Communications of the Association for Information Systems

Volume 9 Article 22

11-16-2002

AMCIS 2002 Panels and Workshops III: How Will Media Technology Evolve as an Academic Discipline?

Daniel Peak
UNiversity of North Texas, peak@unt.edu

Michael Gibson
University of North Texas

J. Wayne Spence
University of North Texas, spence@unt.edu

W. Kenton Bales
University of Nebraska at Omaha

Verlyn Kroon
Omaha Public Power District

See next page for additional authors

AMCIS 2002 Panels and Workshops III: How Will Media Technology Evolve as an Academic Discipline?

Authors
Daniel Peak, Michael Gibson, J. Wayne Spence, W. Kenton Bales, Verlyn Kroon, and Richard Vedder

Communications of the Association for Information Systems

THE AMCIS 2002 WORKSHOPS AND PANELS III: HOW WILL MEDIA TECHNOLOGY EVOLVE AS AN ACADEMIC DISCIPLINE?

Daniel A. Peak
College of Business Administration
University of North Texas
peak@unt.edu

Michael Gibson
School of Visual Arts
University of North Texas

J. Wayne Spence
College of Business Administration
University of North Texas

W. Kenton Bales
College of Fine Arts
University of Nebraska at Omaha

Verlyn Kroon
Omaha Public Power District
Omaha, NE

Richard Vedder
College of Business Administration
University of North Texas

ABSTRACT

Media Technology (MT) is a new, multidisciplinary field that integrates the knowledge, expertise, resources, and creativity of diverse, established, fertile artistic disciplines (visual design, art, music, radio, television) with new technological disciplines (digital media, information systems, information technology, computer science, network engineering) through rapidly-evolving technologies. Its application in electronic commerce into what will become a full synthesis of information technology and sensory interaction will be made possible by approaches to presenting and exchanging information visually, aurally--and eventually in combination with all of the senses. This article reports on a panel held at AMCIS 2002 in Dallas TX. The panel discussed the need to develop a literacy and understanding in the IT discipline of the MT and its importance in keeping IT research relevant. The panel also discussed strategies for attaining MT literacy, integrating MT into the IT curriculum, and discussed two universities where it is being done.

KEYWORDS: Computer Media, Media Technology, Aesthetic Design, Form, Function

I. INTRODUCTION

Media Technology (MT) is a term we coined for an emerging field that represents the maturation of computer multimedia. MT is a new, multidisciplinary field that integrates the knowledge, expertise, resources, and creativity of diverse, established, fertile artistic disciplines with new technological disciplines through rapidly-evolving technologies [Peak, Lipschultz, et. al 2001]. This integration is already occurring in the entertainment industries with special effects in motion pictures, games, simulations, and experimental interfaces and is now rapidly infusing into the mainstream commercial media [Terhune 1999]. It is evolving in the business environment from the simple paradigm of the web page. Its application in electronic commerce into what will become a full synthesis of information technology and interaction is made possible by approaches to presenting and exchanging information visually, aurally--and eventually in combination with all of the senses [Dertouzos 1997]. While only at its beginning, MT is beginning to change business, education, and even life as we currently know them [Herman and McChesney 1997; Gates 1995].

MT is deeply rooted in the arts, information systems, and communication, but also in the computer and human sciences. It is as eclectic and pervasive as Information Technology (IT), simply because it is an expansion of IT into the sensory world. It spans the fields of Arts Technology, Music Technology, Communications Technology, Information Systems, Computer Science, and Engineering. Even a half-dozen years ago, prominent researchers recognized the inevitability of the coming change [Negroponte 1995; Ives 1994]. We predict that MT will completely integrate with IT to permeate all disciplines, businesses, communities, environments, and educational venues. The diverse areas of MT will enrich the university environment because it enables the cross-pollination of new ideas from faculty and students. Programs in MT can and will be based in any or all of these areas, as students and researchers emphasize one or more areas of the integrated whole.

