

Down From the Top of Its Game

The Story of Infocom, Inc.

Hector Briceno
Wesley Chao
Andrew Glenn
Stanley Hu
Ashwin Krishnamurthy
Bruce Tsuchida

ABSTRACT

The success and failure of Infocom, a company founded by members of MIT's Laboratory for Computer Science, resulted from a combination of factors. Infocom succeeded not only because it made *Zork*, a text-adventure game, available on personal computers, but also because it developed an effective system for supporting new platforms, maintained an engineering culture that excelled at writing computer games, and marketed its products to the right audience. Similarly, Infocom did not fail simply because it decided to shift its focus to business software by making *Cornerstone*, a relational database. Infocom failed for many reasons that were closely tied to how the company managed the transition to business products. Behind the scenes, the transition created a litany of problems that hurt both the games and the business divisions of the company. Combined with some bad luck, these problems—not simply the development of *Cornerstone*—ultimately led to Infocom's downfall.

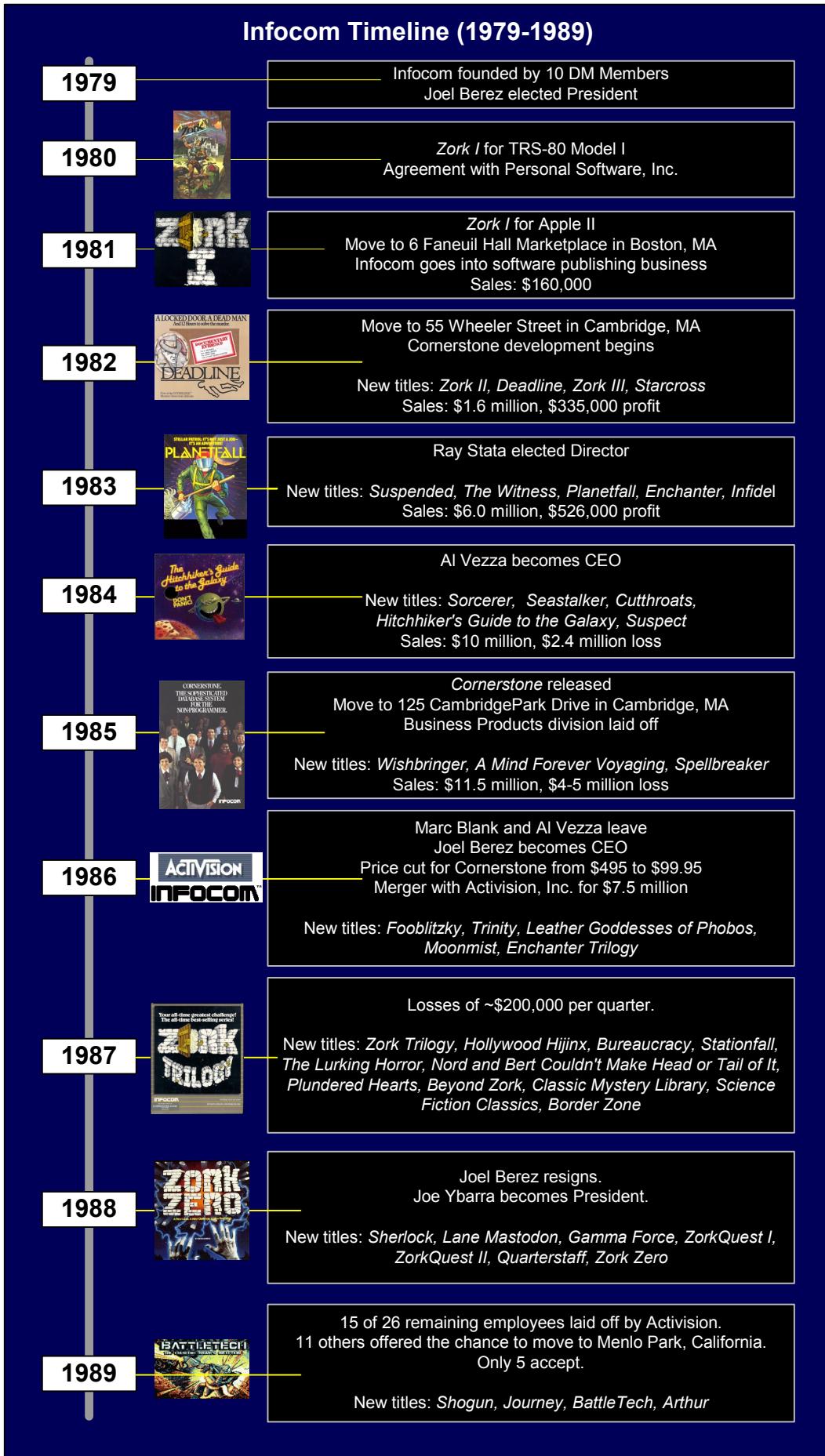
6.933J/STS.420J
Structure of Engineering Revolutions
Professors David Mindell and George Pratt
TA: Eden Miller
December 15, 2000

