

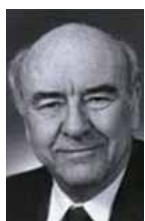
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Integration in IDR and TDR ***Report from international td-net conference in Berne***

By Julie Thompson Klein, Machiel Keestra, and Rick Szostak

The Network for Transdisciplinary Research, known as *td-net*, is the largest multilingual international organization devoted to transdisciplinary research (<http://www.transdisciplinarity.ch/>). It was started in 2000 by the Swiss Academic Society for Environmental Research & Ecology and since 2008 has been overseen by the Swiss Academies of Arts and Sciences. In addition to hosting a website, *td-net* sponsors a bibliographical database of literature on transdisciplinary research (TDR), publications, projects, conferences, and a biannual award for outstanding projects. AIS members Julie

Thompson Klein (former President), Machiel Keestra (International Liaison), and Rick Szostak (Board of Directors member) attended the latest *td-net* conference November 19-21, 2009, in Berne, Switzerland and present here a report on the meeting and our reflections.

In a defining essay on TDR on the website, leaders of *td-net* highlight the network's commitment to socially relevant problem fields in the "life-world," a translation of the German word *Lebenswelt*. TDR problem fields are defined by complexity and uncertainty, and include such examples as

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Teaching with Repko: ***Text provides exemplar for senior capstone course***

By Marilyn Tayler,¹ Montclair State University

Allen Repko's *Interdisciplinary Research: Process and Theory*² is the essential text for the year-long Interdisciplinary Senior Research and Writing Seminar in Jurisprudence at Montclair State University. While the focus of this particular capstone is on legal studies, its use of Repko's book provides an exemplar that may be adapted to other advanced undergraduate interdisciplinary research and writing courses that combine a wide range of disciplines in the humanities and/or the social sciences.

Jurisprudence is an interdisciplinary "law in the liberal arts" major. The major represents the convergence of law, humanistic studies, and issues in the social sciences. Through the major, undergraduate students have the opportunity to acquire the fundamental knowledge essential to understanding legal institutions and processes. Students develop intellectual skills necessary to

evaluate policies, practices, and philosophies within the context of legal systems.³ Jurisprudence provides a solid foundation for students aspiring to law school and other graduate study, as well as for work in many other careers that require analytic, conceptual, and communications skills.

The Jurisprudence major culminates in a rigorous year-long capstone experience, the Senior Research and Writing Seminar. The "data" employed by students for their research are generally found in the literature of the disciplines, which include primary source material as well as secondary sources that provide critical commentary and analysis. However, the methodology of the Senior Seminar is also applicable to courses where students carry out empirical research.

Description of Capstone Courses

The capstone seminar courses, JURI495 and JURI496,
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td-net conference ...*(continued from page 1)*

migration, violence, health, poverty, global environmental change, and processes of cultural transformation. The network links abstract and case-specific knowledge while developing knowledge and best practices that promote the common good. Collaboration and participatory research with stakeholders in society are prominent, modeling joint commitment to solving or mitigating problems in a recursive research and negotiation process.

A pdf file defining *Core Terms in Transdisciplinary Research* may be downloaded from the website, and major works in English provide an overview. The 2007 book *Principles for Designing Transdisciplinary Research* presents a synthesis of principles, concepts, and methods (edited by Christian Pohl and Gertrude Hirsch Hadorn, and available from Oekom). The 2008 *Handbook of Transdisciplinary Research* provides a state-of-the-art overview of theory and practices (edited by Hadorn et al., and available from Springer).

