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Perspective

The Sorcerer's Tool: Technology as Servant or Master?

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ABSTRACT

After critiquing the four visions of alternative futures proposed by Costanza last year in *Conservation Ecology*, I encourage students to use epistemology (the study of knowledge) in assessing the role of technology, to incorporate the insights of various religious traditions regarding environmental theology, and to focus on the Greek nature of "household" in developing an integrated curriculum of study.

KEY WORDS: environmental theology, epistemology, global vision, household, integrated education, modernism, sustainable development.

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INTRODUCTION

In applauding Costanza's (2000) call for a global dialogue and universal envisioning process in seeking a sustainable and desirable future for all, I wish to support his efforts by first reacting to some of his ideas, particularly the ambiguous role of technology. I will challenge students around the globe to understand that there is more than one way to know something, to incorporate the perspectives of our religious traditions in the dialogue, to reconsider the implications of U.S. hegemony, and to adopt an integrated view of humanity's "house".

COSTANZA'S FOUR VISIONS

It is impossible that old prejudices and hostilities should longer exist, while such an instrument has been created for the exchange of thought between all the nations of the earth.
(Economist Editorial 2000).

Consider the sense of false hope for world peace caused by the first transatlantic telegraph cable in 1858. Similarly, it may be disastrously naïve today to assume that the Internet will engender the type of communication that fosters a universal sense of global stakeholdership among humans living in physically separate communities (Costanza 2000).

In Costanza's matrix of possible futuristic policies and outcomes (Star Trek, Mad Max, Big Government, Ecotopia), technology plays a key and uncertain role. As he notes, "technologies may create as many problems as they solve" (Costanza 2000). It is thus imperative that today's students learn how to evaluate the pros and cons of various technologies, including an ethical perspective. To the slogan of "SEE: Sustainability, Equity, Efficiency" (Costanza 2000) needs to be added "Ethics", not in the relative sense of fairness addressed by equity, but in the absolute moral sense of when is it right or wrong to "play God" with technology (more below).

Indeed, Costanza has offered us a powerful paradigm for thinking about and acting upon possibilities for the future of life on earth. His model illustrates the need for holistic and interdisciplinary thought, *for in the search for truth there is indeed often more than one way to know something.*

IN SEARCH OF TRUTH: THE MODERNIST DEBATE

But they have only analyzed the parts and overlooked the whole, and, indeed, their blindness is marvelous.
(Dostoevski 1880)

Wisely, Costanza (2000) questions "one's faith in technological progress." Given their familiarity and general satisfaction with modern technology, students may be surprised to hear statements such as: "science has failed society;" "knowledge is uncertain;" "technology is a problem, not the solution;" or more dramatically, "A massive intellectual revolution is taking place that is perhaps as great as that which marked off the modern world from the Middle Ages ... The foundations of the modern world are collapsing, and we are entering a postmodern world" (Allen 1989). One may wonder: science a failure? How can this be? Is technology a blessing, curse, or both?

Some philosophers of science (Wolterstorff 1984, Hoksbergen 1994, Lunn and Klay 1994) are suggesting that science, in spite of all of its technical contributions to life, has failed to solve the major problems of society: poverty, hunger, disparity of wealth, greed, envy, conflict, pollution, illiteracy, hatred, oppression, exploitation, unhappiness, misery, etc. Although science has solved many problems, producing marvelous enhancements to everyday life, it can nevertheless fail society if we allow its powerful methodology to distract us from also employing other modes of thought. The famous Scientific Method is not the only path to knowledge, nor does it render certain truth, even in the "hard" sciences like physics, chemistry, and mathematics (Kline 1980, Bartusiak 1993).

Beginning with Bacon, Descartes, Locke, Galileo, Copernicus, and Newton, the Western world *progressed* from the Enlightenment to the Industrial Revolution to the current Age of Modernism, a period of confidence and

optimism characterized by a belief in logical truth, positive science, universal/foundational laws of nature, reductionist research methods, scientists as objective observers of facts, and humans as detached controllers of the world around them. The principal theme of modernism is of a *mechanistic* world that can be manipulated by rational leaders or impartial judges to solve all social problems once science has ascertained all of the pertinent facts. In other words, technicians are capable of solving society's most vexing problems, leading to a "culture of technical control" (Yankelovich and Habermas in Costanza 2000).

To the modernist, building on the medieval notion of natural law (that the cosmos is designed by an intelligent God who instilled it with knowable laws), human reason is the ultimate tool. Neoclassical economics, the dominant school of economic thought, is founded on the idea of *economic man*: individual producers and consumers who behave predictably because they make calculated decisions according to their consciously developed "objective function" to maximize profits or utility, respectively.