Despite the business world's *de facto* adoption of sensory technologies into computing (e.g., graphics, sound, the desktop metaphor) over a dozen years ago, IT and its researchers almost entirely neglected the accumulated knowledge in the MT reference disciplines as a resource for user-centered computer and interface design [Peak and Gibson 2002]. While Human Computer Interaction (HCI) currently fills the user-centered and interface design role, HCI focuses on functional and psychological effects. Authorities in design observe that form and function are virtually inseparable [Rand 1960]. While research on functionality and its implications are mainstream to IT, practically nothing can be found in the IT literature that seriously examines form, also called the aesthetic side of design.

NEEDED: DESIGN LITERACY IN IT

People who are not knowledgeable and skilled in engineering are usually incapable of designing safe, efficient, effective, and affordable products (e.g., buildings, bridges, machines, electronics). People who are not knowledgeable and skilled in visual or aural design are certainly at a disadvantage as they design visual and aural interfaces, as they design systems that are increasingly dependent on those interfaces, and as they develop strategies for future designs. The breadth of knowledge required to master both IT and engineering is daunting, but IT professionals became functionally literate and skilled in fundamental aspects of critical engineering disciplines such as software engineering. The breadth of knowledge required to master both IT and the MT reference disciplines is equally daunting, but IT professionals are not yet literate in these disciplines. Web design is an example [Peak and Gibson 2002]. University IT instructors teach web design despite having little or no background in:

1. Visual aesthetics and design (elements and principles of design, artistic skills, composition, typography, color, graphic arts, animation),

2. Aural aesthetics and musicianship (sound design and engineering, music and sound synthesis, instrumental proficiency, music theory, music composition),
3. Communications media (broadcasting, radio/TV, photography, film, integration of aural and visual media, digital editing, compositing), and other fields.

Simply giving an IT web design student sophisticated visual tools like Adobe Photoshop, Adobe Premiere, or Macromedia Flash is analogous to putting a non-musician in front of a Steinway concert grand piano. The resulting products will leave much to be desired.

OBJECTIVES OF PANEL

This article reports on a panel held at AMCIS 2002 in Dallas TX. The key objective of this panel was to create an understanding in the IT discipline of the necessity of MT and its importance in keeping IT research relevant.

From a teaching perspective, supporting objectives were to persuade the IT discipline to:

1. Recognize the need to create IT design teams that possess diverse sets of functional and aesthetic design skills,
2. Establish the importance of aesthetic design, as inseparable from functional design,
3. Acknowledge that aesthetic designers are just as important to IT projects as DB designers and system designers,
4. Develop and execute a strategy to teach MT literacy to our students.

II. PROFESSIONAL NON-IT DESIGNERS BELIEVE AESTHETIC FORM AND FUNCTION ARE INSEPARABLE

Aesthetic form and function cannot be separated in design [Rand, 1985]. In his celebrated book, *The Design of Everyday Things*, Donald Norman notes that form and function coexist in virtually all everyday things [1990], including both natural and man-made things.

Design is a continuum between form and function (Figure 1). At one extreme is pure aesthetic form, or pure art. Pure art would have minimal functionality, such as a post-modern painting. At the other extreme lies pure engineering, such as the unwieldy ENIAC computer with its vacuum tubes and plug boards. Most “things” of the world lie somewhere between the extremes. Modern business, in particular, requires aesthetic form for product design, marketing, advertising, and other applications. As we noted, form, an indispensable part of standard design theory, is seldom taught in CS or IT departments nor referenced as a discipline in IS publications. Aesthetic form, an aggregation of knowledge and experience that evolved from prehistory, is taught in art, design, architecture, computer graphics, animation, music, and literature. It is applied in engineering, radio, television, motions pictures, and theater. It is neglected in IT [Peak & Gibson, 2002]. But why?

III. IT LACKS AESTHETICS BECAUSE IT BEGAN WITH MINIMAL VISUAL AND NO AURAL INTERFACES

Electronic computers were developed prior to and during World War II. They began to gain significant use for business purposes in the late 1950s. These machines were comparatively weak in speed, resources were precious and limited, and output was primarily printout.