Over the last two years, *td-net* has hosted two international conferences in a four-year series funded by Stiftung Mercator Schweiz. The goal of the series is to support and strengthen the network of inter- and transdisciplinary researchers, promoting excellence in both research and teaching. Their meetings provide platforms for exchanges between individuals and teams involved in projects on a diversity of issues. The network fosters mutual learning from experience and further development of integrative methods and approaches for knowledge-based solutions to pressing problems. Conferences are organized in collaboration with a different Swiss university or research institute each year and combine plenary talks with workshops and paper sessions. The series as a whole covers the four aspects that together make up the transdisciplinary research process, which similar to the interdisciplinary research process is an iterative and decision-making process. Following this four-part structure of the research process, the theme of the 2008

td-net seeks proposals for 2010 conference

The Network for Transdisciplinary Research (*td-net*) in Switzerland invites proposals for paper, poster and workshop sessions for its 2010 conference September 15-17 at the University of Geneva. The submission deadline is May 3, 2010. The conference theme is "Implementation in Inter- and Transdisciplinary Research, Practice and Teaching." For more information and submission guidelines, visit the website, <http://www.transdisciplinarity.ch/e/Conference/international/2010/index.php>.

inaugural conference, hosted November 27-28 by the Collegium Helveticum in Zurich, was devoted to "Inter- and Transdisciplinary Problem Framing." (The conference booklet may be downloaded from the *td-net* site.) The theme of the 2009 conference in November, hosted by the Institute of Geography at the University of Berne, was "Integration in Inter- and Transdisciplinary Research." As *TD-net* representative Christian Pohl said in his conference introduction, integration is an aspect of the research process that requires continuous attention right from the beginning, when all stakeholders bring their perspectives, paradigms and interests to the research table. The 2010 conference, scheduled in Geneva for September 15-17, will focus on "Bringing Results to Fruition." The fourth meeting in 2011 will be announced on the *td-net* website at a later date.

Readers wanting to follow the complete schedule for the recent 2009 conference booklet while reading our report may download it from the *td-net* site (www.transdisciplinarity.ch/e/Conference/international/2009/). Conference organizers used a tiered sequence of keynote addresses to frame sections of the meeting. The opening plenaries on Thursday evening, November 19, represented the international scope of the network. After welcoming remarks and context from *td-net* Board members, Pasqualina Perrig-Chiello and Pohl, the opening keynotes ensued.

Keynote Addresses

Bernhard Schmid from Zurich, who is a member of the Swiss Research Council and heads the commission for

interdisciplinary research, spoke on "Multi-, Inter- and Transdisciplinarity: Integrated Biodiversity Projects and the SNF as Case Studies." He illustrated the complexity of addressing environmental problems that require integration and collaboration with case studies from biodiversity-ecosystem functioning research. Schmid gave an overview of the pragmatics of project design, coordination, complementary skills, and discussion mechanisms. He also presented two new Swiss funding instruments for inter- and transdisciplinary research. In the discussion following his lecture, Schmid emphasized that because interdisciplinary and transdisciplinary proposals are more complex to prepare—since they require preliminary aligning of different interests, research paradigms, conceptual frameworks, and methodologies—it may be necessary to offer seed-money to the research groups that prepare them.

Julie Thompson Klein, who is Professor of Humanities and Faculty Fellow in the Office for Teaching and Learning at Wayne State University, followed with a historical overview, "Taking Stock of Integration at the Century Mark." She traced definitions of integration over time in education and research then highlighted new connotations in the European-based *td-net* and the U.S.-based Science of Team Science initiative that grew out of a TDR initiative at the National Cancer Institute in the late 1990s. She also called attention to the Australian-based Integration and Implementation Science network and closed by identifying four major principles of integration emerging

from this history: the principles of variance, platforming, iteration, and communicative rationality.

In keynote #3, Ulrike Felt of Vienna, Austria, explored “Tempor(e)alities in Transdisciplinary Working Contexts.” Felt emphasized the role that timing and trajectories play in research contexts. Especially in transdisciplinary research projects—where professionals, scientists, and other stakeholders need to collaborate—the negligence of differences in “tempor(e)alities” may have an impact on the research process and its outcomes. For instance, a study in which scientists observe patient-doctor interactions in a clinical context involves negotiations of observations, although often the time-space conditions are set by the clinicians.

In Keynote #4, Matthias Bergmann of Frankfurt, Germany, offered “A Collection of Methods and Examples for Integration in Transdisciplinary Research.” He described how the TDR process is involved in both scientific and societal problem solving. This process could be made visible in a TD matrix, where horizontally a line is drawn between understanding-conceptualizing-transforming/solving, while vertically problems could be distinguished as having a more societal focus, or rather a more scientific focus.