Critics assert that the modernist paradigm is lacking (perhaps fatally flawed) because not all truth is logical; science has a normative dimension; few, if any, natural laws hold under all circumstances, so truth is *relative*; knowledge has a subjective element as the scientist consciously or unconsciously makes value judgments in selecting research topics, choice of research method, application of theory, and interpretation of facts; and humans are both exogenous and endogenous factors (coach and player) in the workings of reality. Although the Scientific Method is an enormously powerful tool of epistemology, "scientism," the arrogant attitude that science is the only valid form of knowledge, is an unprovable and rigid ideology no different or less flawed than religious fundamentalism (Haught 1995).

To the postmodernist, the best we can hope for is not certain *Truth*, but "the more modest aim of verisimilitude" (J. Polkinghorne in Newton-Smith 1981). In the extreme, some critics assert that there is no such thing as "brute facts" and "value-free science" (Hoksbergen in Lunn and Klay 1994). For the pursuit of knowledge, the postmodern tool box includes the pluralistic techniques of *rhetoric* (McCloskey 1983, 1993): logic, intuition, art, music, poetry, revelation, metaphor, story-telling, myth, and even illogical means. The key is to engage in fruitful "conversation" with others, whatever it takes.

So, what are students to do about the debate? First, know that it exists and watch for its evolution throughout their educational years, to avoid being ignorant of it during their careers. Second, participate in the debate by thinking about the issues involved. For example, should the focus of economics, law, and science be utility maximization by consumers, the individual person and private rights as sovereign, and human domination of nature, respectively; or egalitarian motives, communal values, and environmental stewardship? Should the test of scientific theories be perfection or "fruitfulness" (J. Polkinghorne in Carnes 1982). Third, give serious consideration to the postmodernists' call for interdisciplinary education and nontraditional modes of inquiry (Lunn and Klay 1994). Economic analysis needs to focus on institutions and culture, not just individuals; and feminist insights suggest that self-interest is not the only motive people use in making decisions about things like family size and labor market choices (McCloskey 1993).

Students need to *think about thinking*: how do we know something? And, teachers need to *think about thinking about thinking*: how do we know when we know something? Postmodernists suggest that what counts most in the learning process is a good argument, i.e., persuasion, whether it is based on objective or subjective information, science or art, logic or illogic. Our whole being is involved in the knowing process and we should therefore recognize, acknowledge, and utilize the reality that our experiences, biases, hopes, and fears cause us to filter, interpret, and translate all incoming and outgoing information. It is thus imperative that, to learn from others, we engage in "conversation" within and among disciplines: truthful discourse, constructive dialogue, through all means of persuasion (McCloskey 1983), a conversation in which we "take differences seriously" and "solidarity seriously" (McCloskey 1993).

PLAYING GOD WITH OUR FUTURE

When academic scholars and professional scientists discuss paths to a sustainable future, an essential dimension is frequently omitted: our religious traditions. To reach global consensus and exercise effective public judgment, we must acknowledge and incorporate the influential role that religious ideas and values have played and will continue to play in shaping humanity's attitude toward the environment and our quality of life. For example, the biblical traditions have significantly shaped our historical understanding of the notions of *dominion* and *stewardship*.

Environmental scholars need to know that pertinent developments are occurring in Judeo-Christian-Islamic theology that will affect the mindsets and world views of many believers. Orthodox environmental theology has progressed through three historical stages of thought about our relationship to nature (Haught 1993):

Apologetic

a defensive posture about how we have treated the natural world (Genesis 1:28; New American Bible for Catholics 1970);

Sacramental

a positive view that all of creation is sacred and deserving of our care (Genesis 1:31; New American Bible for Catholics 1970);

Eschatological

today's hopeful paradigm that the entire cosmos may be journeying toward redemption and eternal wholeness (Romans 8:19-21; New American Bible for Catholics 1970).

However, some of issues involved in daily life are getting increasingly complex and difficult to assess in a moral framework, particularly issues related to technology. We need to add "Ethics" to Costanza's (2000) slogan of SEE *E* because the rapid advancement of technology is forcing us to decide how and when to play God with Mother Nature.

First of all, it is naive to merely assert, as some religious leaders do, that "we must never play God." In reality, we play God all the time: whenever we fix a broken arm, eat a cow or deer, or divert a river for irrigation and flood control, etc. Believers do these things because we think/feel that these actions are consonant with, or at least do not violate, Allah/God/Yahweh's will. Thus, the real question is not *whether*, but *when* and *how* to play God?

As technology empowers us to control more and more of the world (micro and macro) around us, we need to continually update our legal guidelines and moral consciences as to what is ethically appropriate human intervention into the natural world, including our own bodies. Mapping the human genome offers incredible possibilities in terms of promoting healthier people, yet simultaneously raises frightening scenarios of designing "superior" individuals and races. Feeding millions of starving children with genetically altered crops may reduce biodiversity and cause irreparable harm to some species and ecosystems or diminish concern about the world's burgeoning population. Conversely, abortion and contraception can limit population, yet lure us into that dangerous "culture of technical control" (Yankelovich and Habermas in Costanza 2000). Nor does the end automatically justify the means.

