

and games for management training. My abiding interest, indeed my passion, is for learning how to learn.

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Gaming: An Emergent Discipline

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Experiential learning efforts in the 1950s mimicked the logistic operational gaming of World War II; the results were encouraging. Subsequently, funded research efforts over three decades focused on gaming phenomena. Computers permitted more elaborate games, creating the illusion that they might be used for prediction; subsequent research established the potential of games for communicating complexity. By the late 1970s, large organizations were losing faith in the ability of other disciplinary approaches to deal with complex decision environments that defied quantification. Prompted by crisis, these clients sought to employ gaming for developing strategic plans. Many gaming projects, national and international, presented the context for observations about the evolution of knowledge of the disciplinary characteristics of gaming. Both advantages and disadvantages of viewing gaming as a disciplined activity are considered. The evolution of professional organizations, related academic activity, the game design process, and the need for consistent use of terms are also addressed.

KEYWORDS: *computing; consulting; design; discipline; gaming; Greenblat; ISAGA; communication; complexity; METRO/APEX; METROPOLIS; social concerns; urban planning.*

In his instructions for this article, David Crookall asked for “an idiosyncratic, personalized account of the past 25 years in gaming, as seen through my eyes.” As you know, gamers never follow the rules; as evidence, my story starts 37 years ago. So here goes. . . .

In 1958 Stu Marquis and I were teaching city planning at Michigan State University; this was a time of very rapid urban growth (post-World War II), and modern urban planning theory and practice were in their infancy. We were forced to improvise as we developed a new curriculum. In truth, I had never heard of experiential learning or gaming; however, circumstances demanded that we create a teaching vehicle that served a comparable purpose. Until then planning had focused on the physical environment, primarily at the neighborhood scale. If students were to be adequately prepared to

do more than perfunctory tasks, it was obvious that we needed to include emergent social, economic, environmental, fiscal, and political realities into our teaching.

Together, we set about to develop the materials required to make Lansing, Michigan into a "Laboratory Community" (Duke, 1961, 1962). We wanted these to be a lively and emergent collection, a smorgasbord of pertinent documents that would serve as background to the planning function. Stu had studied at the University of Chicago with Rex Tugwell; this program had a strong social-science orientation. Stu's skills, combined with my knowledge of physical planning phenomena, meant that we were well equipped to identify and organize an unusually broad range of materials for the collection.

By 1960 we were able to establish a large collection of documents from a variety of public and private sources. These materials were inherently dry and not coherently linked to each other. As a consequence, Stu and I had to face the problem of bringing the materials alive for students. Our objective was to allow the students to understand the material and to synthesize their findings into their assigned planning problems. In an attempt to solve this, each student was given the task of understanding the perspective of some significant community figures (e.g., land developer, builder, mayor, city council member, president of a citizen group). Students were encouraged to meet with their real-world counterpart to gain perspective. During class meetings, each student was required to represent the assigned perspective when discussing the planning task at hand. A dynamic interactive style of teaching evolved from this experiment. Students were no longer permitted to sit at their drawing boards and draft exotic plans without the benefit of firsthand knowledge of, and interaction with, the community. In retrospect, this early teaching style sounds a lot like a game!

During this period, Stu kept referring to the operational gaming activities that had been employed for logistical purposes during World War II; in particular, Stu kept prodding me to visit Professor Richard E. Meier at the University of Michigan. I called Professor Meier and briefly described what Stu and I had been doing at Michigan State. Meier was an imposing figure. He enthusiastically spent the afternoon giving me a sense of the state of the art of gaming as it existed at that time; in addition, he directed me to specific literature (primarily war and business games). I was delighted with his support for the deliberate use of games in the classroom and astonished to learn of his belief in the potential of this technique for improving communication (and therefore revealing solutions) in critical policy situations, both public and private. His response galvanized me into action, and the following fall I began my PhD studies with him (Duke & Meier, 1966) while continuing to work with Stu on the Lansing Laboratory Community Project (Duke, 1963).