In Keynote #5, Gabriele Bammer of Canberra, Australia, presented an overview of “Dialogue Methods for Research Integration.” She emphasized that currently there are many small and fragmented networks involved in interdisciplinarity and transdisciplinarity. As a result, resources, concepts, methods, and criteria are fragmented as well. She argued that dialogue methods are useful for integrating a diversity of judgments, and that specific situations may benefit from one or the other dialogue method. Dialogue methods may even be helpful in reaching a shared understanding among ourselves as researchers, without homogenizing the diversity. Such a result would strengthen

the position of interdisciplinary and transdisciplinary research. As we will show towards the end of this report, we took her advice to heart.

In Keynote #6, Urs Wiesmann of Berne presented case studies on the theme of “What, Who, How and When? Experiences, Challenges and Perspectives of Integration in Transdisciplinary Research.” Drawing on his experiences in international and multicultural transdisciplinary research projects, Wiesmann defined seven traps that may hamper such projects. Apart from traps that stem from differences in scientific concepts, methodologies, and paradigms, he emphasized those stemming from value dimensions, communication problems, from differences in goal expectations, and demands put forward by different stakeholders.

A final plenary session on Saturday, November 21, focused on “Gender Studies and Transdisciplinarity.” In her opening remarks, *td-net* President Pasqualina Perrig-Chiello of Berne emphasized that both transdisciplinarity and gender studies stand for scientific endeavors that lead to ecologically valid and socially robust results. At the same time, however, both are equally contested from disciplinary perspectives. As a result, they are equally in fashion and problematic in the practice of scientific funding applications and results implementations. The other panel members joined her in contributing their experiences and perspectives on the shared challenges of TD and gender studies.

Two of the keynotes premiered new books on TDR with a strong focus on integration. In Keynote #4, Bergmann previewed a new book on TDR methods (in German). He also mentioned plans to develop a transdisciplinary academy or think-tank that will address issues of teaching. In Keynote #5, Bammer drew on another new book that was launched formally at the conference. Co-authored by McDonald, Bammer, and Deane, *Research Integration Using Dialogue Methods* is a “methodological toolkit” of 14 dialogue methods that is useful for

both IDR and TDR collaborative process (published by Australian National University Press and downloadable for free at <http://epress.anu.edu.au/dialogue_methods_citation.html>. Bammer’s advocacy of a new discipline of Integration and Implementation Sciences generated considerable debate from the audience over use of the term “discipline.” However, the audience was much in favor of building a common knowledge base and networking.

Parallel Sessions

Parallel sessions were divided into two categories: workshops and panels. The multi-paper workshops focused on four themes: Integrating the Arts and Design, Practical Approaches to Integration, The Long-term Evolution of Integrative Frameworks in Problem-Oriented Research Fields (with a case example on Invasive Species Research), and Integrative Research Curricula for the Humanities and Social Sciences. The panels on Friday and Saturday morning were grouped around the organizing themes of Designing Integrative Systems, Analyzing Integration, Integrating Academic and Life-World Perspectives, Teaching Integration, Tools for Integration and Theorizing Integration and Integrative Research Programs.

We offer here a number of highlights. In the paper session devoted to Teaching Integration, Catherine Lyall of Edinburgh and K.P. Jaikiran of Trivandrum (India) emphasized the importance of articulating and codifying tacit knowledge about the common research problem faced by various stakeholders involved in ID and TD processes. For Lyall, this is a crucial ingredient of *Interdisciplinary Masterclasses*, devoted to preparing young researchers to cope with ambiguities and complexities of ID research. Jaikiran spoke of “explicit knowledge islands in a tacit knowledge sea” that need to be discovered, citing for example methods derived from Knowledge Management practices. Willi Haas and Barbara Smetschka of Klagenfurt added that it

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td-net conference ...

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is useful to have participants reflect on and articulate their understanding of the disciplines or perspectives of other participants, including their aims for the project. Both Haas and Smetschka have developed exercises in which students tackle particular research challenges and form research groups. Lyall and Haas/Smetschka also emphasize the value of having students discuss the challenges they are facing in interdisciplinary research with other interdisciplinary students.