A religious principle to adopt is to try to always follow God's will, as we think we know it. Hence, we should promote real values (e.g., health, education, freedom, creativity, responsibility, reconciliation, hope, etc.) and avoid false values (e.g., vanity, materialism, power, status, greed, division, fear, etc.). In the secular world, we must get beyond the naive idea that all scientific "advancements" (e.g., cosmetic surgery, nuclear weapons) are inherently good and should therefore be utilized. Regarding the environment, I cautiously suggest that we need to get beyond the naive position that no species must ever be allowed to go extinct, for some change (e.g., dinosaurs) is apparently an integral part of life in the biosphere and cosmos.

As scientists, we must assume responsibility for weighing carefully and collectively the ethical aspects of our work, including the possibility of unforeseen consequences. A key ethical principle, to which Costanza (2000) alludes, is that technology must remain our servant, not master.

UGLIER AMERICANS?

Wisely, Costanza (2000) calls for global dialogue to develop a "shared vision" of our future, which is "probably the most challenging task facing humanity today" (Costanza 2000). I agree, yet ask myself frequently, why doesn't everyone agree?

I am afraid that the hardest group of humans to convince may be U.S. citizens. Given our political hegemony, phenomenal wealth, technological confidence, intellectual creativity, natural optimism, and generally frontier mentality about the future, we in the United States may be the most resistant to global cooperation on the environment, e.g., America's reluctance to sign the Kyoto Protocol on greenhouse gas emissions. If so, this next century may see our historical image as "ugly Americans" worsen to the point of

global resentment and rage at our perceived narcissism.

Students everywhere, especially in nations that emphasize individual liberty as a primary ethos, should consider why it is in the United States that the National Rifle Association (NRA) can capture the public's attention and mobilize enormous public and financial support to sustain the idea of private gun ownership based on an arcane constitutional amendment about the local need for a well-established militia? Apparently, the NRA has achieved this by framing the gun control issue in terms of private property rights, a theme that resonates with our personal and national identity.

What can the global environmental movement learn from the success of the American NRA? I suspect that the key lesson is the importance of self-interest, i.e., getting individuals in each country to see that they have a direct stake in the outcome. If so, then we should be able to mobilize far greater public concern over the future of the world in which we live. Somehow, we must demonstrate to everyone that they have a vested interest in the outcome—that their right to life is at stake. And we need to show believers that we have jeopardized Allah/God/Yahweh's cosmic plan.

A FRAMEWORK WE MUST LIVE WITH

Almost unavoidably, Costanza's four visions of the future are described with value-laden language (Vanclay 2000) and are imbedded with philosophical and political values and biases (Mead 2000). This divisive approach makes it more challenging to reach public consensus and judgment in a democratic world (Yankelovich in Costanza 2000). To get the global dialogue started and elicit the essential buy-in from everyone, including Americans, we could focus our initial attention on a basic model with which we hope everyone can agree (Ellerbrock 1998). It is a world view that illustrates our interconnectedness (Costanza 2000) and the need for holistic education and global dialogue. Then, we could collectively answer Costanza's call.

First, consider what three core disciplines—*economics*, *ecology*, and *ecumenism*—have in common? Often perceived as philosophic enemies, the disciplines have common roots in the ancient Greek notion of a household, *oikos* (Meeks 1985, Young 1992). In their etymological meanings, the disciplines were originally defined as:

Economics

study of the management of a household's financial resources;

Ecology

study of the management of a household's physical resources;

Ecumenism

study of the management of a household's moral, ethical, and spiritual resources amidst a plurality of values. An ecumenical person is one who seeks common ground as a synthesizer among various perspectives and traditions.

Some scholars argue that the disciplines are hopelessly split because they serve or have adopted competing goals: economics vs. human welfare maximization, ecology vs. species' survival, ecumenism vs. moral freedom (Merton 1983, Young 1992). Other scholars are more optimistic (Costanza 1991, Nelson 1991, Daly and Cobb 1994). If we are to integrate the best insights that each discipline has to offer about life on earth, then recovery of the notion of a household may serve as a common metaphor for fruitful conversation (Haught 1995).

In sequence,

[Fig. 1](#) asks, "How big is the household?";

[Fig. 2](#) reflects the proper understanding that our common household contains the entire biosphere and all human activity therein;

[Fig. 3](#) broadens the interconnectedness by including all academic disciplines and perspectives;

[Fig. 4](#) reflects Schilling's (1968) argument that in the search for truth all knowledge—scientific and religious—is theoretical (born in wonder), empirical (grounded in reality), and transformative (changes the learner);

[Fig. 5](#) ties the three dimensions of knowledge to the threefold mission of our Land-Grant University System (Ellerbrock 1998) and its approach to teaching and learning; and,

[Fig. 6](#) illustrates the increasingly central importance of an integrated education.

Fig. 1. Oikos: How big is the household?

