmental education, and sex education (to curb the high teen pregnancy rate in the region). Regarding the issue of violence, the mission statement reads in part, "[The school] seeks to form citizens capable of defending human rights and who can foster democratic processes of citizen participation and self-generated projects that minimize violence . . . and intolerance toward others." A parallel mission of the school is to seek in small ways to improve the socioeconomic standing of local families, as in the case of the seventh-grade gardening project. To diversify their diet, students learn at school to grow vegetables that locals generally do not eat (e.g., spinach, radishes, green beans, Brussels sprouts) and try out recipes based on the produce. Children then have to grow them in their home garden (most homes have backyard vegetable gardens) in the hope that these vegetables will become an integral part of the family's diet. As one parent told me, "One of the vegetables my daughter has learned to grow, the one that has really stayed in the family, is spinach . . . my wife loves it." It should be noted that the school and the community have been tightly integrated since the school's founding. Parents and teachers together petitioned the Colombian Ministry of Education to create the school, and parents participated in the building of classrooms and general improvement of the campus. This has allowed parents to develop a sense of belonging toward the school and a sense of trust toward the teachers and staff. As a result, parents are by and large receptive to new ideas emanating from the school if they see a practical application at home.

A political battle that staff and students have undertaken since the school's creation is related to public accountability and transparency. In a region dominated by political graft, including the buying of votes, the

school has shaken the political terrain by organizing public forums where they have invited local politicians and demanded from them accountability for their actions and campaign promises. Politicians have not appreciated these calls for increased transparency and have found different strategies for sabotaging the school, including withholding funds for a much-needed water supply system. Nonetheless, through these forums, teachers have provided students and parents with a language, set of practices, and sense of empowerment to challenge existing oppressive structures.

Another aspect of this critical pedagogy of work is the highly participatory nature of the projects, which is manifested in two main ways. First, students participate in all aspects of the production, and teachers create a system of rotation to ensure that all students master the production process. "It's very important that all children, boys and girls, participate in every stage," said the teacher in charge of the organic garden. "Sometimes girls want to do less because of the hard physical labor, but I tell them that in order to obtain a high grade, they have to work as hard as the boys." The aquaculture teacher, who teaches the upper two grades, encountered this issue as well. "That's a big problem we faced at first. Girls didn't want to handle the fish or get into the ponds. Over the years we have more or less solved the problem because younger students see that we treat everyone equally here." Fishing is a notable example of a gendered activity historically dominated by males, and the school has been instrumental in opening up opportunities for females. A 12th-grade female student said,

My dad and my brothers always went fishing on their own and didn't take me with them. Now that I know about aquaculture thanks to Professor Tamaris [the aquaculture teacher] my dad asks me to come along, something that had never happened before. I still have a lot to learn [about fishing] but now I feel much closer to my dad because of that.

A second form of participation is in the sharing of profits or goods produced. During the time of my research, the only project generating a profit was the sixth-grade medicinal garden. The profits derived from selling twigs and branches of the medicinal plants to inhabitants of Peñoncito and nearby towns. Many of these plants are rare and difficult to find, and thus locals place a high value on them. Students not only sold the plants but also provided information on their medicinal use to buyers. By common agreement, the profits were divided equally among the students, the school, and the teacher. It was decided that the teacher

should receive a share of the profits because she has to put in many hours beyond her normal schedule. With regard to the other projects, any products they generate are shared among the students or used for the luncheons that the school organizes regularly for students and parents. The idea of sharing profits has come as a surprise to many parents; in the region, there is little in the way of a cooperative movement because income is generally generated through work as peons on larger farms or through small landholdings that the family may have. So teachers, both in the social science classes and in parent meetings, have talked about alternative labor arrangements such as cooperatives and labor unions, a highly risky proposition in a region historically dominated by landowner-peon relationships in which the peasant has had no bargaining power, and any slightly socialistic idea has been met with extreme violence. Nonetheless, many parents have welcomed these ideas with a healthy sense of curiosity. As one father asked in a meeting led by teachers,

[In a cooperative] how do they make sure that the lazy ones don't take advantage of the hard-working students? How do they distribute the earnings in a fair way? If there's no boss and someone makes a mistake, who will make sure that they correct the problem? How can we create a union if there has never been one here?