Since then, computers are much more compact and powerful, resources are abundant and inexpensive, many types of users exist, and interfaces are increasingly user centered. Interfaces

Figure 1. Design Combines Both Form and Function. Pure Art Lies at One Extreme While Pure Engineering Lies at the Other.

are becoming highly visual and dynamic. Most personal computers, for example, come with sound cards and other integrated visual / aural features. Taken together, these sensory features are commonly called "multimedia" by the IT profession. Unfortunately, "multimedia" became synonymous with downsized and grainy video, inferior sound, and slow response. Despite the continued development of the Personal Computer, the PC paradigm remains firmly rooted in the text-only, mute, and function-oriented paradigm of its origins.

IV. BUSINESS PROFESSIONALS CURRENTLY SEE DESIGN DEFICIENCIES IN IT

Many executives are aware of IT's emphasis on functional design:

> *"IT applications are about finance, about accounting, about making money. They are not about impressing anyone. They are designed to work well* [CIO of Cyberphilla as quoted in Goff, 1998]*."*

> *"… there is no question IT is still functionally focused. In the IT division, we now find that our company needs more than IT skills. For example, when we build our web design teams we extend beyond IT, looking for people with backgrounds in art and related fields. We don't ask them for a resume; we ask them for a portfolio"* [Verlyn Kroon, CIO of Omaha Public Power District, one of the panelists].

So, is the IT paradigm outdated? Edwards [1998] asserts

> *"since the first computers were not consumer products, their form followed function, and their function did not require anything beyond the basic configuration to do the job."*

V. THE WEB: AN EXAMPLE OF WHY VISUAL AESTHETICS SHOULD BE IMPORTANT TO DESIGN IN IT

Because the primary stimulus of websites to the visitor is visual, visually compelling web sites can be powerful. Helfand [1998] observes:

> *"Good design can create something really powerful and compelling so that people will want to come back to the site again. The real challenge for Web designers lies in making the WWW beautiful, unusual, provocative, hypnotic and engaging."*

Hoque & Lohse [1999] state that a user's first impressions are critical: "the user interface is essential for conducting business online." Cotlier [2001] notes: "the impression that your Web site makes on a visitor in the first seven seconds can turn off a prospect for good."

From an economic perspective, Postrel [1999] concludes that good web design makes economic sense: "good design is an important source of economic value and competitive advantage." Armstrong & Tomes (1996) note: "there is some evidence that attention paid to aesthetics pays off in superior economic performance."

Schaffer (2000) suggests that educated, aesthetically-skilled web site design pleases customers: "web site design that produces a positive customer experience is not a matter of chance or intuition." Goff [1998] underscores the need for web developers to understand not only the aesthetic side of design, but their need to apply it to target customer groups: "aesthetics start to play a bigger role as you try to appeal to different user groups."

VI. GOOD DESIGN EXTENDS FAR BEYOND THE FUNCTIONAL

Still, web site design is but a part of the larger picture of IT interface design **that** spans both hardware and software considerations. Take**n** from a global perspective, design authorities Mullett & Sano [1995] maintain that any good design communicates with the user, integrating the goals of the product into a single message.

> *"Good design diffuses the tension between functional and aesthetic goals because it works within the boundaries defined by the functional requirements of the communication problem."*

Thus, design extends beyond the functional. It communicates. It is appealing. It has attractive qualities.

> *"To design is much more than simply to assemble, to order, or even to edit; it is to add value and meaning, to illuminate, to simplify, to clarify, to modify, to dignify, to dramatize, to persuade, and perhaps even to amuse."* [Rand, 1985]
> *"… design, in its most simple sense, is an attempt to visually convey the logical, functional, or natural relationships that exist among the elements in an information display."* [Williams, 2000]

VII. IT DESIGNERS NEED A STRONG SENSE OF OBJECTIVE, AESTHETIC TASTE

All designers should have a well-developed and informed sense of objective taste. There is a distinction between

1. personal taste or preference and
2. objective judgments of success or failure in a design.