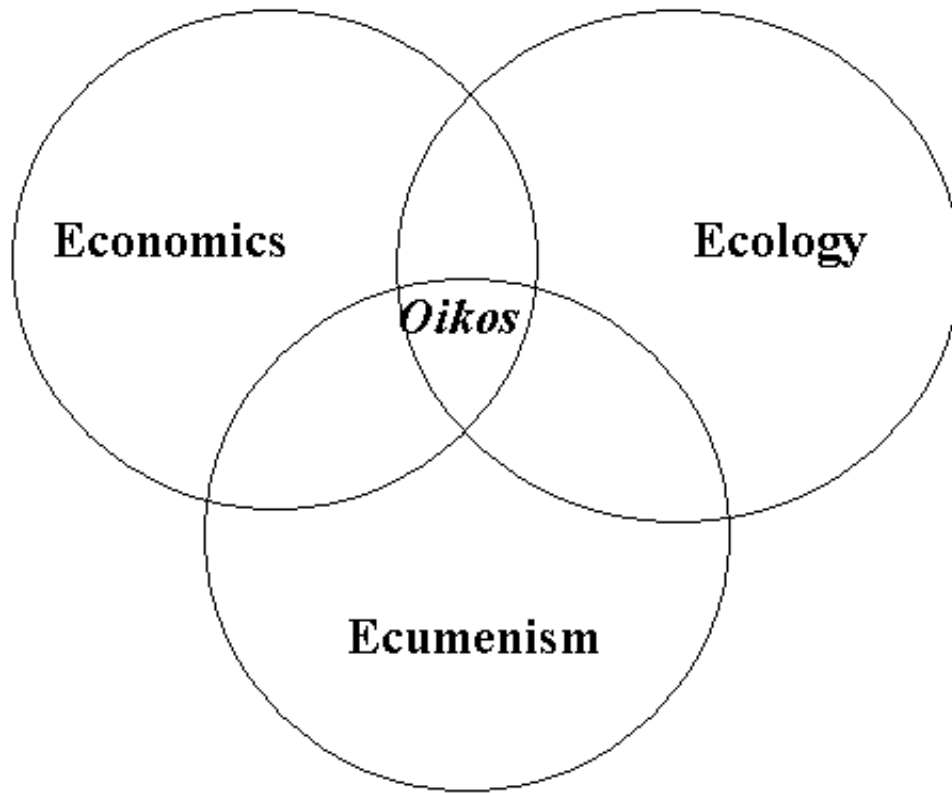


Fig. 2. Oikos: An integrated view of the household.

