

Facts and Faith: Teaching Science from a Christian Standpoint in a Post-Modern Age

Early May is the season of contented mating and proud parenthood along the banks of the River Charles. Only this morning, I spotted two terrapins floating on an old tree trunk, content in each other and with the morning's sun. Further along, two proud Canada geese displayed their brood of downy goslings for all the world to admire. These moments of perfection are moments in the human quest for truth when the forces of faith and reason click in a collective effort to explain and give glory for the created world and wonder of life. The natural world around us has so much to teach, not only knowledge of facts but wisdom for life, if only we are prepared to open our minds and our hearts.

The advances of Galileo and Newton led modern thinkers to reject the ancient understanding of the world as organic, and to replace it with a mechanistic model. Armed with this mechanistic outlook, which reduces reality to a set of basic particles and forces, the modern scientific enterprise set about unlocking the mysteries of the universe, presuming that even the greatest mysteries were now within reach of their scientific method. Rather than seeking the answers to the great questions of life and death through faith, modern thinkers looked to hardnosed, empirical data and to hypotheses advanced, proved or rejected through the scientific method for certainty and reliability.

But the world keeps evolving and our understanding of life keeps changing, and this age of post-modernism has brought another new way of understanding the whole process of learning (Grenz, 1996). The atomic structure of the material world reveals that it is dynamic, relational, paradoxical, predictable in its effects, and yet uncertain and relative, as Einstein insisted. Accordingly, the view of science has changed from one that has answers to all of life's questions to one that understands science, like any discipline, to be contextualized, conditioned and ambiguous. The best of science now knows that the great mysteries will always remain so. Further, no longer are we prepared to accept the objectivity of any learning process and outcome; what learners bring to the study and the socio-cultural context in which they work makes a difference to learning outcomes. Yet science continues to be taught and examined as if it had never left the age of modernism; to a large extent it still reflects the modern understanding of science as objective and certain.

Post-modern understanding of faith

Catholic understanding of 'faith' has also shifted in comparable ways from the modernist stance of absolute truths revealed and taught as infallible beliefs toward deep faith convictions that can embrace paradox and ambiguity; faith in the age of post-modernism is more of a leap than a certainty. The modernist legacy often poses faith and science as enemies, but tradition, time, and perhaps postmodernity, suggest they are more entitled to be friends and partners. From early Christianity, most biblical scholars have recognized the need to interpret the Bible in the light of wider knowledge.

. A primary theological warrant held by Catholicism for commitment to education was the conviction that faith and reason are essential partners in the life of Christianity – understanding and faith, reason and revelation need and enhance each other (Groome, 1995). This is well summarized in a classic statement of Thomas Aquinas: “Just as grace does not destroy nature but perfects it, so sacred doctrine presupposes, uses, and perfects natural knowledge” (*Summa Theologiae* 1a. 1.8-2).

In light of post-modern systems of understanding, a key question arises for

Catholic schools - will we continue to glibly accept the assumptions of the modern scientific world view – something that enlightened scientists now reject, or will we take the post-modern understanding of science as an opportunity to teach for spiritual wisdom and in ways deeply compatible with a faith perspective on life?

I am not proposing here that we blend high-school teaching of religion with that of science, or attempt to square scientific findings with dogmatic truths. Rather, I am lifting up the purpose of the science class as the rigorous teaching of content, scientific method, techniques of experimentation - the whole broad curriculum. But if we accept that all education is formative (or indeed malformative) we must remain conscious of the potential that science holds for young inquiring minds, and the endless possibilities of integrating life with learning. As spiritual beings we are constantly searching; there is a constant desire in us to understand the source of that yearning within. Our Christian tradition sees the quest to know the world as the search for God. Christian schools present us with an abundance of opportunities to work with ourselves and our students as time and tide allow, so that we do not end up teaching in a vacuum, transmitting no coherent set of values but whatever might be the flavor of the day. Therefore, I propose a pedagogy that raises a consciousness of our Christian faith, particularly in the traditional hotbed of questions – the science class. It is a pedagogy that honors both the rigorous discipline of science and a life-giving faith. We are, in the end, two-winged creatures – we fly to deep truths on the wings of reason and faith.

