"KILLER APPS"

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ABSTRACT
For decades, the information industry has relied on traditional designs for information delivery. Typically these designs are dependent upon techniques and skills that have become limiting factors in their usage. With the dawning of an information enabled society, it is incumbent on our industry to develop comprehensive solutions to information problems and move beyond our traditional markets. We are an industry that is well positioned to create **"killer applications."**

As an entering freshman at Carnegie Tech in Pittsburgh, PA in September of 1963, 1 knew very little about information science. In fact, I knew very little about most everything. My high school career was enriched by a weekend computer course (Carnegie Tech had an EDIAC!) and in combination with a strong math background I was confronted with that deadly choice that freshmen fear... which major to select. If I wanted anything to do with computers, my choices were either Electrical Engineering or Mathematics. Hence, my BS is in Math.

I was fortunate enough, however, to land a part time job running the school's computers at night and quickly became one of the early computer nerds. Working day and night at that time was a blessing... because I needed the money... and I became fairly adept at everything from wiring a card sorter to programming an Algol compiler. Lots of punched cards!

But where was information science let alone abstracting and indexing! I never heard of those words until much later in my working career. Some of my work at the computer center involved support of Drs. Herbert Simon and Alan Newell who were busy at work studying cognitive processes by playing chess around the world amongst computers, while others similarly tried to emulate the way that we think... but no A&I (abstracts and indexes). I'm certain that I used H. W. Wilson's "Readers Guide to Periodicals" while on one of my THREE trips to the library during my college career, but that was it.

Today, that same institution is providing abstracting and indexing databases to the entire student body. If I were to attend Georgia Tech, I would learn sophisticated online searching techniques that are incredibly effective at navigating complex A&I databases. At virtually every institution of higher learning, most public libraries, and at an increasing number of elementary to high schools, students regularly use tools such as InfotracTM to support their educational or research activities.

Although they may not understand the concept of a controlled vocabulary, they reap the benefits of precision and recall that make their research fruitful and effective. They may not understand that sophisticated rules exist that are used to create useful abstracts, but they understand that abstracts can be a time-saver in deciding which articles are the most articulate on a point of inquiry. Nor will they understand that a cross-reference is the quintessential application of the hypertext concept that was 'invented' decades before the computer community thought that it was 'hip', but they appreciate the assistance in finding terms that best define their topic.

How did all of this occur in a short span of time? Certainly, technology was a great enabler. Without computers we'd still be setting linotype by hand. But that's only part of it.

First, I believe that a fundamental change occurred in the nature of periodicals. As the 'velocity of informational change' increased, more of the world's knowledge is being published in daily and weekly cycles than ever in history. Real-time is a plausibility. Moreover, the vastly improved quality of editorial content in periodicals as well as the content's timeliness add a new dimension to our quality of life. From science to business, from homework to recreation. We can find periodicals providing information of the highest caliber.

Although scientific research has relied on A&I for a long time, it is relatively new for a student to use A&I tools to evaluate a laptop. Or for a business to identify a new process. A&I has moved information to the fingertips of the rich and the poor, the sophisticated and the untrained.

I never met Miles Conrad. That would have been a treat. But I am testimony to the role that information science and A&I is playing in our lives and how that role will increase over time. I think about A&I in the present and future, I think of it beyond its technical aspects. For too long, perhaps, we have thought and taught A&I as a technical skill. Its rules and discipline and structure. We have positioned ourselves as technicians and been shy about that. If you doubt that, reread some of the earlier Miles Conrad lectures!

Today, this very moment, we must change the way that we think about ourselves. In a sense, today, we are marketers. Today, we can no longer teach process or rules, because those processes and rules are obsolescing as we teach them. Today, we are trying to explain our entire industry in terms of the features and benefits of the products and services that we build or can build. We solve problems for our users who don't really need to understand how we do it. We enable the undisciplined to locate the undefinable!

As we step forward and assume our place alongside the true contributors to technology and society, we represent the next generation. Hardware technology has advanced itself quickly so that we can scarcely tell the pros and cons of one PC versus another. Software has similarly synthesized itself into homogeneous groupings that most software packages are not differentiated. And if they are differentiated, few of us care about their subtle nuances. We are in the AGE OF KILLER APPS! We are looking for and in need of quantum leaps.