Why? A design can be successful and significant, even though it may not suit one's personal taste. The Eiffel Tower in Paris is one such example. Despite the fact that it is now a locally-cherished and world-famous landmark, originally the tower was almost universally condemned as an eyesore, even though it was acknowledged by many as a marvel of engineering. Many wished to have it torn down. Today, few would argue that it is a masterpiece of both art and engineering, and the world is richer for it.

Unless one can lay claim to a high level of expertise, it is unreasonable to condemn a work as "bad" simply because one does not like it. This distinction is important because designers are constantly called upon to produce work that must succeed within the contextual framework of someone else's tastes and ideas. Their survival demands that designers cultivate an objective, aesthetic understanding of taste. Objective taste, then, is the knowledge of aesthetic design elements, principles and other relevant factors.

It is the understanding of how aesthetic form and function are interrelated that provides insight into stylistic composition and implementation. However, personal preference is also a key consideration in aesthetic matters. Personal tastes can be as numerous and unique as there are personalities. Examples of personal tastes include traditional tastes, *avant-garde* tastes, eclectic (varied or broad) tastes, and "no" taste (lacking the interest, awareness, or capacity to respond to visual or aural material). Unless IT designers have a developed sense of aesthetic, objective taste, they generally lack the basic skills to perform visual design for others.

Designing for others is fundamental to user-centering and targeting. Within limits, IT designers can learn to navigate objective taste. Design elements, principles, and methods can be analyzed, synthesized, and applied. Talent, appreciation, and other subjective criteria are also important, but these can develop with knowledge and exposure. Because design criteria can be known and understood, IT designers who develop an aesthetic literacy also can develop an aesthetic vocabulary and appreciation. IT designers, like designers in other professions, can become knowledgeable in objective criteria by which they can determine whether or not a work is successful (or "good") and learn to develop products visually pleasing to specific target groups.

VIII. INTEGRATING AESTHETIC FORM INTO THE IT CURRICULUM: TWO SAMPLE APPROACHES

The authors believe that there are many ways for incorporating aesthetic form instruction in undergraduate IT education. Illustrating these possibilities are the experiences of the University of North Texas and the University of Nebraska at Omaha.

Legislatures nationwide increasingly regulate much of the undergraduate educational experience (e.g.. insisting on a common body of core courses transferable between schools, limiting the number of credit hours available for a degree). Public universities in Texas operate within such an environment. Yet there is room for innovation. At the University of North Texas, the required core includes one course from visual and performing arts. The College of Business Administration is negotiating with the College of Arts and Sciences and the College of Music to

create an interdisciplinary course, aimed at prospective business majors, which would satisfy this requirement. The course would teach the fundamentals of aesthetic form and demonstrate the importance of this knowledge for business applications.

A far more comprehensive and ambitious approach is underway at the University of Nebraska at Omaha, which now offers an undergraduate degree minor in media technology. A diverse team of faculty from the Colleges of Arts and Sciences, Fine Arts, and Information Science and Technology created a degree minor (Figure 2) that integrates courses in the following areas:

1. graphic Arts and Animation,
2. music (including MIDI) and Sound Technology,
3. radio/TV/Mass Communication Technology,
4. Information Technology and Integration, and
5. capstone Media Technology Project.

To take the degree minor, the undergraduate student must be a major in one of the four reference discipline areas. The courses are designed to increase student understanding and vocabulary in each area, while keeping an IT and a design emphasis. Consequently, courses contain a minimum of prerequisites—all students are required to take introductory courses in each of the subject areas or demonstrate a basic knowledge in them. The final, capstone, course in the minor convenes a team of four students, a faculty member, and a sponsoring