In 1962-1963, I developed a game called METROPOLIS, which was to serve two purposes: first, to help students better understand how to use the laboratory materials that Stu and I continued to collect; and, second, to engage city council members in a discussion of emergent trends in the Lansing area. METROPOLIS was a simulation of the greater Lansing urban area; it presented actual current and historical socioeconomic data in the context of the existing political jurisdiction. The annual municipal budgeting process was the backbone of the game; this was strengthened by the introduction of role-specific events during each cycle of play that had been drawn from actual happenings in the community. I paid students to participate during the first test run. Too many students volunteered (for free) to play the second test run, and, to my astonishment, Lansing City Council paid me the princely sum of \$100 to present the game to them (my third trial).

Clearly, I was onto something, but what? In retrospect, the game was of poor quality (game elements not clearly defined, overly mechanistic, etc.). There was minimal gaming literature for reference, and my trial-and-error method of design was still heavy on the "error" side of the column. Nonetheless, I was fascinated by the interest shown in METROPOLIS (Duke, 1964). Participants clearly were enjoying the game and reporting that it served a useful purpose in improving communication concerning budget decisions. During play, their enthusiasm was contagious and participation was spirited; in subsequent academic tasks their planning projects became more sophisticated. For reasons unknown, it worked (Duke, 1965).

The problem was, what was "it?" And not to be forgotten, how could we escape calling it a "game?" This was a major problem because it blew academic fuses, particularly among the dinosaurs in my department.

With the METROPOLIS game under my arm and a new PhD in my pocket (both quite rare at that time) I soon became the gamer's equivalent of Johnny Appleseed (a mythical figure of early American folklore who reputedly traveled across the emergent nation planting apple seeds so that the settlers who followed would find sustenance). For reasons that still remain a mystery, I was invited far and wide to demonstrate the METROPOLIS game. At first, this was local, but through time these invitations carried me to universities throughout the United States and Europe. In the process, my interest shifted more and more toward gaming as a phenomenon and away from traditional urban planning concerns.

One day, it dawned on me that I was no longer Johnny Appleseed, but only One-Note Johnny playing the same tune over and over. It was time for a new game.¹ Computers were in their infancy, and I had done a lot of work using this emergent technology for various planning inventories (Duke, 1960). At that time, many of us believed that it was possible to model (in the predictive,

scientific sense) a major metropolitan community so as to evaluate various proposals affecting the community. This proved to be a simplistic view that was to fall victim to a paucity of theory and the limits of technology as existed at that time (Duke, 1966).

In 1964, with youthful enthusiasm (yes, I was once young) and blithesome ignorance (since replaced with a more humble understanding of a much broader universe of related knowledge), I set about the task of developing such a predictive simulation for Lansing, Michigan. As testimony to my exuberance for the task, I was able to get the US Department of Housing and Urban Development to fund the project and the Ford Foundation to purchase a computer (an IBM 1130 with 8k of memory, no CRT, no keyboard entry, programming in machine language with wire connectors and a plug board). Three years later, after a heroic team effort, the expenditure of more public monies than I care to recall, and a move to the University of Michigan, the METRO game/simulation came forth (Duke, 1977c).

With a quiet thud. Certainly, the low point of my professional life was in 1967 at the moment when a critic, during a formal evaluation of the METRO project, pointed out that the average cost per hour of training achieved to date was in excess of \$100,000. With all humility, I must point out that these were real, pre-inflation dollars. The only rebuttal (rather pathetic) that I could muster was my unshakable belief that someday, somehow, properly used, games were going to change the world. He did not buy that argument.

Thirty years later, there is some considerable consolation in having discovered from a presenter at the International Simulation and Gaming Association (ISAGA) conference in 1994 that METRO (much revised, now labeled APEX) is still in active use at more than 100 universities here and abroad. I am delighted to be able to report that as of 1995 it is conservatively estimated that use of the revised game is now measured in many hundreds of thousands of training hours at a unit cost quite reasonable by competitive standards.