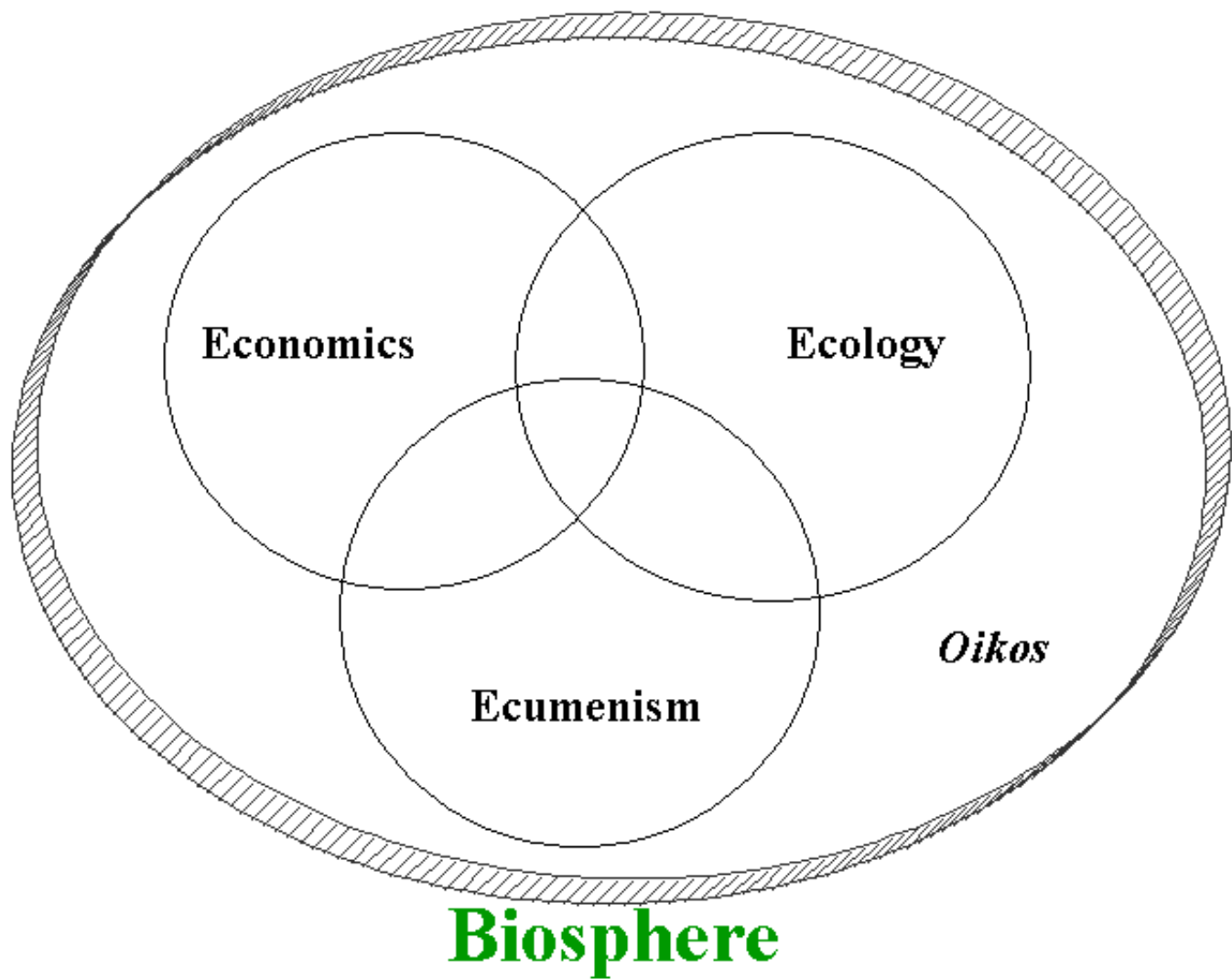


Fig. 3. Oikos: Other disciplinary members of the household.

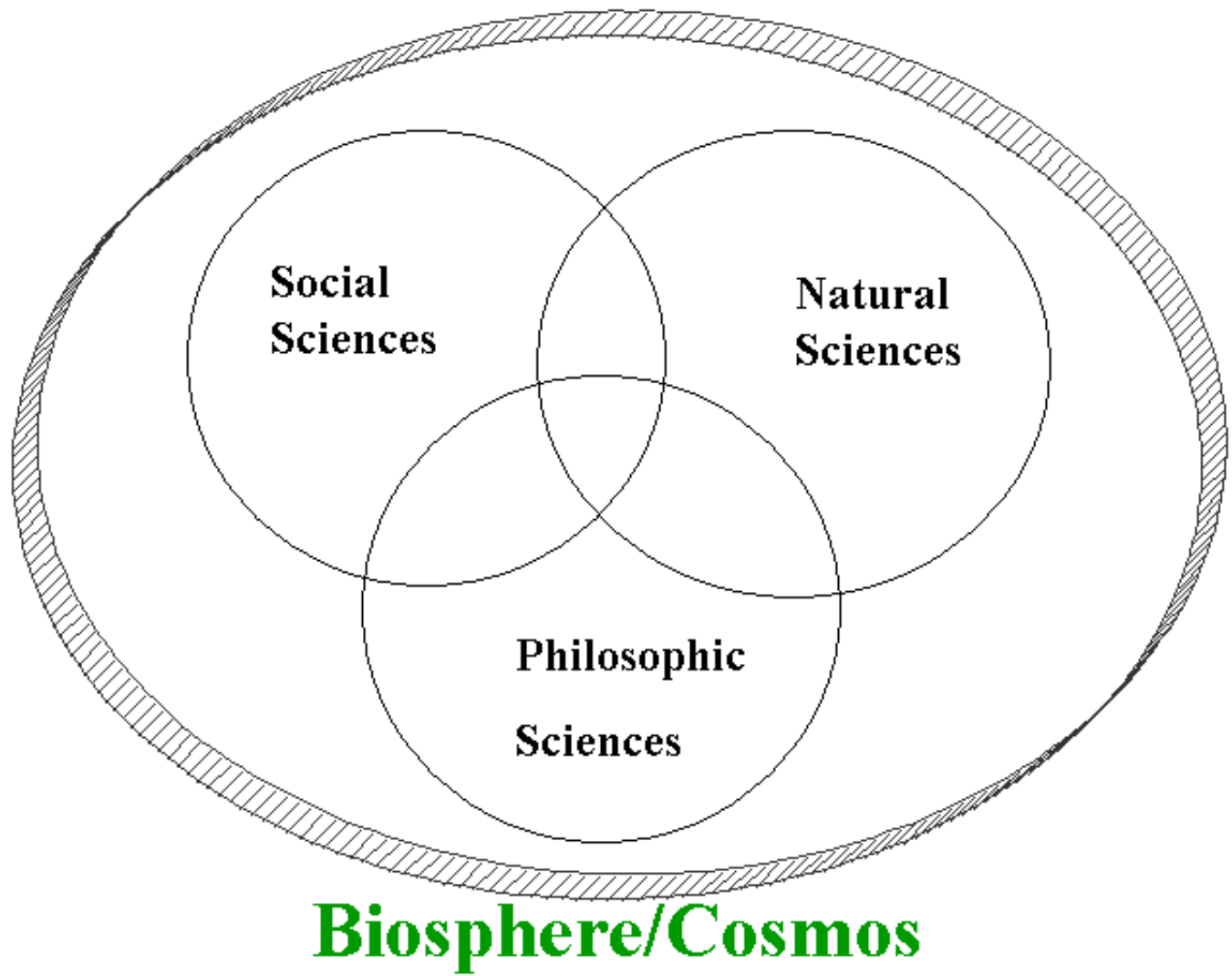


Fig. 4. Truth: The three dimensions of knowledge (see Schilling 1968).