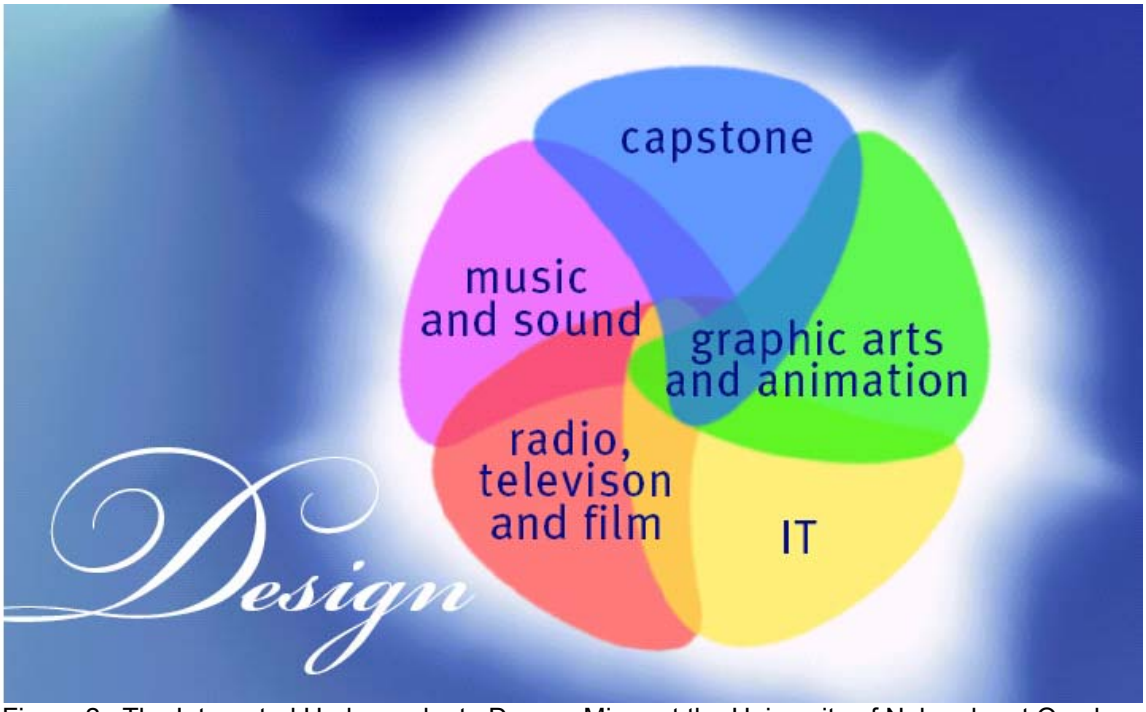

Figure 2: The Integrated Undergraduate Degree Minor at the University of Nebraska at Omaha. Four Course Areas With an Integrated Capstone Area—All Unified Through a Balance Between Functional and Aesthetic Design

client. The topic areas are represented by one student in each major. This way, students have an opportunity to specialize in their major area and still work with student majors in other areas to produce a client product. Students completing the minor receive a CD, DVD, and/or some other evidence of the project, as well as a letter from the client and a notation on their transcript.

The University of Nebraska at Omaha is currently developing a major in Integrated Media, which will take the concepts developed in the degree minor, and provide students with a broader, more in-depth selection of courses and experiences that cover the topic areas.

IX. CONCLUSION

Although the MT is beginning to attract the attention of some IT researchers, MT is far from mainstream IT. To this panel, the concept of integrating MT with IT makes sense. As MT is subsumed under the mantle of IT, IT will integrate with additional diverse disciplines and will adopt a broader, previously unfamiliar spectrum of skills and knowledge. That integration pools the talent and creativity of MT with the technical expertise of IT, producing products that reflect artistic richness and technological sophistication.

The first step is engendering MT literacy in the IT profession, actively acknowledging and addressing this deficiency. Then, integrating MT into the IT curriculum and into the IT research stream would follow. We believe university curricula ultimately must change to educate and produce a new generation of MT-knowledgeable, qualified professionals. The result will be an improvement in the quality of IT research, teaching, students, and media—all emanating from superior IT design knowledge and skills.

Editor's Note: This article is based on the authors' panel at AMCIS 2002 in Dallas, Texas. It was received on September 13, 2002 and was published on November 16, 2002 in a special issue of CAIS together with other articles from the Panels and Workshops. The special issue was under the editorship of Les Ball.

REFERENCES

Armstrong, P. and Tomes, A. (1996). "Art and Accountability: The Languages Of Design and Managerial Control." *Accounting, Auditing & Accountability Journal*. 9(5): 114-125.