We can no longer think traditional thoughts. Our goal must be to integrate hardware, software and content into unique applications that change the equilibrium in a market or industry sector.

But what is a "Killer App?" In 1983, Information Access Company introduced the first InfoTracTM on 12-inch laser discs and inextricably--(Why did I put this word in a speech that I have to deliver?!)-- combined the sophisticated tools of A&I with the power of PCs. In his design, Dick Carney, Senior Vice President of Product Development for IAC, understood that IAC would want to harness the intellectual creation of our A&I staff with that of our software engineers. This KILLER APP was a killer app because it was able to solve information inquiries without knowledge of anything but the question! InfoTrac was so sophisticated that it made usage simple. In 1983, most A&I applications were delivered to libraries in print form. Today as you are well aware, databases are delivered to libraries electronically in a multitude of formats.

Today there are many applications that are classified as "killer." Tomorrow there will be many more. The volume and velocity of today's information sources compels our industry to reach out and market itself and package itself to become the creator of killer applications.

It looks as though many are in search for killer apps. Maury Cox of CompuServe claims "CIS is still trying to figure out what the killer application is... I don't believe that chat is the killer application of the future. Americans are starved for convenience... that's where the killer application lies." Maury provides his perspective on what IS as well as WHAT IS NOT a killer app. Perhaps it doesn't exist yet because it's not convenient enough. Or perhaps it's not singular and that's why searching for the "Holy Grail"is so difficult.

The computer folk claim lots of killer apps. Carole Patton in her article "Killer Apps a Rare Breed" nicknames three software packages as killer applications, but I'm certain that a vast majority of you never heard of any of them. Perhaps this is a new application of literary license?! Steve Curcuru talks about "creative applications" being the killer applications... but laments that they may also merely be symbols of those things that are hard to create. I guess that they are difficult to create, but that should give us energy to try harder to create them.

Our cousins in software development have hunted for killer applications for a long time. Read: BIG BUCKS! But it seems that as soon as one software package establishes a unique position, ten clones

come along that are slicker, cheaper, faster, etc. Maybe that's the definition: A killer app is a concept that changes the way that we conduct our lives... at least for a while!

Perhaps it's important to mention the Internet and World Wide Web at this point. Clearly, few phenomena have affected us more in the last few years than these applications. Growing by leaps and bounds, these advances are changing the way our society thinks and opening up new horizons for thinking. Young and older, veteran and novice alike have the opportunity to telecommunicate at a lower-than-before cost and to take advantage of a standard though limited structure. Their beauty is in their flexibility, which is also their detractor. Whatever we can say about this dynamic duo, be certain of two things... it's just beginning and it's going to be very significant.

Some may posit that the Internet and WWW are the ultimate killer applications. They have brought disequilibrium to an environment and perhaps qualify under my own definition. My sense is, however, that they are so fundamental that I treat them much as I treat the silicon chip or advances in modem technology. They facilitate and illuminate the options that we have to participate in a new world of applications. They are bringing our enabling technologies to the front of everyday living. Into every office, school, and home. They are inescapable. Unto themselves, they cannot achieve what can be accomplished, but perhaps without them, we could not either.

As I looked back over some of the previous Miles Conrad Lectures, I found an exciting mix of perspectives [one in particular caught my attention.] In 1978, seventeen years ago, Ben Weil spoke of "Information Transfer in a Time of Transition," where he discussed standards, the technical construct of abstracts and the relationship of the newly enacted copyright law to primary and secondary publishers. His timely speech is worth rereading because very little has changed... while in other ways, everything has changed. Ben was concerned about the relative relationship and standards of an industry. But the Internet did not exist. The World Wide Web was the subject of low budget sci/fi flicks. Ben spoke of an orderly environment disrupted by a newly enacted copyright law.