INFOCOM™

TABLE OF CONTENTS

INTRODUCTION.....	4
THE BIRTH OF A LEGEND	5
THE CREATION OF <i>ZORK</i>	5
<i>ZORK</i> : THE GREAT UNDERGROUND EMPIRE.....	6
INFOCOM'S FOUNDING	8
ORIGINAL INTENTIONS	10
INFOCOM TAKES OFF.....	10
MAKING <i>ZORK</i> FIT ON PERSONAL COMPUTERS.....	11
COMPANY CULTURE	14
WRITING NEW GAMES: THE IMPs	16
THE LURE OF INTERACTIVE FICTION	19
PUBLISHING GAMES	22
MARKETING	23
INNOVATIONS OVER THE YEARS	27
INFOCOM SHIFTS TO BUSINESS PRODUCTS.....	28
WHY BUSINESS PRODUCTS?.....	28
THE ORIGINS OF <i>CORNERSTONE</i>	30
DEVELOPING <i>CORNERSTONE</i>	31
CHANGES IN MANAGEMENT.....	32
RAISING MONEY	33
TROUBLE ARISES: THE BEGINNING OF THE END	34
SKYROCKETING COSTS.....	35
CLASHES WITHIN THE COMPANY	35
PROBLEMS WITH <i>CORNERSTONE</i>	36
FLAT GAME SALES	38
STRUGGLING TO MAKE IT	39
LAYOFFS AND DEBTS	39
LOOKING FOR HELP	40
ACTIVISION TAKES OVER.....	40
COMPUTER GRAPHICS COME OF AGE.....	41
THE END OF INFOCOM	44
CONCLUSION.....	46
WHY INFOCOM SUCCEEDED	46
WHY INFOCOM FAILED	47
LESSONS FROM INFOCOM	48
REFERENCES	50

Infocom Timeline (1979-1989)



Introduction

They generated a buzz around the computer industry. Their products drew glowing reviews from *Time*, *Newsweek*, *Discover*, and even *Rolling Stone*. They created the games that people played—games that captivated, perplexed, and amused thousands around the world. They were the creators of *Zork*, the first interactive fiction game, and the founders of Infocom.

Infocom debuted its first product in 1980 with the release of *Zork* for the TRS-80 Model I. *Zork* soared to the top of the bestseller lists, remained there for months, and attracted a cult following. Fans devoted hours staring at computer screens, trying to solve the game's puzzles and desperately seeking help whenever stumped. Actor Robin Williams was said to have called one of the authors of *Zork* in the middle of the night asking for hints.

With sales topping \$10 million in 1984, Infocom seemed poised to dominate the software entertainment industry for years to come. Thousands of eager fans snatched up copies of *Zork II*, *Zork III*, *Starcross*, and *Deadline* as soon as they were released. No one, it seemed, could get enough of Infocom's games. “We're making them as fast as we can!” an advertisement declared.

Suddenly, everything began to fall apart. Infocom spent millions of dollars to develop a database program called *Cornerstone*. Even though *Cornerstone* sold 10,000 copies in its first year, the company went into the red, losing over \$4 million in 1985. For the first time, Infocom struggled to pay its bills. Layoffs began. The company needed help badly. Help came in the form of a corporate merger: Activision, a game company based in California, agreed to buy Infocom for \$7.5 million and cover its outstanding debts.