At about this time (1967), a similar gaming disaster was brewing at the West Coast, where the development of POLLEX, a game for training air pollution control officers, was under development at the University of Southern California (USC). The failure of this product was the result of a combination of badly confused objectives and poor management. For those of you who appreciate irony (or chutzpah, as the case might be), I was called in as an expert to save the project. (Actually, the benefit of screwing up big time is that it leaves an indelible memory of failure and a burning desire to recover!)

At my urging, Dick McGinty (a former student from the Lansing Laboratory years) was hired as the new director as the project was reorganized. The

original METRO was brought in as the base for a new game that came to be called METRO/APEX. This version was the result of a collaboration from 1967 through 1970 between the METRO team at the University of Michigan and a new team formed at USC (Duke, 1971a). Having undergone a metamorphosis, METRO/APEX has since been used for several decades by the USC Air Pollution Control Institute and by many other groups.

It should be noted that one of the USC team members ultimately took METRO/APEX into the private marketplace (through mechanisms unknown), changed the name to APEX, and has recently sent a flyer offering to sell it to me (or anyone) for \$10,000 (includes training). One can view this as (select one): evidence of the continuing success of METRO, the free (?) enterprise system at work, or perhaps more chutzpah.

Three decades have passed since I began the METRO project; I have had many opportunities to reflect on some of the problems, and, fortunately, many successful gaming applications in other venues that provided the opportunity to try new techniques. Here are a few of the many lessons that I have learned:

1. Have precise and reasonable objectives for the game and stick closely to them.
2. Be persistent, do not be deterred by critics.
3. Employ teamwork effectively—a successful game requires an amalgamation of talents and viewpoints.
4. Remember that games serve well as devices for communication, so it is incumbent on the designers to identify who is trying to communicate with whom and, quite specifically, about what substantive content.
5. Remember that games serve poorly for predictive purposes; it is best to use other, more appropriate techniques for this purpose.
6. Games are situation specific; if well designed for a specific client, the same game should not be expected to perform well in a different environment.

There are many generic truisms about game design that I would like to describe; toward that end I am currently working on a text about the design and construction of simulation games (Duke, 1995b).

By the late 1960s, gaming had begun to take on some of the characteristics associated with the early development of a discipline. The East Coast War Games Council (vintage 1961) had been co-opted by gamers with a broader-than-military view into becoming the National Gaming Council. This group was soon to become the North American Simulation and Gaming Association (NASAGA); this is still a viable gaming group. Another manifestation of the emergent professionalism of gaming was the publication of *Simulation & Games* in March 1970 by Sage Publications; this source has continued unbroken since that time.

Starting in 1964, my Johnny Appleseed activities with METROPOLIS, METRO, and METRO/APEX took me to a number of countries. This travel,

in turn, led to my participation in various game design projects in Europe. These included, but were not limited to, serving as a consultant to the United Nations (FAO, Rome; UNESCO, Paris; IDEP, Senegal; UNEP, Ghana; and others); the Cologne Project for the Germany Ministry of Housing, 1969-1972; the French Government Ministère de l'Équipement et du Logement, Paris 1969-1973; and the US State Department, International Conference on Environmental Problems, 1971 (Duke, 1967, 1971b).

In the summer of 1969, I was doing a housing market simulation project for Dortmund with Hans Hansen, Roy Miller, and Al Feldt (Duke, Feldt, Hansen, & Miller, 1970). On a lark, I sent out a few letters (28 to be exact) to gamers I knew with the promise that I would buy the beer and sausage if they would come to Bad Godesberg to talk about gaming. To my astonishment and delight, 84 people arrived (counting wives and children), and an impromptu conference was created. Because 5 or 6 people at most had been expected, we were completely unprepared—no accommodations, no program, no planned activity of any kind. We rented an old windmill that had been converted to a conference center and quickly organized presentations to familiarize ourselves with each other's work. We had a wonderful time with informal discussions and group meals (I had to buy a lot of beer and sausage!). It was very exhilarating to discover that so many kindred spirits existed in so many different countries. Through the effort of Henk Becker, organizational papers were drawn up and the International Simulation and Gaming Association (ISAGA) was created, which celebrated a 25-year reunion in Ann Arbor in 1994!