Teachers obviously did not have answers to all these questions but explained that they employed the regular academic disciplines, particularly social studies, to provide a larger historical framework to help explain social and environmental problems. For example, given the agricultural, husbandry, and fish farming focus of the school, students study the green revolution and its social and environmental effects in the country. They also study the reasons that Colombia has one of the highest arable land concentrations in the hemisphere and the consequences of this for its rural population—0.4% of landowners own more than 60% of the registered rural land in the country (“En Colombia Hay,” 2004). In addition, they study and practice viable alternatives to the agroindustrial mode of production through the various projects that dispense with synthetic inputs and other capital-intensive strategies. Thus, in the best Habermasian tradition, students, parents, and teachers acquire emancipatory knowledge that helps them envision new realities and possibilities.

Many students, however, do not want to follow in their parents' footsteps by becoming farmers or fishers. They want instead to go to a large city like Barranquilla and study engineering, nursing, accounting, architecture, fashion, or other professions. The teachers encourage the pursuit of higher education, but they always remind students of the impor-

tance of giving back to the community, an example set by the school founders. The school has no solid data on what happens to students after graduation, thus most of the available information is based on word of mouth; according to the school's secretary, about half of the graduates enroll in a higher education institution, and of those, only about 20% study agronomy or a related field. Nonetheless, when I asked several 11th graders what they wanted to study after high school, even those who mentioned that they wanted to pursue an occupation unrelated to Peñoncito's focus said that they appreciated the school's curriculum. As an 11th grader noted,

I want to be an architect, and although growing food is not going to be necessary for my career, I do like to know that I can rely on my hands to grow food. I think that's important, and who knows, maybe one day I can do both. . . . I know many people in the city don't know how to grow their own vegetables, so not only would I be able to speak their language [as an architect] but I would also be able to do something that they can't.

One important aspect of this statement and of the career choices of many students is that Peñoncito suffers from a problem common among traditional rural schools. As has been recognized since the 1960s (Foster, 1963), rural schools have not been successful in stemming the rural-to-urban migratory flow or in encouraging students to pursue postsecondary degrees related to agriculture and livestock production. The real and perceived social and monetary benefits of living in a large city and possessing a college degree far outweigh the dim occupational prospects and less glamorous lifestyle of rural areas. Nonetheless, teachers encourage students to return to the village after obtaining their degrees, knowing well that unless returnees work for the government, have their own parcels of land, or open up their own businesses, prospects for employment in Peñoncito are somber. Teachers feel that their ultimate responsibility is to provide not employment (because this is outside their control) but a critical perspective on life, along with some valuable skills that could provide a modicum of independence from the incertitude of the market economy. As a teacher said, "Our students have a vision of life that many youth their age don't have. Will that help them get good jobs? I don't know. But I do know, and so far our graduates have demonstrated, that they can help make Colombia a better place."

ENVIRONMENTAL RENEWAL IN PRACTICE

The school's mission statement reflects not only its social orientation but also its environmental focus: "[The school] seeks in the medium and long term to foster the protection, love, and defense of natural resources." Peñoncito's anthem reinforces this focus; one of the verses reads, "With ecological vocation a futuristic vision will be forged for the country." One of the clearest examples of this orientation is that all the projects use organic and ecological methods of production. For instance, the school rejects the use of synthetic pesticides or fertilizers and instead relies on several biological methods to maintain a healthy soil, including compost, green manure, natural predator-prey relationships, and crop rotation.

As part of its environmental goal, each project is conceived as a demonstration site for local producers in the region. A notable example is the aquaculture project, the rearing of aquatic organisms. Although there are 11 large marshes in the region, fishing is one of the weakest economic sectors. To counter this deficiency, the school decided to focus on aquaculture in the upper two grades. The goals of the aquaculture project were to awaken an entrepreneurial spirit among students as to the potential for fish farming and also to enhance the diet of locals, most of whom do not eat fish (an inexpensive source of much-needed protein) on a regular basis. The downside of the aquaculture project so far has been the difficulty in setting up an adequate facility. For instance, in 1998, the acidity in the pond water was too high for the tilapias, which prevented their growing and breeding. According to the teacher in charge, "To prevent this in the future, we would have to do a lot of scientific experimentation, which my students are capable of doing, but we have to use a lab in Mompóx that is inconvenient because it's far away and not always available." (The school does not have its own lab and must use one in a different school.) To compensate for the technical problems related to aquaculture and to capitalize on the large number of marshes in the region, the aquaculture teacher decided to place small underwater cages in the marshes to capture bigger fish. This dual strategy of using ponds in the school campus and cages in the marshes has allowed students to experiment with two different methods of fish harvesting. The idea of using small cages was completely innovative for the region and captured the imagination of fishermen, a few of whom decided to put it into practice with modest success. Another innovative practice has been to offer workshops at the school to encourage fishermen to stop using dynamite for fishing—a local custom with highly damaging effects on the overall fish population—and to teach them more sustainable ecological

