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About ISEM
The International Society for Ecological Modelling (ISEM) promotes the international exchange of ideas, scientific results, and general knowledge in the area of the application of system analysis and simulation in ecology and natural resource management. The Society was founded in Denmark in 1975, and today has chapters in Germany, Italy, Japan, and North America. ISEM sponsors conferences, symposia, and workshops that promote the current philosophy in ecological research and teaching, and in the management of natural resources. The Society publishes the newsletter ECOMOD, and its members frequently contribute articles to the official scientific journal of the Society, Ecological Modelling.

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Perspectives
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An Immodest Proposal for Systemic Change in Higher Education

Over the past 18 months, I have been involved in a multi-university study of the theoretical bases for systemic change in agricultural higher education. The primary "deliverable" from this project funded by the USDA Department of Agriculture has been a book manuscript (Kunkel et al. ms.). But for me, the real product of our effort has been a growing realization that we in academia must act to change systemically the way we effect higher education (in the U.S. and most of the Western world), and that systemicity itself must now assume a central place in education, both strategically and tactically. That thesis was developed as one of the book's chapters (Neill et al. ms.), which provides the basis for this article.

The central proposition is this: The complexities and pace of modern life have outstripped higher education's capacity to educate in a truly relevant way—to foster the intellectual development students need, not just to survive, but to thrive. At the very time when integrative problem-solving and synthesis, communication, and cooperation have come
to the fore as essential elements of conflict resolution, we in colleges of agriculture and science continue to teach our students more and more about less and less. Our faculties, always research-oriented, increasingly are reductionistic and even narrow-minded in their scholarly perspectives, to the detriment of innovative, integrative educational programs. How can we in colleges and universities simultaneously give our students both rigorous training in increasingly complex technical subjects and a working knowledge of the larger world upon which those subjects impinge and evolve? The short answer, I suggest, is revitalization of higher education around intellectual teams, comprised of undergraduate students, graduate students, faculty, and other professionals within and beyond the university, using systems thinking and techniques (systemicity) to learn together, and to solve complex problems in a cooperative way.

The long answer, replete with specifics, has many reasonable variants. Here is the crux of the one offered up in our book chapter (Neil et al. ms.:). One or a few courageous faculty—renaissance men and women, with a bent for systems thinking—would administer and facilitate the work of teams involving, perhaps, 20-50 persons each; each team would focus on a single, broad issue—e.g., sustainability of agroecosystems—which might evolve over time. Teams would have indefinite (tirspans (multi-year or even decades), but with continual turn-over of membership as students graduate and other partici-

pants come and go. Composition of membership would include students from various majors (disciplinary emphasis areas), from freshman to post-graduate, with appropriate adoption and evolution of functional roles; faculty (and even administrators) representing the various dimensions of the focal issue and offering appropriate tools for dealing with aspects of it; volunteer emeritus faculty who would serve mentor roles; and non-academics who would shape and sharpen the focus in terms of "real-world" context. For the undergraduates involved, the team effort might comprise, say, 25-50% of the academic program, in parallel with conventional courses, to make room for the teamwork, 25-50% of current coursework would have to be combined with that which would remain—perhaps, through modularization—or be absorbed into the activities that comprise the teamwork. For example, elementary math and statistics, computer use and programming, English composition, logic, rhetoric and even some "capstone" courses might be incorporated, in a formal or casual way, into such team activities as problem definition and development, data reduction and analysis, report writing and oral presentation and defense of ideas. Because much that is now "spoon fed" would have to be gotten via individual study and effective intellectual exchange within the learning community, success, on an individual or institutional basis, would not come easy. Team members would have to be bright, self-starting, hard-working, well organized, communicative, tolerant of
diversity... It might be best to begin the effort as a voluntary honors pro-
gram—voluntary and honorary for all participants, including those paid and
those paying (the distinction between teacher and student begins to get a
little vague). Agriculture and other applications of natural-resource
ecology, with their vital and multidisciplinary character, make them
collectively the logical focus and
leader of the revolution.

The primary business of these intel-
lectual teams would be the intellectual
growth of the individuals involved.
Although we were thinking here
mainly of the students, the preceding
sentence can stand as drafted,
without qualification. In fact, the
intellectual growth both of students
and teachers could be measured by
how they answer such questions as
these (paraphrased from Orr 1994):
Where does your field of knowledge
and career path fit in the larger land-
scape of learning and human enter-
prise? Why and how is your particular
expertise important to the long-term
human prospect? What are the
ethical, social, and political implica-
tions of your scholarship?

My colleagues and I went on to
consider intellectual teamwork in the
contexts of “deliverables,” perfor-
manence criteria, relationship to re-
search, and leadership training. Of
special concern was the issue of
intellectual discipline. Without such
discipline, there is always the real
danger that the whole of any human
enterprise will turn out to be less than
the sum of its parts. Experiential
learning (Kob 1984) to have real
educational value, must be more
than simply experiencing life pas-
sively. Indeed, one must work to
ensure a richness of experiences.
Perhaps most important (and afford-
able) is a careful and ambitious
reading program—which should
begin well before college. How the
bright, well-rounded young person
can achieve and maintain a commit-
ment to reading and other enriching
experiences, amidst the frivolous
distractions of modern life is a hard
puzzle, and, I submit, an important
problem to society.