During this period (1964-1970) the University of Michigan was a hotbed of gaming. Richard Meier, my gaming mentor, was shifting to California, and I was asked to teach several of his classes starting in 1964. In 1967 I was invited to join the University of Michigan as director of the Environmental Simulation Laboratory and I had the good fortune to lure Al Feldt (who had just created CLUG) to leave Cornell and join our group. Bill Gamson (who had recently created SIMSOC), Fred Goodman (who had a new game called POLICY NEGOTIATIONS), Layman Allan (creator of EQUATIONS, Wff'nPrff, and other games of logic), and several others were actively pursuing gaming techniques in their respective professional departments at the U.M. Each of them taught courses in which games were embedded; in some cases, game design was included in their class material. Research funds were readily available, and a number of significant projects were completed during this period.

In 1970, I hosted the NASAGA conference at the University of Michigan. There was a large and enthusiastic turnout; it was impressive to discover that so many people were using gaming in so many different ways. These

conferences have always served as a terrific opportunity to meet new gamers. It was at the 1970 NASAGA meeting that I first met an energetic young professor from Rutgers, Cathy Greenblat, who was reporting on the conference events for the journal *Simulation & Games*. Through Cathy, I was introduced to gaming as a sociological phenomenon; this initial meeting evolved into extensive collaboration, and Cathy and I subsequently produced several books on gaming. I am indebted to Cathy for her persistence in introducing me to her perspective on the gaming field and for her patience as we developed the several manuscripts.

In 1972, while scuba diving in Hawaii, I suffered a serious injury; as a consequence, I spent a major part of that year in a hospital bed. An injury of this kind tends to focus the mind, and the associated immobility gave me a wondrous opportunity to collect my thoughts about gaming. With the help of a graduate student, Nancy Stieber, I collected the bits and pieces of "truth" that seemed to emerge from the literature then available. These thoughts were written on small scraps of paper, and with the help of hospital staff and visitors they were tacked to the wall opposite my bed. Over a period of many months, these notes were systematically rearranged into an outline for a book (Duke, 1972). In retrospect, the book has somewhat of a strident tone, but given the urgency of the moment ascribable to my health, perhaps I can be forgiven.

After my recovery, I was fortunate to be invited, through the good graces of Henk Becker (one of the participants at the first ISAGA meeting), to spend a year as a fellow at the Netherlands Institute for Advanced Study in the Humanities and the Social Sciences, Wassenaar. During this time I wrote *Gaming: The Future's Language* (Duke, 1974). Also noteworthy is 1973 because it was the occasion of the first joint NASAGA/ISAGA conference, held in Washington, DC (Duke, 1973).

In 1973-1974, while working on a game with a group in Paris, I had a chance encounter with Pierre D'Ayala of the United Nations Educational, Scientific, and Cultural Organization (UNESCO); this led to the development of a series of games for use in underdeveloped countries (Duke, 1975a, 1975c). Gaming shows great promise for use in these environments as a way of quickly providing a cogent model of urgent problems. Several examples can be cited: SNUS (Duke, 1977d, 1977e) has been used extensively for nutrition planning; HEX (Duke, 1976a), which presents a simple model for sectorial economic planning in a Third World environment, is in increasingly widespread use. For games to be used well in these contexts, it is essential that a straightforward and simple discipline be applied during the design phase (Duke, 1976b, 1977b, 1978).

By the early 1970s individual courses in gaming were beginning to appear at many different universities. Reflecting the substantive interests of the

professor, these courses took many different forms; however, the treatment of gaming tended to be incidental, not central to the course content. At this point, students wanting to gain knowledge of this approach were largely on their own and searched the literature by reviewing reports of projects from many different fields of study. I was quite frustrated with the paucity of literature that treated gaming as a legitimate field of study. My good friend and colleague, Cathy Greenblat, who was doing state-of-the-art gaming in sociology, shared this concern. As a consequence, we collaborated in the development of a textbook that addressed gaming as a phenomenon unto itself (Greenblat & Duke, 1975).