practices, such as making nets with a large mesh to ensure that only the bigger fish are caught. In an interview, one of the local fishermen said, “Teacher Tamaris [the aquaculture teacher] and the students are very kind. They have taught us good techniques to protect the fish while still being able to feed our families.” The close relationship that has been developed between the school, students, and community members has helped students to feel that they are socially useful. An 11th grader told me,

Last year [as a 10th grader] when we went with the teacher to work with the fishermen I was nervous. There was nothing I could offer. Now, I know about the importance of the cages and how to make them and install them. A few of the fishermen have warmed up to the idea. I feel this is great because now I feel I can help others.

Along with promoting solidarity among community stakeholders and environmentally sustainable forms of production, the school has been at the forefront of legitimating oral, noncommodified forms of knowledge related to the projects. In the case of fish harvesting, community elders were invited to the school to tell stories about fishing in their youth. In this way, students learned that decades ago, one could find in the marshes *bagres* (a type of catfish) that measured one meter in length, whereas today, the longest measures only 40 centimeters. Students also learned about the *coromorán*, a native fish considered a local delicacy that became extinct with the introduction of nonnative species such as tilapia.

Another illustration of the valuing of oral knowledge as a community asset occurred in the sixth-grade medicinal garden project. The teacher and students interviewed local mothers and grandmothers to find out about plants that they employ (or used to employ) to cure common ailments. After compiling the lists from these interviews and comparing them with botanical books, they identified about 50 species of plants with medicinal value and planted at least one specimen of each. In this way, students learned about such rare plants as *anamu*, useful against the common cold and fever; *malambo*, for getting rid of parasites; and *tua tua*, an excellent antidote to swelling. The medicinal garden thus became extremely important in revitalizing a form of traditional environmental knowledge that is in danger of being lost. On one occasion, I asked an eighth grader (who had gone through the medicinal garden project 2 years earlier) if he still remembered the lessons from the botanical garden. We went to the garden, where he proceeded to correctly name about 20 of the plants with their medicinal value. To the question of

whether he actually applied such knowledge, he replied,

Well, probably not as much as I should [he said with a shy voice]. But I do know more than I used to. The other day my grandmother had a cold and I told her to make a tea of *anamu*. So I went out, got some leaves, and my mom made the tea for her. She drank it all and said afterwards that she was feeling much better.

A final component of the school's environmental philosophy is class discussions and associated activities (mostly in the social science courses but on occasion as part of the productive project itself) on the relationship between industrial societies, mass consumption, and the natural environment. According to the social science teacher, the discussions center on the importance of producing goods that satisfy basic needs (i.e., food, shelter, clothing), entail an environmentally friendly production process, and are long lasting. In one of my visits to the school, a teacher was teaching young students how to make purses out of foil candy wraps. The wraps had been collected from the students' own candy consumption and from trash cans. The beautiful and durable purses were then sold to teachers and in the community. While the students were making the purses, the teacher told them about the importance of reusing materials rather than throwing them away, and a lively discussion ensued about the many things that people in the community reuse on a regular basis without being aware of the resulting vital environmental (and economic) benefit.

In sum, teachers from the various disciplines make a conscious effort to pass on to students knowledge, skills, and sensitivity that make them more self-reliant; to encourage them to respect and rescue environmentally friendly local traditions; to incorporate new practices that have a low impact on the environment; and to develop a sense of appreciation of and care toward the natural environment. In relation to the attachment to nature that Peñoncito tries to transmit to its students through its productive projects and other activities, a teacher told me,

In general the longer you live in the city, the greater the separation between yourself and nature. That's inevitable. It's not felt as strongly by the first generation, but definitely you do [see it] by the second, third, and fourth generation of living in the city. People become so busy in their own lives that they don't have time to spend with friends and family, or just take a stroll in the countryside. And I'm not trying to romanticize the countryside.