A session on Theorizing Integration covered three different meta-perspectives on ID and TD research. Jan Schmidt of Darmstadt (Germany) offered reflections on the concept of integration, which is central to these types of research yet often remains unclear. Often, an instrumental “solution” starts either from premises about the types of knowledge involved, or about boundaries between disciplines or between science and society, or about forms of transgressing these boundaries. Schmidt suggested developing a taxonomy or classification of different types of integration, depending on whether integration is aimed at the level of objects, or theories, or methods, or problems. Ulli Vilsmaier of Salzburg presented a different take on integration, stressing the implication of researchers’ personalities in TD research. Moreover, science should be considered as part of societal processes, in which researchers play different roles. Conflicts arising from this situation should not be considered as disadvantages but as proofs of the ecological validity of this mode of knowledge production. On a more general level of reflection, Bob Frodeman of the University of North Texas suggested that underlying the unsustainability of material production is an unsustainable process of knowledge production. Knowledge over-production by the “knowledge industry” keeps us from devoting our energy to applying the knowledge that we already have, or being more moral, fair, and self-

controlled in our research.

In addition, a variety of Tools for Integration was presented in a session covering artistic methods, group modeling, and the epistemology of mechanistic explanation. Artists Melody Burke and Frank Hoppe of London and Berlin demonstrated how their investigation of an early warning system suitable in densely populated cities brought them into contact with Delft space scientists. The different roles for intuition, creativity, personal experience, and knowledge in art and science fostered success. Ewan Lord of Warwick described an even more disparate group of stakeholders interested in combating problems of teenage pregnancy. Facilitated by a preliminary workshop, each group member could contribute via a laptop immediately and anonymously to a graphic and comprehensive description of the problem, the players, and their interrelations. Subsequent discussions were aimed partially at goals and values that foster integration. However, rapid consensus formation was avoided. Machiel Keestra of Amsterdam made a more theoretical contribution on how an explanatory method being used in the life and cognitive sciences allows even the integration of meaningful semantic, symbolic, or cultural contents. These mechanistic explanations are generally restricted to biological or neural processes that occur “within the skull,” but meaningful contents can be shown to influence various cognitive processes at different levels. By doing so, we can demonstrate reciprocal relations between mechanisms and meanings. The next session of Tools for Integration included a paper by Rick Szostak and Claudio Gnoli discussing the possibility of the development of a system of library classification that would facilitate interdisciplinary research. They argued that it is both feasible and desirable to develop a classification grounded in the phenomena we study and the relationships between them, rather than in disciplines. One notable outcome of this session was an invitation to the presenters

to work with *td-net* in the ongoing development of their bibliography of works in the area of TDR.

The workshops were structured around three target papers, invited responses, and open discussion. One workshop dealt with *Integrative Curricula for the Humanities and Social Sciences*. Julie T. Klein of Wayne State University began by sketching a historical development of rival positions in the study of human culture and behavior. Under the influence of at times theoretical positions and at other times demographical changes or social movements, the study of human social behavior and culture changed over time. A main trend led to a “cultural turn” in disciplines, in the sense of the cultural or life-world contexts of the objects they study. This cultural turn had a significant impact on scholarship and disciplines, blurring previous boundaries. Respondent Britt Holbrook of the University of North Texas asked to what extent disciplines eventually erode, or alternatively have the ability to accommodate such seemingly challenging changes. Manuela Rossini then reported on the development of a Graduate School of the Humanities and the Social Sciences at Berne. For its curriculum she proposed not focusing on a diversity of methods, theories, etc., but rather grounding it in Mieke Bal’s notion of “travelling concepts.” Instead of aiming at synthesis, courses center on concepts such as “Affect,” “Memory,” and “Space,” facilitating a coherent yet diverse program. Catherine Lyall of Edinburgh asked what success would look like in terms of such a program, that is, how one could evaluate it. This question led to a discussion of fostering experimental and risk-taking attitudes as a goal of graduate education. Francesco Panese of Lausanne argued that for a fruitful collaborative program involving biomedicine, social bioscience, environmental sciences, converging technologies and prospective governance, a new and integrative “epistemic culture” is needed. He emphasized that participants would be required to reconsider not only their ontological and