By the 1980s many courses in gaming could be found at universities here and abroad; with this activity came demand for a new version of the original textbook. Cathy had garnered a great deal of experience through her work with gaming projects; she was familiar with a wide range of gaming literature, and she had considerable experience with the use of games in her teaching of sociology at Rutgers. Together, we were able to meld our knowledge through collaboration on another gaming textbook (Greenblat & Duke, 1981).

My recuperation from the 1972 injury and subsequent fellowship at the Netherlands Institute for Advanced Study in the Humanities and the Social Sciences resulted in my being absent from the university for a year and a half. On my return (in 1974), the situation at the university had changed; I found myself moving into the Chairmanship of the Urban Planning Program. This was a fresh opportunity to engage in urban gaming, and over the next ten years I worked on several projects of this kind (Duke, 1979c, 1981; Duke, Feldt, Hansen, & Miller, 1977). METROPOLIS was still in demand, and a three-volume set was published that made the game more accessible to users (Duke, 1975b).

At this time I became interested in the concept of frame games; this was prompted in large part by my work in Third World environments that highlighted the need for simple, flexible, and efficient tools. My central belief had been (and remains) that games are situation specific; as a consequence, they should not be expected to perform well except within the context of the usage envisioned during their design stage. I was troubled to see many subject-specific games being used in increasing inappropriate contexts with mediocre to poor results. The conundrum was the great cost and time associated with developing new games for each specific use. I saw two possibilities for addressing this: (a) a more coherent and efficient design process (Duke, 1979b, 1980a, 1980c) and (b) the use of frame games where appropriate content could be added to preexistent game process and mechanisms.

Once again, collaboration with Cathy proved productive. We developed a trilogy of frame games for Monterey Bay, CA, USA. In addition to meeting the need of that project, Cathy and I produced a monograph that has proven reasonably successful in illustrating the concept of frame games (Duke & Greenblat, 1979).

In 1981, after considerable discussion and negotiation among my colleagues, the Rackham Graduate School at the University of Michigan approved a Certificate in Gaming & Simulation; I have served as director since the inception of this program. In truth, my colleagues were skeptical of the wisdom of developing such a program; a few remain so today. I have no such doubts! We have a robust profession with thousands of practitioners and tens of thousands of gaming products; gaming methodology can be found in the four corners of the earth, and its use is increasing. We have an obligation to take a responsible posture in the development of a professional approach. There *are* such things as “good” and “bad” games, and if we are not able to make the distinction, our clients will. Moreover, to the extent that we tolerate confused, imprecise, inadequate, or otherwise suboptimal gaming products and their inappropriate use, we continue to present a poor public image.

This controversy about the wisdom of viewing gaming as a disciplined activity lies at the heart of our profession. As an example of how strongly these differences are felt, consider this exchange. During the NASAGA conference in Spokane, WA, USA (1992) the Chair asked that we each identify ourselves by name, institution, and our central gaming interest. When my turn came, I stated “Dick Duke, University of Michigan, and my objective is to foster a formal discipline of gaming.” A few moments later, when Fred Goodman’s turn came, he stated “Fred Goodman, University of Michigan, and my objective is to prevent Dick Duke from achieving a discipline of gaming.”

Fred’s position, as I understand it, is a concern that any formalization of gaming as a discipline might endanger the very core of the technique through the stifling of spontaneity. There seem to be at least as many gamers who agree with Fred as who agree with me. Perhaps such a danger does exist—but, in my opinion, there is a much greater danger in constantly presenting a mishmash of technique that we defend with a loose and undefined jargon that does not convey consistent meaning even within our profession.

David Crookall addresses this concern at length in the preface to *Simulation and Gaming Across Disciplines and Cultures: ISAGA at a Watershed* (Crookall & Arai, 1995). He quotes Joe Wolfe as describing a discipline as gatherings of like-minded people basically pursuing the same quest.² Crookall raises the valid concern that the pursuit of a discipline can be overdone in an effort to protect insiders from outsiders (other disciplines); as

a consequence, distortions may occur. David, in his ruminations, raises the question if gaming might better be called an art, a technology and/or a methodology (none of these possibilities deny that gaming is inherently interdisciplinary). However one may view this issue, it seems to me that we share a need for some clarification and consistent use of terminology and technique. Potential clients, facing troublesome and urgent problems, will not be inclined to take the profession seriously if we are unable to convey a consistent and accurate representation of our professional work.