Biology as a representative discipline

Science is generally taught as three separate disciplines of Biology, Chemistry, and Physics. This paper concentrates on Biology (the science of life and life processes) as a representative discipline. I locate the teaching-learning process in second level schools that uphold Christian values in their mission and identity, and I suggest Shared Praxis as a teaching approach that lends itself to teaching Biology grounded in Christian faith for a post-modern world. As a case study within the Biology curriculum, I focus on Darwin's theory of Natural Selection ('Survival of the Fittest'); in the current climate, it appears most pressing. My premise is that both the spiritual perspective of Christian faith and the work of scientists have worthy voices to lend in the balanced learning of the origin, development, and continuation of life. Christian educators are uniquely poised to raise a sacramental consciousness – a disposition to see the ultimate in the ordinary - in their teaching of Biology.

More recent Catholic teaching has embraced the dual roles of true contingency in the created order and a purposeful providence in its understanding of divine causality. Although they may have quite different starting points, both science and theology grapple with the mysteries of life. The two interests dovetail around mystery, human desire for knowledge and meaning, and the will to investigate; it is this that lends science resonance with spiritual questions and concerns.

Darwin and Evolution

From the ballrooms of Paris to the bivouacs around Gettysburg, Darwin's theory of evolution was the talking point of the 1860s. There was nothing new in the notion of evolution; many early Greek philosophers had evolutionary views (Wolsky, 1960). Darwin's contribution was to explain how this happens. Hence, it was more for his theory of Natural Selection that Darwin was both lauded and vilified.

Darwin's theory of Natural Selection suggests that many more individuals are

born than can possibly survive. Nature selects as survivors those organisms with some competitive edge that makes them best adapted to survive the harsh conditions of life. In the 'struggle for existence', any member of a particular species who gains an advantage over fellow members is more likely to survive and procreate its kind, whereas those with weaker traits are weeded out: "This preservation of favourable individual differences and variations, and the destruction of those which are injurious, I have called Natural Selection, or the Survival of the Fittest" (Darwin, 1993, p.108).

Darwin's observations threw up many shocking implications, not least was his competitive picture of the world of nature. Darwin's nature is a savage place of predation, violence, competition unto death. Both animal and plant inhabit kingdoms where the strong survive at the expense of the weak and individuals are caught in a terrible fight for existence. No fiercer battle is fought than against members of one's own species. His is a nature of jagged teeth and razor-sharp claws, the world of Skull Island without Kong as king.

The implications of Darwin's theory have much to excite the scientific enterprise and the world beyond. But it would be cold comfort to leave it at that. Christian faith provides another voice – not contradictory, but with a deep perspective that balances the terror of Darwinian systems.

Shared Praxis as an Approach that honors Faith and Reason

Shared Praxis, as developed by Thomas Groome in the 1980s, invites people to bring their lives to faith, and their faith to life, in order to come to a lived faith¹. In the context of religious education, the dynamic moves from people reflecting on their own lives, to the resources of a religious tradition, to return to life with more faith-filled praxis. In the context of science education, students would be given access to scientific knowledge in the context of their own lives and interests, with the specific intention of enhancing their human living, including their spirituality. This approach reaches beyond knowledge in the objective information sense toward wisdom for life. Its pedagogical circle closes (and begins again), inviting participants to see for themselves and make decisions (cognitive, affective, or behavioral) about what to 'do' with their newfound knowledge/wisdom. In this sense, a shared praxis approach to science education can reach beyond depositing data toward enhancing people's lives, including their spiritual lives.

Groome's shared praxis approach involves a focusing act and 5 subsequent (but often overlapping) movements built around a generative theme. After each movement, Groome encourages participants to write down their thoughts, and to share them with conversation partners or the whole group. In that moment, participants get a chance to reflect, to pull their thoughts and feelings together in an environment of engaged, active communal learning.