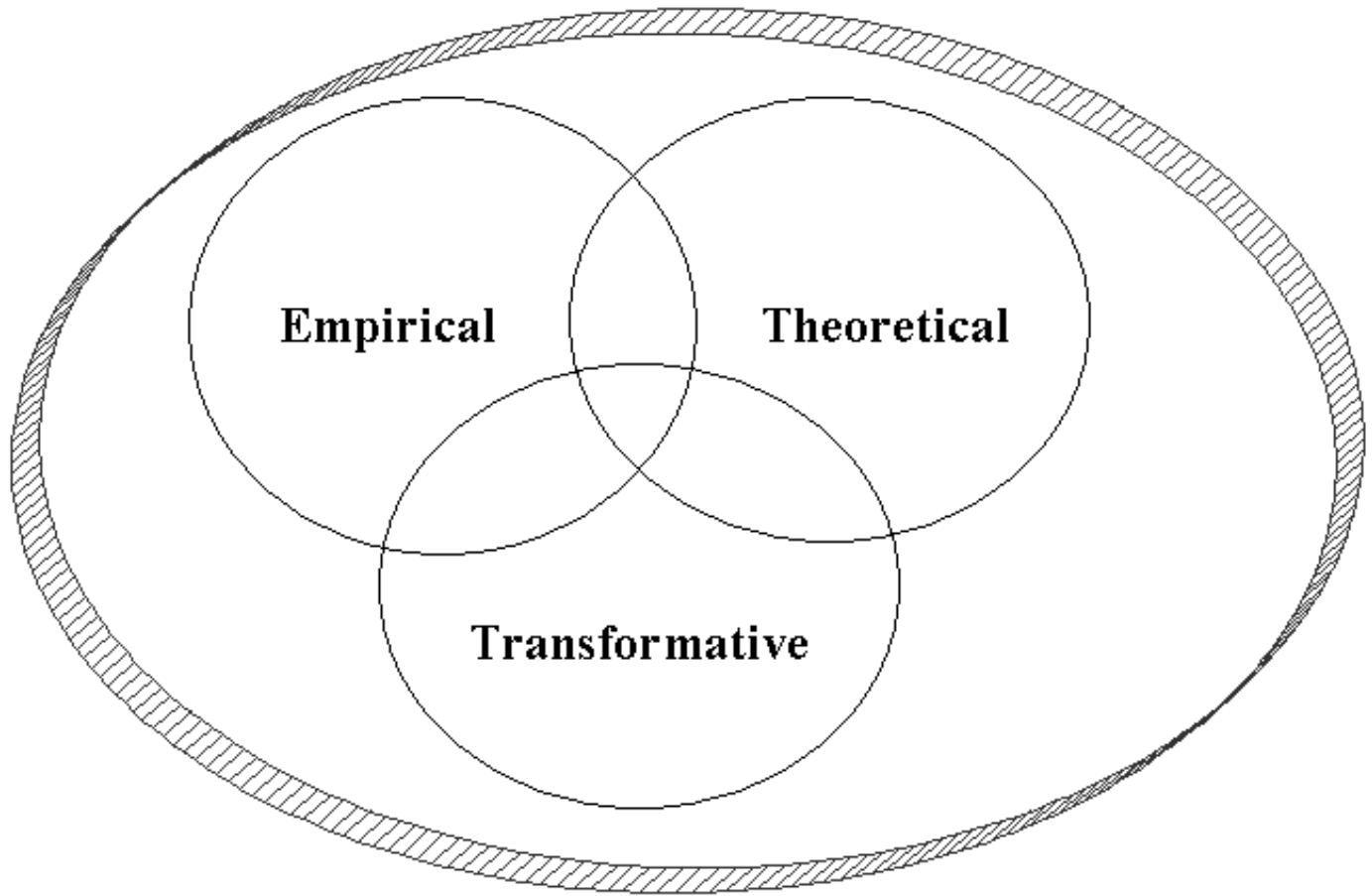


Fig. 5. Education: The three missions of the land-grant university system.