By any standard, today we exist in a disorderly environment. So many of the important issues of yesterday seem to be disrupted by technology and changes in the relationships amongst the players. Information Products are being combined into information powerhouses. Primary publishers are struggling to provide sufficient value added services to continue to exist. Authors are claiming rights beyond the printed word into the mystical cyberspace. A&I organizations are seeking new sources of revenue as the growth rates of traditional sources of income flatten. Online services of the traditional sort find it difficult to make ends meet, while the new breed of client/server farms multiply like rabbits. THIS IS A WAKE UP CALL. WITHOUT CHANGE WE WILL BE LEFT BY THE WAYSIDE!

Last year, my friend Ron Dunn in his Miles Conrad Lecture closed with a call to arms. . . "The successful secondary services of the future will be those that are adept at sensing market needs and users' preferences, and adapting their services accordingly." I like that. I like it a lot! But l want to take the thought further. Let's take a stroll outside of the "box" for a moment:

Let's say that all of the chemists, in the world joined together and agreed that they could create a Killer App that was 100% electronic. That via their Internet connections they would record their papers, publish abstracts to a standard of quality and timeliness that exceed today's, and complete peer review in 72 hours. They also decided that they could charge for this service at 10% of today's prices. Let's say that they also decided to write abstracts and provide easy to use software for individuals that are not trained in chemistry but could have an application in homework or small businesses. And that as a result of this creative thinking received a development grant from NSF to fund the project! OK let's not get carried away! But what if we changed the fundamental structure of publishing in the chemical sector. Clearly, this would have a substantial impact on several of our attendees at this meeting.

For the last 7 or 8 years, I have received presentations of software that are supposed to perform traditional A&I processes ... Artificial Intelligence... everyone from ADL to two guys in their basement. Most of these processes have been ineffective, but all of them valuable from several perspectives. First of all, we have been able to incorporate some of the concepts into our database production systems. These computer aids make our processes more efficient and improve our consistency.

Secondly and perhaps more importantly, proponents of these software approaches have convinced us that sooner or later, someone will develop an approach that produces product that is "good enough." We hope that we are courageous enough to be the early adopter of this technology. . . and if we are, our operation will become more efficient and benefit financially.

The more interesting, though frightfully scary scenario, presumes that a competitor moves forward more quickly than we do. Sooner or later, the "good enough" application will develop what "walks, talks and looks" a lot like A&I. So why do I mention this in my discussion of killer apps?

I think that our industry must adopt an expansive market-driven, solution-oriented strategy that takes us well beyond the scope of our existing databases. We need to raise the stakes by redefining our entire industry and the markets that we serve. Here are some of the things that I think are relevant to consider:

> 1. Today we publish databases that are merely strings of information records with little or no relationship to each other. Almost robotically we produce new databases, but we rarely try to put our products into the context of the user. We take them to the party, but don't seem to dance with them much. "Go to the journal... write an abstract... go to the next journal." We need to think about solving their information need in a broader sense than we have previously done.

> 2. Most of us have not considered how our customers use our databases. We need to ask ourselves what information in addition to our database record does our customer need to satisfy their information requirement? How can we build solutions rather than strings of information records?

> 3. Today, we tend to limit the applicability of our databases to target markets of relatively low population. Do we not believe that some of the sci/tech and certainly business information is valuable "outside the box"? Must we be so traditional to believe that high school students cannot benefit by new applications in chemistry or electronics or biotechnology? Who should we assign the task of building these new applications? I think that the "who" is us! Is there any industry better equipped to organize and deliver these applications than we are? I think not.

> 4. In a world whose technological pace is increasing exponentially, new market sectors are emerging at an incredible pace. For example, one of the largest at-home oriented online services has a very successful affinity group program about tropical fish (breeding, raising, import, politics, etc.). Almost every conceivable aspect of tropical fish is discussed every day. How many of you in the audience have built an information utility for the tropical fish crowd? No hands?

As a member of the Board of Visitors of the University of Pittsburgh SLIS, I am constantly amazed at the sophistication of the program. Networks, online databases, preservation... all sorts of interesting components of information science, library science and technology. I try along with others on the Board to assist the program by constantly trying to introduce marketing concepts to the program. . . well shy of an MBA! Why? Because these graduates must enter a world where their success is based on their creativity, their ability to conceptualize new applications and to market them for both funding and utilization. They must understand the concept of presenting information as a solution to their constituents' problems. They must articulate the features and benefits of information in order for new applications to gain acceptance and to be successful.