There are obvious openings for this approach right across the Biology curriculum. As a practical example, I apply a shared praxis approach to Darwin's theory of Natural Selection².

Focusing Act: Groome suggests that the focusing act is tied to interests, not just honoring the existing interests of participants, but also generating interests, as long as they actively engage people. Therefore, I might begin the session by turning students to the natural world with a field trip to a local ecosystem. Any eco-system – a forest, sea-shore, woodland, grassland, back yard, even the town dump, will provide ample evidence

of competition, interdependence, and the struggle for life. What is important is that students get a feel both for the lived reality of ‘wild’ life in both supportive and adverse conditions, and what the different organisms, both plant and animal, might need to survive in that ecosystem.

Movement 1: Groome describes the essential task of the first movement as offering “an expression in present praxis of the theme, so that participants can perceive what is going on . . . regarding this issue in their lives” (p.376). Students’ own thoughts and feelings about the field trip are crucial here; how it engaged them personally. I invite initial expression from life around the theme by asking questions that evoke people’s consciousness of what they have experienced such as: what plant and animal organisms did you notice in the ecosystem we visited; what ways are they dependent on/independent of each other; are any organisms vulnerable or threatened in this habitat; did you experience this habitat as a peaceful/turbulent place and why?

Movement 2: The aim here is to bring participants “beyond recognition to some level of critical reflection” regarding present praxis (p.376). Groome advises that such reflection can draw from reason, memory and imagination so a variety of questions that engage all of these faculties should be crafted. In this case I start by prompting some social analysis and critical reflection on their field trip experience; why they saw what they saw and what they think it means. We might then consider their interpretations in light of Darwin’s theory of Natural Selection using questions such as: does Darwin’s picture of the natural world help you to understand the ecosystem of the field trip; does it help you to relate to your experiences of life in general?

Movement 3: The aim of the previous movements is to enable people to come to recognize their own stories and visions of the learning experience that they now bring into dialogue with both Darwin’s theory and an exposition of Christian faith. Movement 3 involves seeking the practical wisdom of the learning. The substantive element of movement 3 is Darwin’s theory of Natural Selection. Movement 3 initially sets up a dialectic between this theory and student’s own experience by asking questions like in what ways did your field trip experience confirm or refute Darwin’s theory; how does your experience of life confirm/contradict Darwin’s view of nature; does the theory of Natural Selection apply equally to human beings as to animals and plants?

At this point opportunities need to be taken to raise up a Christian vision, so that rather than merely learning about natural selection, we learn from it, and in line with Groome’s great paradigm of learning, we see the implications for ourselves. In addition to the sources of scripture and tradition, material for Christian vision can be drawn from the world of poetry, prose, art, or any aspect of popular culture that brings the content of the science lesson into conversation with Christian faith. For this lesson, the two stories of creation from Genesis 1 and 2 respectively are appropriate. I propose to lift up both accounts on the advice of Hebrew scholarship: “the contrast and interaction of the creation accounts offer a richer understanding of the relationship of God to human kind than we would have if the accounts were read in isolation” (JSB, 1999, p.15).

Genesis 1: ²⁴ God said, “Let the earth bring forth every kind of living creature: cattle, creeping things, and wild beasts of every kind.” . . . ²⁶ And God said, “Let us make man in our image, after our likeness” . . . ²⁷ And God created man in his image . . . male and female He created them. ²⁸ God blessed them and God said to them, “Be fertile and increase, fill the earth and master it”.

Genesis 2: ⁷ the Lord formed ‘adam’ from the dust of the earth. He blew into his nostrils the breath of life . . . ¹⁸ The Lord God said, “It is not good for man to be alone; I will make a fitting helper for him.” . . . ²⁰ And the man gave names to all the cattle and to the birds of the sky and to all the wild beasts; but for Adam no fitting helper was found. ²¹ So the Lord God cast a deep sleep upon the man; and, while he slept, He took one of his ribs . . . and [He] fashioned the rib that He had taken from the man into a woman; and he brought her to the man.