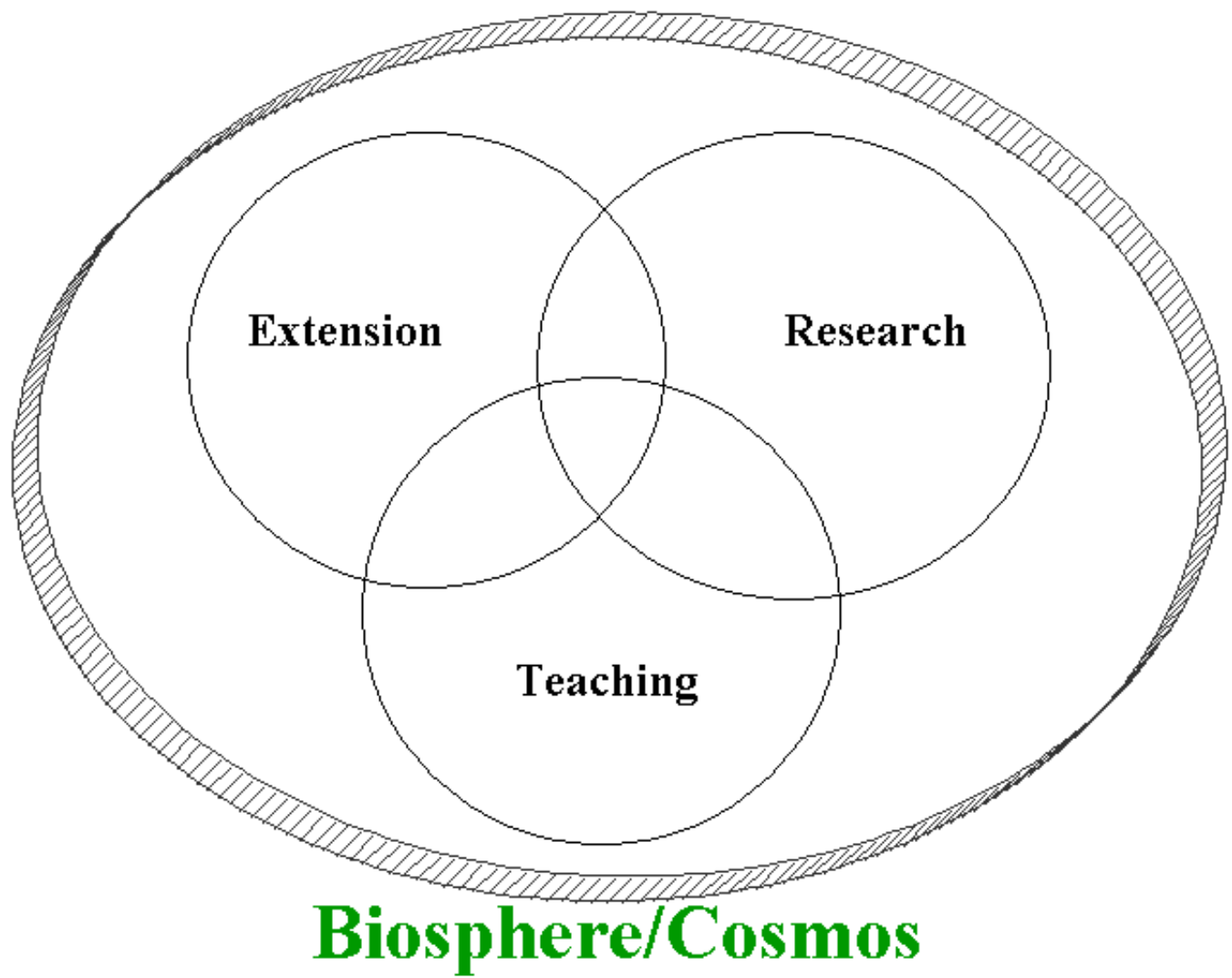
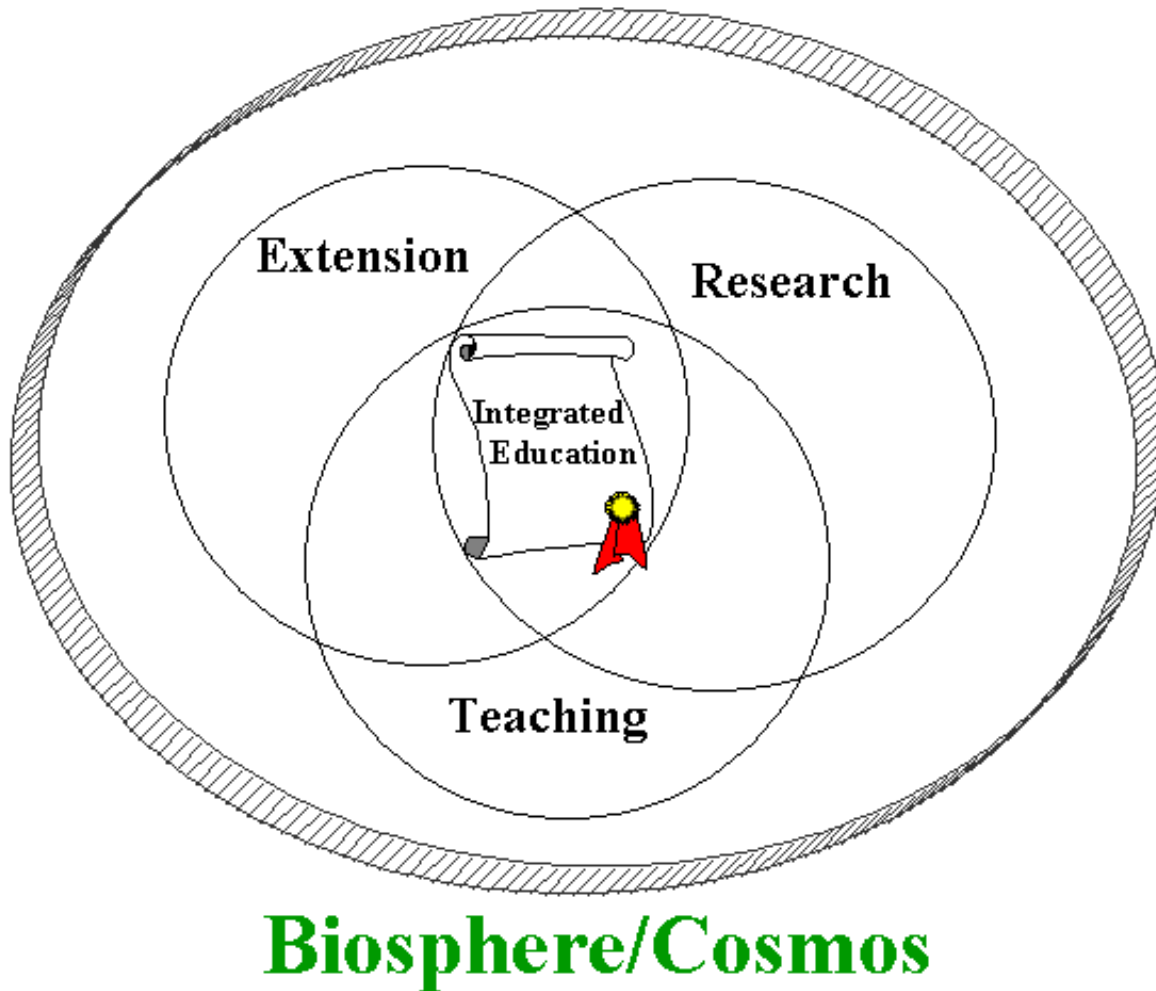