epistemological assumptions, but also their “axiological” ones—concerning moral and social values. The common exploration of “trading zones” might be useful for discussing, for instance, the importance of neuroscience for human self-understanding, returning to the question of what it means to be human. In his response, Machiel supported such a program by raising the question of whether ID and TD research benefits more from an attempt to reach unification or synthesis than from accepting plurality and fragmentation as a given—especially as moral values and human self-understanding require some sort of synthesis too.

Conclusion and Future Prospects

Many themes and contents of the conference in Berne are familiar to readers of the *AIS Newsletter*, since interdisciplinarity and transdisciplinarity share many contents, goals, and methods and face similar challenges and problems. However, some differences should be noted. Most obvious is the explicit inclusion in the European formulation of TDR of participation by stakeholders or owners of research problems during the course of the research process: from definition of the problem to implementation or application of research results. Moreover, the potential use of results must in such cases influence definition of the problem. Because of this broad inclusiveness, the need for alternative methods and programs and skills to explore non-academic sources of insights and expertise is great. Yet, if TDR is more broad in this sense of inclusiveness of stakeholders, it is at the same time more narrow in its focus on real-world problems. To the extent that ID research and education focus more on the articulation and integration of different scientific, disciplinary insights of a phenomenon, a combination of TD and ID approaches would be fruitful. With that idea in mind and acting as representatives of AIS, we discussed with *td-net* representatives Manuela Rossini and Christian Pohl the possibility of future collaborations such as joint workshops or conferences.

We were joined in those conversations by representatives of the Center for the Study of Interdisciplinarity (CSID) at the University of North Texas, Bob Frodeman and Britt Holbrook. All agreed that collaboration can only further common interests as we work toward formulation of criteria for quality in research, education, funding, and evaluation.

Plans are now underway for a meeting of representatives of AIS, *td-net*, and CSID in spring of 2010, generously supported by CSID. At that meeting, they will explore possible topics for a small-scale seminar in Europe in 2011 and a larger international conference in 2012. They will also consider further networking with groups such as the Philosophy of/as Interdisciplinarity Network (with organizational roots in Georgia and Darmstadt), the Australian-based Integration and Implementation Sciences network (I2Sn), and the Institute for Social-Ecological Research in Frankfurt. Possible topics of conversation include bridging discourses of inter- and transdisciplinarity, bridging AIS expertise in curriculum and pedagogy and *td-net* expertise in research and problem solving, and responding to current international imperatives such as the Bologna Reform and related questions of competencies. Other shared interests include the impact of technology, CSID’s research on peer review processes and consequences for ID research, and the role of humanities and social sciences in relation to natural sciences. Machiel also articulated a core question that cuts across all of these topics. What approaches to teaching and research will be “robust” enough to help all of us address current changes in academic structures, research projects, and related issues? To elaborate, how can we advance common goals while distinguishing differing approaches and concerns related to particular projects? Ultimately, CSID also asks, what is the future of inter- and transdisciplinary research and education in terms of sustainability?

We look forward very much to those conversations and will keep you posted. ■■■

Teaching with Repko ...

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are offered respectively in the fall and spring semesters each year. The seminar intertwines three simultaneously developed threads: the study of the interdisciplinary research process (employing Repko); an example of an interdisciplinary research-based paper (drawing upon original documents developed for the seminar,⁴ manuals on bibliographic style, and research methods books). The work of actually researching and writing a paper represents the essential application of the interdisciplinary studies (IDS) research process learned through Repko. The seminar culminates with the presentation of the results of each student’s research as a paper or poster session at an annual student research symposium at the end of the second semester.

Course Content

Repko’s *Interdisciplinary Research* provides the essential building blocks for the Senior Seminar in Jurisprudence. The text provides students with a guide for the preparation of their individual research projects as well as a broader knowledge of interdisciplinary research theory and process.