After the creation accounts are read, a Shared Praxis approach would ask, what did the passage say to you on this occasion; how did it make you feel; what memories did it evoke; what images came to mind? Engaging the faculties of memory, reasoning and imagination can elicit many and varied responses. A key theme from this discussion is that the creation account is not a treatise on scientific origins. Here the language of faith speaks of something lying behind or beyond human experience: the origination and ordering of all that exists by the will of the Creator.

The central learning of the Genesis accounts is that humanity is set apart from other animals. Unlike every other species of animal and every species of plant, humans are conscious beings, not bound to live by the force of instinct. This theme reaches climactic expression with the creation of humanity, commissioned with a special role in God’s creation, and gifted a special relationship with God the Creator. Each of us is loved uniquely; we are aware at our deepest core of this love and we search for its source and origin.

Movement 4: The key intention of movement 4 is to invite students to create a dialectic between the Darwinian ‘struggle for existence’ and the loving Creator God of the Genesis creation accounts, coming to “see for themselves’ where they stand or the wisdom emerging.

Movement 3 has set out the resources for students to enter into a conversation between a Darwinian view and a view of Scripture. Movement 4 asks people to engage in this conversation and rather than simply co-relating the message, to integrate it, coming to their own insights and positions. Again, this can be done by a series of reflective questions such as; how is Darwin’s theory resonant or dissonant with a faith perspective; could God’s providence be ‘working’ through natural selectivity; what does this mean for our free will, for human agency, for our responsibility for neighbor; can Darwin’s theory be applied to human society, even if it is true of nature; what about Christian outreach to people who are poor and weak; what insights emerge for you from this conversation? In one way or another, these questions ask “what are you coming to see for yourself” (Groome, 1998, p.378)?

The message of the creation accounts can provide a welcome counter voice to that of Survival of the Fittest, but the reassurance it promises also denotes responsibility. Movement 4 focuses on people coming to their own positions; each student is encouraged to figure out what they really believe and the wisdom this learning has for their lives.

Movement 5: A shared praxis style invites participants to make decisions – cognitive, affective, or behavioral - around the generative theme. God calls us into partnership as stewards of creation (Gen 2:15); movement 5 helps students to consider that responsibility and how it pertains to each one of them.

Further Opportunities for Shared Praxis in Teaching-Learning Biology

Any biology curriculum provides scores of opportunities for a Shared Praxis approach: cell biology and genetics with implications for genetic engineering and cloning; how artificial nutrition, hydration and reproduction has changed our view of human anatomy and physiology; the complexity of systems, organs, and tissues, and the causes and effects of breakdown; organism populations and the effects of different types of pollution; the pressing concerns of ecology and conservation; and the bioethics involved in the decisions we make regarding our own health and the health of the planet.

Conclusion

Influenced by the prevailing climate of post-modernism, our understanding of science has changed; no longer do we believe that merely examining the cells of life through a microscope can give us the measure of the wonder and mystery of life. But if the consciousness of scientists has shifted, so too has the language of faith. It has become much less the dogmatic language of certainty.

This essay proposes that it is possible to have distinct scientific beliefs but deep faith. Even in teaching science, what we wish to pass on is more than a set of facts; it is a way of knowing that honors the complexity of life and the holistic nature of humanity, and nurtures a spiritual wisdom that is life-giving for self, others, and the created order. It moves beyond information to wisdom. It supports an outlook and perspective that honors science as a rigorous discipline whose fruits have advanced the human family in ways unimaginable to our ancestors yet at the same time places science in dialogue with the wisdom of Christian tradition.

Note

¹ Shared Praxis is a comprehensive approach to religious education and pastoral ministry developed by Thomas Groome in the 1980s.

² It is not my intention here to examine the Evolution/Intelligent Design controversy that has beset some public schools, nor is it my intention to directly address the literal value of the creation myth or the theory of common ancestry. Such debate is outside the scope of this paper. However, as these are issues that might be of concern to our students, we need to be prepared to allow them into classroom discussion. Therefore, I have chosen material for movement 3 that will provide a space for discussion of these issues if they arise.

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