Cotlier, M. "Judging A Site By Its Home Page," *Catalog Age*. 18(6): 49-50, 2001.

Dertouzos, M.L. *What Will Be: How the New World of Information Will Change Our Lives*. New York, NY: HarperEdge, 1997.

Edwards, O. "Beauty and the Box." *Forbes*. 162(7): 131, 1998

Gates, B. *The Road Ahead*. New York: Viking Press, 1995.

Goff, L. (1998). "Form follows function." *Computerworld*. 32(43): I1-I6.

Helfland, J. "Does Your Org.Com @ WWW?: Seven Common Mistakes in Developing Web Sites," Delphine Hirasuna, ed., *@Issue: The Journal of Business & Design*, 2.1,Spring 1998, 26-31.

Helfland, J. and Maeda, J. *Screen: Essays on Graphic Design, New Media, and Visual Culture*, Princeton Architectural Press: Princeton, NJ, 2001.

Herman, E.S., and McChesney, R.W. *The Global Media: The New Missionaries Of Global Capitalism*. London: Cassell, 1997.

Hoque, A and Lohse, G. "Designing Interfaces For Electronic Commerce: Predicting How Information Search Costs Influence Consumer Choice." *Journal of Marketing Research*, 36: 387-394, 1999.

Ives, Blake. "Transforming the Learning Industry," *MIS Quarterly*, 18(1), 1994, V.

Mullet, K. and Sano, D. (). *Designing Visual Interfaces: Communication Oriented Techniques*. Upper Saddle River, N.J.: Prentice Hall, 1995.

Negroponte, N. *Being Digital*. New York, NY: Alfred A. Knopf, 1995.

Norman, D. *The Design of Everyday Things*. Currency Doubleday, New York, 1990.

Norman, D.A. (1990). The Design of Everyday Things. New York: Double Day Books.

Peak, D. and Gibson, M. "A Study of Aesthetic Design Variables In Web Design." Unpublished working paper, College of Business Administration, University of North Texas, 2002.

Peak, D., Lipschultz, J., Spence, W., Bales, K, Day, G., Nelson, J. "Building Academic Bridges: Interdisciplinary Media Technology (MT) Laboratories" *Feedback,* 42.4, 29-36, 2001.

Peak, D., Gibson, M., Spence, W., Bales, K., Kroon, V., and Vedder, R. "A Panel Discussion: How Will Media Technology Evolve as an Academic Discipline?" *Proceedings of AMCIS 2002 Conference*, 2002.

Postrel, V. (1999). "Looks matter." *Forbes*. 163(9): 88.

Rand, P. *A Designer's Art*. Yale University Press: New Haven, 1985.

Rand, P. *Design Form and Chaos, 2nd ed*. Yale University Press: New Haven, 1960.

Schaffer, E.). "A Better Way for Web Design." Information Week. (784): 194, 2000.

Terhune, A. "Charting an E-Commerce Course: A Case Study for CIOs," GartherGroup IGG-05261999-02, May 1999.

Williams, T. R. (2000). "Guidelines for Designing and Evaluating the Display of Information on the Web." *Technical Communication*. 47(3): 383-397.

APPENDIX I. A PARTIAL TYPOLOGY OF VISUAL DESIGN ELEMENTS, PRINCIPLES, AND TYPOGRAPHIC VARIABLES

ELEMENTS OF DESIGN	PRINCIPLES OF DESIGN	TYPOGRAPHIC VARIABLES
1.Point 2.Line Plane 3.Shape/Form Organic Geometric Figure vs. Ground 4.Color Hue Saturation Luminance Chrominance Gradation Complementary Association Surface Area Occupied Analogous 5.Value 6.Texture 7.Space Positive Negative Virtual Depth Location_placement Detail Perspective	1.Balance Symmetry Asymmetry Approximate symmetry 2.Gestalt Proximity Similarity Continuity Closure Pragnanz 3.Movement 4.Rhythm Repetition Alternation Gradation Linear Non-Linear 5.Contrast Size Scale Texture Shape 6.Emphasis Focus Contrast 7.Pattern 8.Unity Harmony Concord Discord Conflict Variety 9.Proportion Scale Standard	1.Placement 2.Type Size 3.Weight 4.Column Width/Measure 5.Alignment 6.Chronology 7.Posture 8.Letter Spacing 9.Leading 10.Choice of Typeface