We need to package our information, library, and technical capabilities around applications that knock their socks off... that blow their doors off. . . that help to develop our educational programs and in fact our society to new frontiers. Now is the time to pull all of these skills and resources together into "killer apps" that change the way that we function as a civilization.

Delores Meglio, IAC's Senior Vice President and Publisher, reminds me that often we are creative as a result of addressing individual pet peeves. For example, if you look for music or literature by traditional indexing (author, title, subject), your current tools tend to be limiting. But what if you could

hum a few bars of a song and find the CD? Or search for a book written by a "politically liberal Southern author"? Is it difficult to imagine the creation of an application that would enable us to solve these problems? Not me! Those of us who search for problems with technology and creativity in our hip pockets know that solutions are within our grasp.

In their newly released book, "Competing for the Future," co-authors Gary Hamel and C. K. Prahalad make several points that I'd like to share with you. The first is "Learning to Forget." The concept is that in order to prepare for the future, it is necessary to "jettison" some of the past. Although this is a very simple thought, think of how difficult it can be in your own organization to change the way that things are done in order to make way for new thinking. When I'm not sitting in offices or giving speeches, my passion is to race cars. Many of the drivers have placed small stickers on the bottom of their rear view mirrors with the reminder that "What's behind you is irrelevant!" The same can be true throughout our industry.

We tend to get comfortable with our past successes. We tend to be enamored with our current products. We get lazy. We tend to become so preoccupied with playing defense that we forget to direct our offense. There's a phrase that I like that goes something like this: Whenever you feel that you have changed enough, there's always one competitor that will be happy to show you something that you have overlooked!

I remember giving a speech over 20 years ago (I guess that I must have been in high school!) to an audience of printing and publishing executives. I was trying to explain how microfilm was going to change their businesses and how quickly technology was going to play a more important role. The rate of technological change over the last 20 years has been extraordinary (even if microfilm wasn't all that I thought it might be!) It used to be that technology was an enabler for information science. Now it is a driver.

Another point from Hamel and Prahalad--and I think their main point--is that we must enable our creativity to regenerate the industries that we serve. They point out that both restructuring and re-engineering, two popular management themes these days, are both expense line actions. Reduce headcount to become smaller, re-engineer our processes to become more efficient. But how do we affect the top line. How do we grow revenues?

Most recently I watched the new Chairman and CEO of Kodak, Mr. George M.C. Fisher, come under attack by Wall Street geniuses for not cutting jobs, and for not restructuring. His point was that he wants to focus on Kodak's core competencies in digital photography and the like, to redefine their future. He doesn't only want Kodak to become more efficient for the present, but rather to take the longer view that Kodak must prepare itself for the future...and he believes that they know what their future looks like. I, for one, hope that he knows more than the Wall Street crowd.

The authors (Hamel and Prahalad) make the point that in order to compete for the future, an organization needs to either reinvent their industry or reinvent their strategy or both. You need to gain foresight into what the industry will or can become and then adapt your strategy accordingly. Sounds simple. Why did CNN produce an all news channel instead of CBS? Why was MTV not created by one of the broadcast networks? And even though Mike Millken did some things that were illegal, without "junk bonds" the U. S. would be a laggard in telecommunication and cable technology.

And as I conclude my Miles Conrad Speech, I'd like to leave you with a few thoughts:

> 1. Our industry is about to undergo the most significant and most rapid changes in our history. We must seek to gain a better understanding of what we might look like with extraordinary technological change and incredible competition... especially from nontraditional sources.
> 2.
> We must learn to become more inquisitive. You, as the leaders of our industry, have an obligation to have the curiosity to lead us into this chaos. If you do not gain the foresight, then who is it that will?
> 3.

Change is a continuum. If you are tired or complacent, you enable new players to reshape our future. It is a time for high energy and for risk taking.

Today, you have the potential to reshape our industry. Be inquisitive, take intelligent chances and perhaps you will be the one to create the "Killer App" for our industry. . to create the application that changes the industry equilibrium as we know it today. It is in your hands!

My sincerest thanks to NFAIS for this honor of being the 1995 Miles Conrad Memorial Lecturer.

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