The Activision buyout marked the beginning of the end of Infocom as a company. Even with popular releases as *The Hitchhiker's Guide to the Galaxy* and *The Leather Goddesses of Phobos*, the company lost \$200,000 per fiscal quarter from 1987 to 1989. Finally, in 1989, Activision closed Infocom's office in Cambridge, Massachusetts. Activision offered 11 of the 26 remaining Infocom employees positions in its Menlo Park, California office, but only five accepted. The rest moved on.

It is tempting to conclude simply that Infocom's decision to make *Cornerstone* led to its inevitable failure. After all, how could a computer game company know anything about making databases? The shift to databases, however, was not as haphazard and ill-conceived as it might at first appear. In fact, many of Infocom's founders had originally formed the company with the intent to make business software, not games. To this end, *Zork* gave them the money to fund what they had originally intended to do. Furthermore, *Cornerstone* made sense to Infocom's long-term financial health. Created by people who did, in fact, have an understanding of databases, *Cornerstone* was a way to diversify the company's product line and help Infocom grow even faster.

This paper traces the history of Infocom, starting with its roots as a group of MIT students and faculty. It explores the period when Infocom soared to the top of the software entertainment industry, through the transition from making games to developing business products, and the end, after the Activision buyout. The story shows that a combination of factors, not a single technical or managerial decision, led to Infocom's success and failure. Infocom succeeded in making popular games not only because it decided to make *Zork* available on personal computers, but also because it developed an effective system for supporting new platforms, maintained an engineering culture that excelled at writing computer games, and marketed its products to the right audience.

Nor did Infocom fail simply because it decided to make *Cornerstone*. Infocom failed for many reasons that were closely tied to how the company managed the transition to business products. Behind the scenes, the transition created a litany of problems—skyrocketing costs, depletion of resources, and internal conflicts. Combined with some bad luck, these problems, and not just *Cornerstone* per se, ultimately led to Infocom's downfall.

The Birth of a Legend

The Infocom story starts in the early 1970s in MIT's fledgling Laboratory for Computer Science (LCS). A small group within LCS, originally called the Dynamic Modeling (DM) group, worked to develop a LISP-derivative programming language called Muddle, or MDL. And, “in addition to its other accomplishments, [the DM group] was responsible for some famous games...Dave Lebling [a member of the group] was among those chiefly responsible (to blame?) for the existence of the game [Maze].”¹

Once the DM group had created MDL, they moved on to create libraries of software for the language, trying to supplant LISP as the programming language of choice. One such library was intended to provide programmers with robust methods for implementing persistent objects. It gave programmers a way of preserving the state of a computer program from one execution to the next. To demonstrate the use of persistent objects, Marc Blank and Tim Anderson of the DM group wrote a simple trivia game in MDL. It was their first foray into computer game development, but it paved the way for Infocom's first commercial product: the legendary *Zork*.

The Creation of *Zork*

Around the same time that Tim Anderson and Mark Blank were creating their trivia game, researchers from Stanford University released the first computer adventure game, aptly titled *Adventure*. People were said to be addicted to this game, playing “for about two weeks straight.”² The game had no graphics and had a simple command line interface. Nevertheless, several people at LCS and in the DM group became addicted to playing the game.

¹ Tim Anderson. “The History of Zork – First in a Series.” *The New York Times*, vol. 4, no. 1. Winter 1985.

² Dave Lebling, interview.

Eventually, *Adventure* players at LCS became dissatisfied with the game. The parser, which took user input from the command line and translated it into commands that the game could understand, could only handle two-word inputs (e.g. “go north”). Many players wanted to be able to input complex directives and extend the set of keywords. The game was also written and designed poorly. Players were often presented with text describing an object or place, but were then unable to do anything with the object. Being programmers, the DM group decided to write their own adventure game.