Now, let’s return to the systems part
of the proposal. Without the sys-
tems context, intellectual teams that
have the mission, diversity, and
intensity I envision...simply could not
function. Only with systems thinking
will it be possible to move higher
education towards increased capa-
bility for generalized synthesis and
problem-solving—just when increas-
ing information-flow and complexity
would seem to demand more spe-
cialization. Only with systems
thinking is there any hope of bring-
ing together the parallel universes of
matter (math, science, technology)
and mind (humanities, liberal arts,
sociology, economics, policy), and
their interfaces (psychology and
philosophy)—of explicitly treating the
interactions between “natural” and
human systems. Only with systems
thinking would our intellectual teams
be able even to communicate within
themselves, let alone effectively
function to solve problems and
convey their solutions to society.
I hasten to add that systems thinking does not mean the formulation of every problem as a "hard" systems model coded to execute on a computer (Veltor and Moore 1992). However, I do believe that every problem can be organized and communicated as a system of interacting components. Some of those components will yield to "hard" systems analysis, some will need to be treated as "black boxes" with ill-defined boundaries, and the whole thing will need to be considered a "soft" system with no boundaries at all (Checkland 1981). Depending on disciplinary orientation, training, and intellectual proclivities, what is a hard subsystem to one team member will appear to another as a black box. That is permissible: A good systems model can accommodate unevenness in information and even ambiguity ("fuzziness"). Computers and related technology will prove invaluable both for representing organization and function of the substantive system on which teamwork is focused, and for communication within and beyond the team. In particular, the growing ease of electronic communication will facilitate teamwork at multiple geographic locations. Taken separately, neither the "teamwork" nor the "systems" part of this proposal is particularly novel. Every regular reader of this journal will recognize that systemicity is the natural way to deal with (i.e., define, solve or otherwise manage, and communicate) complex problems. And collegial learning communities already were well developed in some European universities and American Ivy League colleges by the early nineteenth century; a good modern example of such intellectual teamwork is provided by the Hawkesbury School exercise at Australia’s University of Western Sydney (Macadam and Packham 1989; Bawden 1991). It is the union of intellectual teamwork and powerful systemicity that technology only now has enabled. It is a union whose time has come. Systemic change in higher education is essential—not just for survival of the institution, but for survival of society.

Literature Cited


Kunkel, H.O., J.L. Maw, and C.L. Skaggs, eds. Ms. Concepts for Change in Higher Education: Agriculture and Related Areas. USDA-CSR1 Challenge Grant Project on Systemic Change in Undergraduate Education in Agriculture, College of Agriculture and Life Sciences, Texas A&M University, College Station, TX, USA.

Editorial Note

Several factors effectively combined to delay the publication of our newsletter. A complete listing would cause loss of credibility before we had a chance to establish any. We would like to apologize and thank you for your patience. Please take note of the following changes.

1. CHANGE OF EDITORSHIP:

The new editors of ECOMOD are: Wolfgang Pittroff, Department of Rangeland Ecology and Management, Texas A&M University, College Station, TX 77843, USA (Editor-in-Chief);

Ellen Pedersen, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843, USA (Associate Editor);

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2. CONTACT FOR ECOMOD SUBMISSION OF CONTRIBUTIONS:

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An FTP site was created for uploading files pertinent to ECOMOD. This is particularly relevant for the uploading of contributions to ECOMOD as we would like to strongly encourage you to submit your contributions via FTP. This will save time, effort, paper and nerves. All IBM-compatible file formats are welcome. The FTP site can be accessed as: ftp.stat.tamu.edu; log-in as anonymous; password: your-e-mail-address; place to upload to: subdirectory ecomod (cd ecomod). If you have questions, please ask your local guru or e-mail to us.

3. INTERNET - WORLD WIDE WEB

We believe it to be timely to establish presence on the World Wide Web. The Laboratory for Biostatistics and
Editorial Note (from p. 3)

BioSystems Modeling, Dept. of Statistics, Texas A&M University will host a homepage for ECOMOD. The success of this project depends very much on our readership, i.e., YOU. You are probably aware of the vast number of topics on the Internet of interest related to issues covered in ECOMOD. Please submit your suggestions for establishing links to these other sites. You may view this project also as an excellent means for our society to distribute information in a much more timely fashion than the past.

4. SPOTLIGHT ON...

The next issue of ECOMOD will contain a new section entitled: "SPOTLIGHT ON..." In this column we will present organizations and laboratories in which our members are working. The purpose of this column is to enhance scientific communication between our members and hopefully foster collaborative research projects. Emphasis will be placed on a description of the research program of the organization presented, main interests of principal researchers, and informal invitations for collaboration. We strongly feel that such reduction of anonymity will strengthen our society and invite you to submit descriptions including photographs of yourself, your laboratories and organizations.

5. GENERAL

We want to contribute to the growth of ECOMOD. Hopefully, very soon ECOMOD will be included in Ecological Modelling. This is an important step in promoting the interests of our professional society. However, please do not forget that the professional society is YOU. That is, the growth of ECOMOD is dependent upon your continued interest and contributions. Therefore, we invite you to submit papers. We hope to add more columns in the future and introduce more in-depth review of contributions.

News from the Chapters

Japanese Chapter reopened

Dr. Michio J. Kishi reports that the Japanese Chapter of ISEM re-opened. For more information, please contact:

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