The Case for an Interdisciplinary Education

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Author's Note to All Readers:

Current Conditions

Current conditions in our nation's schools dictate that students are taught math, science, literature, history, and other state-mandated courses in discipline-based classrooms or time periods, where one topic usually seems to have little relationship to another. High school students move between different teachers and classrooms in a highly-fragmented school schedule that permits some electives for the students, but relatively few, if any opportunities for the teachers to work in interdisciplinary teams to prepare and present lessons.

Given the strict time constraints (many schools have gone to periods of 45 minutes or less), and the local and current national testing requirements to gauge student learning, it has been difficult for most public schools to incorporate more effective teaching practices that require increased time, effort, materials, training, and/or money.

Reform Initiatives

Educational reformers as well as classroom teachers and parents have long understood the need for a better education for our students, not only so that they may compete in a more closely-linked, technologically-sophisticated world, but so that they become more active, reflective, and responsible world citizens.

As a result, education has undergone numerous reforms in the past decade: for example, school restructuring in established site-based management and teacher empowerment as two of the most recent attempts at changing the way that we do schooling. Research has proven, though, that changes in decision-making structures do not necessarily influence the teaching-learning process at the classroom level. In other words, for all the expensive changes in power structures, there seems to have been relatively little change in actual student learning.

Curricular reformers, however, have worked at redesigning and disseminating materials in such a way as to better and more directly meet student needs. Since knowledge has been growing at such a tremendous rate in this century, and since it is virtually impossible for any one individual to possess all this knowledge, educators must find new ways of teaching so that the mere acquisition of discipline-based facts is no longer the singular goal of school. It cannot be denied, however, that content knowledge is essential for becoming a well-educated individual, but students must also learn how pieces of new knowledge are interconnected, and how they relate to previous knowledge obtained.

Consequently, school curricula must take on a new role, one that involves looking at the teaching-learning process in new, as well as very old ways. While innovative educational methods and organizational structures for teaching have been introduced regularly over the past several decades (the open classroom, tracking, mainstreaming, heterogeneous grouping, cooperative learning, magnet schools, etc.), there have also existed effective teaching techniques for hundreds of years.

Looking Back

Around 400 B.C., Socrates' school consisted of the entire "polis," a community balancing the individuals' personal lives with the shared structure of civic, religious, socio-political, military, and aesthetic experiences. His students, among them, Plato, learned from him as they walked along the streets of the city-state; Socrates would ask questions to stimulate reflection and discussions on Life and Truth so that when the time came to act upon human issues and problems, students would be able to effectively construct meaning, critique their decisions, and then reconstruct meaning more accurately. Modern constructivist theory is actually rooted in such premises.

Socrates' students would look not at fragmented, isolated topics because life unfolded in its entirety, not piecemeal; for example, questions of architectural design, legality, ethics, or art criticism, were not separated from an individual's schooling; they were in fact schooling, and students participated in discussing physical properties of stones, weather patterns, aesthetics, jurisprudence, or citizens' needs at any given time, and often in harmony, for all these subjects would have to be considered in the making of wise and moral decisions for the community and for its inhabitants.

Much later, in the Middle Ages, the Jewish theologian, Maïmonides and later, Catholic theologian, St. Thomas Aquinas looked upon education as first an experience of the senses and then of the mind; they saw Man's ultimate and defining characteristic as that of rationality, a belief consistent with Aristotelian thought of a thousand years before. Aristotle's teachings, much of which had been forgotten, led students through a series of syllogisms (the most common form of deductive logic), which could address issues not only of mathematical interest (e.g. If A=B and B=C, then A=C), but also of a more spiritual and philosophical nature, such as whether a man can be his own teacher, and whether faith and reason can be reconciled in a defensible world view accounting for both an intellectual and a moral society.

In Renaissance times, Leonardo daVinci's genius was revealed more than through his remarkable talents in diverse disciplines - painter and sculptor, mathematician, engineer, scientist, strategist, inventor - it could also be found in his exceptional ability to unite all this knowledge in innovative ways - ways which had never been considered before, and which were not considered again for some four hundred years. He designed the helicopter, the snorkel, and the parachute; he envisioned machine guns, the tank, and the bicycle and he sketched human anatomy as well as all sorts of plants and animals to round his knowledge. Leonardo's often informal education from his apprenticeships, painting jobs, work as both civil and military engineer, and as a student of anatomy, botany, and mathematics was closely and systematically recorded in his mirror-image script. His unsurpassed creativity and ability to solve contemporary problems and to anticipate those which did not yet exist gives us an idea of how we, too, may move beyond the seemingly simple linearity of facts and observations in a given situation towards the complex creation of a new whole, far greater than the sum of its parts, so that we, too, may someday arrive at Leonardo's "imagining of things that are to be."