The first semester of the Senior Seminar begins with the pre-reading of *Ishmael*. Students are asked to mine the book for evidence of disciplines as well as interdisciplines and their insights, theories, assumptions, and concepts. The latter terms are defined for students in the assignment. During the first class, *Ishmael* is discussed as a paradigm of interdisciplinarity. Throughout the first semester, *Ishmael* provides a unifying thread for the steps of the IDS research process.

Beginning early in the first semester, chapters in Repko are assigned each week, first the initial chapters that provide an overview of the IDS research process and then the later chapters that describe and model the 10 steps of the process. In addition to preparing the questions at the end of each chapter, students are asked to relate each aspect of the IDS research process presented to *Ishmael*.

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Teaching with Repko ...

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At the same time as students are working with Repko, they are carrying out the discipline-based research for their individual projects. Before the beginning of the first semester, each student is required to develop, in consultation with the professor, a draft research hypothesis on an issue whose exploration requires law and one or two other disciplines. These draft hypotheses are modified throughout the semester as students advance in their research. Prior to each weekly class, students e-mail the professor a log describing their research during the previous week. This motivates students to properly pace their research. Students meet in small peer groups, in one-on-one individual conferences with the professor, and as a class, in each case to review their work and deal with questions and problems.

Past student research projects have dealt with such issues as: physician-assisted suicide and civil liberties, the use of FDA-approved medical products for non-FDA purposes, the influence of the novel *Uncle Tom's Cabin* on the law of slavery, the creation-evolution controversy and separation of church and state in public education, the creation of a legal system for the sale of bodily organs for transplant, and the use of battered woman syndrome as a justification for self defense in homicide cases. In each case, no single discipline could adequately address the research issue and so an interdisciplinary approach was required.

During the first semester, students complete the following parts of the research process:

- Research issue phrased as a hypothesis, as a research question, and as a title for the research paper
- Two or three literature searches (one for each discipline); students learn and use legal style for primary legal sources and Chicago Style for all other sources.
- Disciplinary data management charts (encompassing disciplinary

perspective, theories, assumptions, and concepts for sources in literature searches)

- Comparative chart of disciplinary insights
- Preliminary outline for discipline-based chapters of the paper
- Draft excerpts of two discipline-based chapters, heavily footnoted

Rubrics are used to guide and grade students for each assignment. The final examination for the first semester revisits the IDS research process. Students are asked to describe the 10 steps of the process as they apply to *Ishmael*.

During the second semester, students build upon the draft pages written during the first semester and complete the paper introduction and discipline-based chapters for each essential discipline. Students employ parallel topic structure for each discipline-based chapter to set up the disciplinary elements for creating common ground. In their integration chapter, students create common ground and attempt/achieve integration. In their conclusions, students generally arrive at a new cognitive understanding, often suggesting avenues for future research. Throughout the process, students engage in peer-review assignments designed to formalize student-to-student feedback. Students submit several drafts of each chapter, and several books on writing style are utilized. The rubric that is employed for the overall research paper adapts and incorporates the Wolfe and Haynes Assessment.⁶ Among students who have completed the Senior Seminar to date, over two thirds of each class have achieved integration according to the Wolfe and Haynes Assessment.

All students prepare an abstract of their research papers as well as either a poster or paper presentation for the annual student research symposium, held at the end of April. After presenting their work, students meet for a final session of discussion and reflection.

Conclusion

The year-long capstone Senior Seminar

in Jurisprudence allows advanced undergraduates to apply the IDS research process to law-related issues. It affords students the opportunity to engage in meaningful research at the undergraduate level in the context of the interdisciplinary research process.⁷ While it is initially helpful for students to have the background of a second major or a minor to develop the requisite knowledge of another discipline, many students choose projects that entail acquiring an understanding of disciplines that are new to them. Because the level of knowledge required is relatively modest, most students have no qualms about undertaking research in new disciplines.