Fig. 6. Integration: The heart of holistic education.



Dealing with uncertainty is scary. Because technology can help or hurt the quality of our lives, students need an integrated education in order to identify and weigh the objective and subjective merits of potential new technologies. Critical thinking is a human skill that removes some of the drama in Costanza's dualistic paradigm by enabling us to have a more flexible worldview about technology: to know whether to be optimistic or pessimistic on a case-by-case basis. It is a key to recognizing our servants vs. masters.

The notion that we all share one household is central to each of Costanza's four visions of alternative futures. It is a transcultural framework that must unite our visions of our future. It means that mere understanding of each other's differentness is not enough. It means that we must live together in harmony.

CONCLUSION

Wisely, Meadows (1966, in Costanza 2000) pleads for education about social goal setting and the visioning process, "very underdeveloped skills in our society." I agree and will close with two quotes urging students to seek breadth as well as depth in their education, and urging professors to model integration.

Breadth is not a contradiction of depth, but its complement. No one person can know enough to put a man on the moon, in the sense that grandpa could know just about everything about managing his corner

grocery store. So different kinds of people, with differing knowledge and skills and networks of friends and acquaintances, have to come together in organizations designed to transmute their separate expertnesses and their collective insights into wise decisions about real-world problems, which are all interdisciplinary, interdepartmental, interprofessional, and (increasingly) international. And the priceless ingredient is this: Each of the participants in this complex choreography has to have some understanding of the whole scene in order to play a relevant bit part in the big complexity.
(Cleveland 1981)

Who, if not the university, shall train the integrators? And what better way is there for the university to pull itself together than to try to pull the world together? Let there be a core course on *Survival of the Species* (SOS for short). Its object would be, first, to make each of us aware of our common peril. (If we cannot get together out of love, perhaps we can huddle in fear.) Second, it would recommence the education of the whole person: the need for every learned person to know something about more and more, rather than more and more about something. Third, it could teach humility: the many knowns that are unknown; the many specific cures that cause unspecified ills; the difference between man, created in God's image, and God. Fourth, it could inspire regard for the "other:" the other discipline, the other tribe, the other self, the other world of the inarticulate and inanimate.
(Botstein 1978)

RESPONSES TO THIS ARTICLE

Responses to this article are invited. If accepted for publication, your response will be hyperlinked to the article. To submit a comment, follow [this link](#). To read comments already accepted, follow [this link](#).

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