We have lots of problems here, I mean, even taking a hike for us has now become a problem because of the danger from the guerrillas or the paracos [paramilitaries]. . . but I've no doubt that we have a closeness to nature that's pretty much absent in the city.

CONCLUSION

In writing this article, I had three goals. The first was to defend vocational education as a vital strategy for challenging many of the dualisms present in contemporary education. A long series of writers have defended vocational education as an intrinsic component of any responsible education. Some, like Marx and Dewey, even believed that it was the most essential pedagogical strategy. Productive work is "the only method of producing fully developed human beings," Marx (1867/1999) once remarked (chap. 15, sec. 9). And Dewey (1916) wrote that education through occupations "combines within itself more of the factors conducive to learning than any other method" (p. 309). Despite important attempts by several governments and groups to revitalize vocational education and make it an integral component of the educational system for all students, vocationalism still holds the unfulfilled promise of making education a transformative endeavor that brings together body and mind in one indissoluble experience.

Second, I set forth a critical pedagogy of work education as an important means to enhance vocationalism. Today, vocational education is overwhelmingly subordinated to the economic imperatives of the nation-state and increasingly to the logic of transnational economics rather than to the moral and ethical dimensions of education. Teaching any student, but particularly poor ones, to fit blindly into industrial and postindustrial capitalism is akin to ensuring that exploitation and unfair labor practices continue unabated. A critical pedagogy of work education offers a theoretical approach that acknowledges the significance of acquiring solid technical skills while stressing the importance of engaging students in an emancipatory dialogue in which they can talk freely about expectations, fears, and frustrations regarding the worlds of education and work. It also introduces students to the history of work and labor, to the struggles of unions and other worker movements, and to alternative systems of economic development while allowing them to work collectively, to learn from each other, and to assume positions of leadership.

Third—and this is the area in which vocational education has made the fewest inroads—I argue that practitioners ought to adopt realistic strategies that make their production processes more environmentally friendly. International organizations have called on businesses worldwide to

implement as soon as possible environmentally sustainable practices; for example, ISO 14000 encourages businesses to minimize the harmful environmental effects of their activities and to improve their environmental performance. In terms of education, the United Nations gave environmental sustainability a forceful push when it named 2005-2014 as the Decade of Education for Sustainable Development (UNESCO-UNEVOC, 2004). This initiative may encourage schools and ministries of education worldwide to pay closer attention to the possibilities for vocational education to promote social well-being in the context of protecting and conserving the natural environment.

Despite the important work being done by UNESCO-UNEVOC, theory and practice that connect social equity and environmental integrity with economic vitality are still a distant reality. A case in point is provided by the official journal of the International Vocational Education and Training Association (IVETA), one of the most important academic communities of vocational educators. Between 2000 and 2005, IVETA published a total of 70 articles, of which only two dealt with the issue of sustainability, and even these only marginally. Therefore, developing theoretical models that address all three of these areas is one of the key challenges that educators face today if vocational education programs are to serve the needs of present and future generations. The school portrayed in this essay provides only one example of the ways in which social well-being and environmental sustainability can be realized. Thus, Peñoncito should not be viewed as a prototype to be carbon copied elsewhere, because it developed a set of practices that responded directly to the unique historical, cultural, and geographic features of this Colombian region. Nonetheless, schools that are located in urban or suburban areas, focused on capital-intensive forms of vocationalism, or situated in highly industrialized countries can still benefit from the lessons derived from this school, and equally important, use them as inspiration for the changes that they themselves want to implement.

Comparatively speaking, few existing vocational programs follow the social and environmental principles outlined in this article. Even the Colombian public school I described has deficiencies—for an extensive treatment, see Arenas (2003a)—that administrators and teachers are seeking to correct. Still, schools like this one demonstrate that even with few material resources, it is possible to make vocational education an invaluable asset for children and communities. As a seventh grader said after working in the organic garden, “When I ate one of the carrots we had grown at school, it tasted like the best movie I’d ever seen.”

Notes

- 1 ICFES is the Colombian Institute for the Advancement of Higher Education.

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