As initially structured at its inception, the Senior Seminar required students to complete half of their research and writing in the first semester and the other half in the second semester. The Seminar has been restructured to require the completion of all research in the first semester while most writing is deferred to the second semester. As part of their research, students focus upon identifying comparable disciplinary insights, thereby setting up the requisite elements for the creation of common ground and integration during the second semester. Students are keenly aware that, although they are following the “steps” that they have learned from Repko, the process is fluid and non-linear. The second semester is devoted to “unpacking” the research already completed.

The essential ingredients for designing and structuring an effective capstone experience are found in Allen Repko's book, which provides the theory and methodology, and the simultaneous development of a student research project, which provides the application of the process to a tangible study. The inclusion of a book such as *Ishmael* at the beginning of the process is helpful, since it provides a point of reference and demonstration as students learn the IDS research process.

Although the Jurisprudence major is quite rigorous, the number of students

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Remembering John Warfield

By Julie Thompson Klein, Wayne State University

I will always remember the day John Warfield declared, “I’m taking you to the war room.” The “war room” was the famed interdisciplinary think tank on the George Mason University campus where John and his colleagues engaged in integrative design and problem solving. The excitement of their work and other projects is conveyed in the wonderful photo of John, working with a colleague on an early computer (from the Summer 1954 issue of *The Pennsylvania State Engineering Review*). That memory and others came quickly to mind when I heard that John had passed away on November 17, 2009, just four days shy of his 84th birthday.

John Nelson Warfield was born and grew up in Missouri. When he died, he held the title of University Professor Emeritus and Laureate at George Mason University. Warfield began advanced studies at the University of Missouri but, like many of his generation, found his life interrupted by World War II. After basic training in the U.S. Army Infantry, he was placed in an electrical engineering program. When the war was over, he returned to the Columbia campus in Missouri, where in 1948 he received a bachelor of arts in mathematics and a bachelor of science in electrical engineering and in 1949 a master of science in electrical engineering. In 1952, he earned a PhD in electrical communications from Purdue University.

During the course of his career, John held many important positions. He was elected president of the Systems, Man, and Cybernetics Society of the Institute of Electrical and Electronics Engineers (IEEE) and president of the International Society for the Systems Sciences. He was an editor of *Systems Research and the IEEE Transactions on Systems, Man, and Cybernetics*. He was also president of Integrative Sciences and the AJAR Publishing Company. Beyond these academic posts, he had 10 years of industrial experience and was the author of two U.S. patents on electronic equipment. It comes as no surprise then that John was honored in his lifetime. He received the Joseph G. Wohl Award for Career Achievement at the 2006 annual meeting of the IEEE Systems, Man, and Cybernetics Society. The highest award conferred by the Society, it acknowledged his contributions to systems engineering concepts, methodology, design, education, and management. In 2007 he also received INCOSE Pioneer Award and the IEEE Third Millennium Medal.

John was not a boastful man, so not one to tout such accomplishments or being called, as he was, “the father of systems science.” He was a kind and easy-going person who enjoyed a good debate but also an informal chat with anyone during meals and breaks at AIS conferences. John attended many conferences and was an early proponent of the link between complexity and interdisciplinarity. In 1997, at Appalachian State University, he spoke on “Seven Milestones in the History of Thought.” At the 1996 gathering at Eastern Michigan University, he considered



John Warfield and his “war room” (right)



implications of five schools of thought for integrative inquiry in his presentation on “Interdisciplinary Domains and Complexity.” At the Arizona State University-West conference in 1995, he participated in a panel on “Demands of Complexity on Integrative Communications.” At the 1993 meeting hosted by Wayne State University, he defined “Criteria for Structural Thinking” that would help promote incorporation of structural thinking into interdisciplinary teaching and research. In 1990, at St. Anselm’s in New Hampshire, his topic was “On Language Components of Integrative Studies.” He proposed four terms for use in integrative sciences—platform theory, domain theory, subsumption, and supersumption. In 1988, at the University of Texas-Arlington meeting, he explored how liberal arts could revitalize science. In his presentation on “Universal Priors to Science,” he examined the roles of human being, language, reasoning through relationships, and archival representation. In 1987, at Pennsylvania State University, he spoke on “Knowledge Integration and the Systems Community.”