APPENDIX II. QUESTIONS DISCUSSED BY THE AMCIS PANEL

One, Part A*:* How do we bring about the realization that aesthetic design and its disciplines (Media Technology: Art, Music and Sound, Kinetic or Interactive Media) are important to IT?

One, Part B*:* How will universities anticipate the demand for MT in the industry environment?

Two*:* For university programs that focus on Media Technology, what kinds of synergies are appropriate and meaningful?

Three*:* How do faculty, students, and industry solve the problems that result from restructuring university programs and disciplines?

ABOUT THE AUTHORS

Daniel A. Peak received his Ph.D. in Business Computer Information Systems in 1994 from the University of North Texas (UNT), with majors in Business Computer Information Systems and in Finance. An Associate Professor, he has recently moved back to the UNT College of Business Administration after serving at the University of Nebraska at Omaha's College of Information, Science and Technology, which he helped develop. His research interests include IT governance, strategic IT planning, media systems and human factors. Dr. Peak has more than 20 years of IT consulting and planning experience with numerous Fortune 500 companies, and has won and participated in numerous production and research grants.

Michael Gibson, a faculty member of the School of Visual Arts at the University of North Texas (UNT), began his ninth year as a full-time design educator. He is a principal in the Denton, Texas-based visual communications consultancy Gibson Clarke Design. He holds a BFA in Graphic Design from the Kansas City Art Intsitute (1985) and a MFA in Communication Design from The University of Michigan (1993). He has taught at Wayne State University, the Milwaukee Institute of Art and Design, and UNT. His published work has appeared in the design journals Visible Language, Zed, The Republic of Information, Design Education in Progress and Rough, and he has lectured widely in the U.S. and in Europe.

J. Wayne Spence is Professor of Business Computer Information Systems at the University of North Texas. He is the author of numerous books, refereed journal articles and conference papers. His specific area of specialization is in human-computer interaction. His research interests include human cognition, human-computer interface design and information delivery systems. His current research stream involves the use of sound and its consequences on users for information acquisition, comprehension and utilization in a decision-making environment.

W. Kenton Bales received his BME Drury College and his MM and DMA from the University of North Texas. Dr. Bales is an active composer whose music received awards from the Society of Composers, Inc., Music Teachers National Association, Mid-America Arts Alliance, and the Nebraska Arts Council. He also serves on the Board of Directors of the Society of Composers, Inc., and is the National Coordinator of the Student Composition Contest for Music Teachers National Association. His works are regularly performed throughout the United States and Europe.

Verlyn Kroon is Division Manager of Information Technology and CIO of Omaha Public Power District, a publicly owned, business-managed electric utility with approximately 300,000 customers in southeastern Nebraska. As a twenty-seven year veteran in the electric utility industry, he has extensive leadership experience in both the information technology and corporate planning functions of business. His special interests are in technology planning, and in providing innovative, practical ideas which add real value to the business. He shares his business experiences with numerous technology advisory boards and academic institutions in the Omaha metropolitan area to further the education of information technology professionals. He sponsored several applied information technology research projects for his employer with faculty of local universities and is an advocate for strengthening collaboration of the academic and business communities.

Richard G. Vedder is a professor of Business Computer Information Systems at the University of North Texas. He received his Ph.D. from the University of Arizona. His research interests include multimedia systems, knowledge-based systems, impact of new technologies, and competitive intelligence. His published work includes articles in the *Communications of the ACM, Decision Sciences, IEEE Transactions on Systems, Man, and Cybernetics, Expert Systems: The International Journal of Knowledge Engineering, Information Strategy,* and *Information Systems Management.*

Communications of the Association for Information Systems

ISSN: 1529-3181

.