Spanning the era between the nineteenth and twentieth century, John Dewey recognized the value of establishing an environment in which children would be stimulated to creative and reflective acts by real problems and situations inherently relevant and interesting to them; school was not to be like life; it was life, and as such, had to be as real and genuine as possible. Learning and growth would come with the ability to intertwine acquired knowledge in multiple areas for the purpose of constructing - and continually reconstructing - new experience. Therefore, the classroom curriculum drew from all the disciplines, and addressed not only a child's cognitive growth, but his or her "whole" self; this would involve freedom and responsibility, cooperation, and active participation in one's own learning experience. Thus, earlier philosophies espousing a constructivist view of education once again found a more modern-day advocate.

The "Enlightened Eye"

Today, we have the opportunity to learn not only from these teachers, but in many of the same ways as they did: from our immediate surroundings, from our neighbors and families, from the social and economic ills of our countries, from the demands and rewards of society, and from deep reflection. We can learn from our work and play, from our physical skills and limitations, from our intellectual acumen, from our teachers, from each other, and from what educator and artist Elliot Eisner refers to as our own "enlightened eye," which gives us the ability to critically perceive the world around us as well as to articulate what we have seen to others.

One of the ways in which we can help to enlighten our students is by giving them the opportunities to see and hear things in different ways from those which they are accustomed. This could mean studying science from an artistic perspective - something Leonardo did frequently in his life, as he saw vision, light, stars, and the production or reflection of light from the aesthetic perspective - or studying art from a scientific point of view - something Leonardo also did throughout his life, as he strived to prove that painting deserved to be considered a "qualitative science" that reflected the "the decoration of the world." An enlightened eye would be needed in such a "qualitative science," as it is both critical and appreciative of what it beholds; but to truly understand it, one must understand the context (social, historical, cultural, economic, religious, practical/functional, communicative, artistic) of the object under study. These contexts would provide the interdisciplinary understanding of the object, and would help the learner achieve what Leonardo called "universality," leading to knowledge, and thus eventually to wisdom.

The case for interdisciplinary curricula can then be made using Aristotelian logic, and Aquinas' favorite syllogistic form of it, as we may see that:

Since society values reflective and critical thinking skills as desirable traits of a knowledgeable and wise citizen, and since myriad opportunities exist (e.g. in businesses, places of worship, museums, homes, government) where learners may gain these skills and knowledge in the world beyond a traditional school or classroom, then it is incumbent upon that society to provide learners all appropriate measures with which to acquire such an education --- whether it be inside or outside the schoolhouse.

Significant Themes

The design of interdisciplinary curricula is intended to address the above needs, in that it proposes the discussion of significant themes whose threads cross time, continents, generations, races, religions and other apparent differences. These themes are derived from the collective works of both Humanity and Nature, thus interweaving as well as recognizing the existing interconnectedness of the arts and the sciences, people and their world.

The themes that guide further curriculum development must meet both intellectual and practical criteria; for example, themes must involve concepts that are not only related, but that are essential to each discipline; the teaching of the theme interdisciplinarily must mutually benefit each discipline and allow learners to better achieve an understanding of related concepts; the thematic teaching of contextualized subjects must somehow "transcend the subject bounds," fostering metacognition; and the interdisciplinary theme must make a significant contribution to some "broader outcome," perhaps by transforming the learners' approach to education, or by teaching learners multiple perspectives and the appreciation of such new skills and viewpoints.

Many themes - such as Protest & Patriotism, and Growth & Change - will seem familiar, for they have often been portrayed in music, film, dance, art, theatre, and verse. Others - such as Thought & Action, Cognition & Metacognition, or Vision and the Scientific Habit of Mind - may seem more enigmatic, often more difficult to articulate, occasionally more controversial.

Reflection upon these themes is a vital step towards understanding who we are, individually and collectively, and towards one day doing something valuable with that knowledge for ourselves, for our children, and for our civilization.