Prior to his passing, John was chosen to be editor of the new *Transdisciplinary Journal of Engineering & Science*, a project of the ATLAS organization. The journal will now be dedicated to honoring Warfield by recognizing responsibilities for a culture of peace and transdisciplinary knowledge. He was also paid tribute in *vault 217*, the online newsletter of the Special Collections & Archives at the George Mason University Libraries. The tribute highlights selected portions of 100 archival boxes of professional materials he donated in 2000. Accessible online, the John N. Warfield Digital Collection includes his papers as well as oral history interviews, videos of class lectures, and filmed sessions of his Interactive Management process (<http://digilib.gmu.edu:8080/xmlui/handle/1920/3059>).

The second edition of John’s book *A Science of Generic Design*, published by Iowa State University Press in 1994, is ample testimony to his accomplishments. It represents his thinking on managing complexity through systems design. Sitting next to my treasured copy of *A Science of Generic Design* is another collection of writings that tap the astonishing reach of his mind, including essays on topics he presented at AIS conferences. In

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in the major has more than tripled in a three-year period. Students who apply to law school, graduate school, or prospective employers report that their research papers distinguish them from their peers. In a broader sense, the Senior Seminar prepares students for life in the real world, where issues and problems are interdisciplinary.

Notes

¹ Marilyn R. Tayler is Professor in the Department of Political Science and Law at Montclair State University, where she has collaborated in the development of multidisciplinary and interdisciplinary curricular initiatives. She is the Coordinator of the Jurisprudence major and also serves as University Pre-Law Advisor. The holder of a PhD in Latin American literature and a JD with Honors, her areas of research include philosophical interpretation of literature, the right of a court interpreter, interdisciplinary analyses of law-related issues, and student-centered pedagogy.

² A. Repko (2008). *Interdisciplinary research: Process and theory*. Thousand Oaks, CA: SAGE.

³ While this article focuses on the IDS Capstone Senior Seminar, it should be noted

that the Jurisprudence major begins with an interdisciplinary non-legalistic course in U.S. Legal Systems. Other required courses include Essentials of Jurisprudence, Legal Research, and Legal Reasoning, which prepare students in legal method and legal theory. Students also take courses in other liberal arts disciplines that are related to law and legal issues as well as electives in philosophy, history, humanities, and social sciences. In order to bolster their discipline-based knowledge in preparation for their interdisciplinary Senior Seminar research projects, students in the Jurisprudence major are encouraged to take an additional major or minor in a discipline of interest to them.

⁴ D. Quinn (1992). *Ishmael*. New York: Bantam/Turner Books.

⁵ Documents, syllabi, and rubrics are found on the AIS Website under Peer-Reviewed Syllabi in the Social Sciences and Humanities at <http://www.units.muohio.edu/aisorg/syllabi/collection.shtml>.

⁶ C. Wolfe & C. Haynes. (2003). Interdisciplinary writing assessment profiles. *Issues in Integrative Studies*, 21, 126-169.

⁷ The case for interdisciplinary integration by undergraduates is supported in W. Newell (2006). Interdisciplinary integration by undergraduates. *Issues in Integrative Studies*, 24, 89-111. ■■■

Remembering John Warfield ...

(continued from page 7)

one of my personal favorites, "Reading for Bureaucrats," he offers an annotated digest of important readings culled from over thirty years of studying complexity. Other works pull together his own essays on complexity, and he lays out a plan for "The Great University" in *The Wandweaver Solution*. Characteristic of John, *The Wandweaver Solution* is a systematic proposal complete with research background, challenges, vision, programs, schedule, and benefits. It was supported by a multi-year research support from the Ford Motor Company (<http://www2.gmu.edu/depts/t-iasis/wandwaver/wandw.htm>).

Like another notable interdisciplinary of his generation, Leo Apostel, John was committed to bridging discourses of interdisciplinarity and systems thinking. Even though he stood still while talking, John's mind was always moving. He interrogated underlying assumptions while formulating conceptual tools for interdisciplinarity and laying out an operational approach. I learned much from John, cherished his friendship, and seek to carry on his work. ■■■



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