These concerns have been vividly demonstrated to me in recent years. Beginning in the late 1970s, a new type of client for gaming began to emerge as, increasingly, leadership of large public and private organizations sought to locate new methods for developing strategic vision. Clients who sought these emergent policy games have included an international bank, a major railroad, a large pharmaceutical house, a major chemical company, and several other significant organizations. In each case, they were required to employ a group process to reach a decision in a very complex environment (Duke, 1995a). For the past decade my professional activity has been heavily dominated by working with such clients. Here, at the University of Michigan, I have been working with several different teams on the development of serious gaming tools for policy use.³

In some cases, these clients have been prompted by a crisis that demanded immediate attention; in other cases, there has been an awareness of complexity that, as a practical matter, defied quantification of the decision environment (Duke, 1977a, 1979a, 1980b, 1994). In effect, these clients had lost faith in other disciplines and as a last resort were turning to gaming for a solution. Even as they have sought this approach, these clients have revealed anxiety because of the interdisciplinary nature of gaming and its inherently ill-defined structure. Clients become more confident as I describe the specific game elements that I employ (25 as of now) and the 22-step process that I follow in the design, testing, and professional use of a game product. As professional gamers, would we not communicate better among ourselves if we could reach some consensus on these matters?

It should be noted that the theoretical underpinning of this work in policy games can be traced to Robert Armstrong, who was a pioneer in this field and one of those who attended the first ISAGA meeting in Bad Godesberg; Bob also gave the keynote address for the 1994 ISAGA meeting (Armstrong, 1995).

Perhaps the most exciting moment of my career in gaming was to host ISAGA 1994. This meeting was a reaffirmation of my belief that gaming has a significant role to play in societal affairs. It was very rewarding to discover an entire new generation of gamers; in this case they came from more than two dozen countries. The presentations covered a wide range of substantive

concerns; of particular interest to me were the panels during which young professionals from ten different countries presented their work. The presentations from this conference have been captured by David Crookall and Kiyoshi Arai in a hardbound book published by Sage Publications (Crookall & Arai, 1995). I was delighted to discover that the book was dedicated to me.

Looking back, I cannot imagine a more rewarding career; looking at the current state of the art, I feel more than satisfied with the progress that has been made by the profession; looking forward, I am confident that an ever-increasing cadre of young professionals will build a strong profession and embed it throughout society in a variety of ways. I wish this next generation the best of luck with their efforts!

Notes

1. With the exception of METROPOLIS, all games referenced in this article have been team efforts, in some cases developed with student groups. My role has been as principal investigator in most cases; in some instances I have served as a consultant to the design team.

2. In the preface to *Simulation and Gaming Across Disciplines and Cultures: ISAGA at a Watershed* (Crookall & Arai, 1995).

3. Current projects include TRANSFORMATION (The Sustainable Corporation) for the University of Michigan Business School; S.E.I.D.L. (Establishing Research Priorities), for the International Joint Commission on the Great Lakes; IVHS (Intelligent Transportation Systems), College of Engineering, University of Michigan; HEALTHPLAY (National Health Care System Simulation) for a private consulting group; and POLARITY MANAGEMENT, for a business firm.

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The COMPETE Saga: Or 25 Years of Writing and Administering Simulation Games

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This article describes the personal side of 25 years of simulation authorship and usage. Current simulation games are sophisticated and complex, and the quality of simulation research is excellent, but it is important to remember that simulations are also fun. This overview and reflection looks at the fun side of writing and administering business simulations.

KEYWORDS: ABSEL; business games; simulations; student assignments.

The Faria-Nulsen duo was born on 15 June, 1969 when, as ABDs, we arrived at Wayne State University in Detroit (USA) for our first full-time teaching positions. Similar to the origins of other famous pairs such as Batman and Robin, the Green Hornet and Kato, and Regis and Kathie Lee,