In 1977, a team of LCS students began writing what would become the legendary *Zork* in the MDL programming language. Marc Blank wrote some of the objects and Dave Lebling began work on the game’s parser. The bulk of the game, however, was written by Blank, Tim Anderson, and Bruce Daniels while Lebling was on vacation. Blank was said to be the “prime mover” in this effort, writing an estimated 60% of the code himself.³ Lebling returned from his vacation to do testing work on *Zork*, which was finished in 1979.

In response to the commonly asked question, “Where did the name Zork come from?”, Blank explained:

“Actually...[Zork is] just a nonsense word. There are all kinds of words like that that hackers tend to use—words like ‘frob.’ Frob means thingamajig, and it can be used as any part of speech. It’s a generic noun and verb. Cars are full of frob that get frobbed. That’s why we named the wizard in *Zork II* the Wizard of Frobozz. He’s forgotten all his spells, except for the ones that begin with the letter F.”⁴

Zork ran on Digital Equipment’s PDP-10 mainframe and was open to any user with an account. Since anyone who could access the machine could get an account, soon people were logging into the server from all over the world. The machine was able to let six people play at one time; usually, all six slots were full. The first article on *Zork* appeared a scant two months after the last puzzles were added to it.⁵ It would be the first trickle in a massive wave of incredible publicity to come.

Zork: The Great Underground Empire

Just like *Adventure*, *Zork* had a very simple interface: a player’s screen consisted simply of text and a command prompt. Unlike *Adventure*, however, *Zork* had a more sophisticated English parser. The player could then enter natural language commands at the prompt, anything from the simple, “Go north” to the comparatively complex, “Hit the ugly troll with the double-bladed axe.” The system would then in turn return more text—room descriptions, results of actions, etc.

³ Mike Dornbrook, interview.

⁴ Richard Dyer, “Masters of the Game,” The Boston Globe Magazine, May 6, 1984.

⁵ Paul Doherty, “Infocom Fact Sheet.” <ftp://ftp.gmd.de/if-archive/infocom/info/fact-sheet.txt>

The parser sifted through an English sentence, looking for noun clauses, prepositions, adjectives, and other clues to “understand” the user’s input. It attempted to break down a sentence into three basic items: verb, direct object, and indirect object. In the example, “Hit the ugly troll with the double-bladed axe”, the verb is “hit”, the direct object is “troll”, and the indirect object is “axe”. The following shows a sample transcript from the game, where bold type signifies text entered by the user, and the plain text is what was printed by the game in response:⁶

```
> EAST
The Troll Room
You are in a small room with passages off in all directions.
Bloodstains and deep scratches (perhaps made by an axe) mar the walls.
A nasty-looking troll, brandishing a bloody axe, blocks all passages out
of the room.
Your sword has begun to glow very brightly.
> KILL TROLL WITH SWORD
A mighty blow, but it misses the troll by a mile.
The axe gets you right in the side. Ouch!
> SWING BOTTLE AT TROLL
Trying to attack a troll with a glass bottle is suicidal.
The axe crashes against the rock, throwing sparks!
> JUMP OVER TROLL
The troll is too big to jump over.
You stagger back under a hail of axe strokes.
> TIE UP TROLL
with what?
> ROPE
The troll struggles and you cannot tie him up.
The troll hits you with a glancing blow, and you are momentarily stunned.
> DIAGNOSE
You have a light wound, which will be cured after 29 moves.
You can be killed by one more light wound.
The troll swings his axe, but it misses.
> SCREAM
Aaaarrrrrrrrgggggggggggggggghhhhhhhhhh!
The axe crashes against the rock, throwing sparks!
> WAKE UP THE TROLL
The troll isn't sleeping.
The axe sweeps past as you jump aside.
> JUMP
Wheeeeeeee!!!!
The troll's axe stroke cleaves you from the nave to the chops.
It appears that that last blow was too much for you. I'm afraid you are
dead.
```

Instead of providing the player with the blocky, pixilated graphics available at the time, *Zork*’s lush prose described a medieval-era underground world. Players didn’t see this world on the screen, but they could imagine it in their minds. They could wander around this world freely, interacting with many different parts of each room, until they solved the puzzles at hand, and in doing so, they would unearth the story buried deep beneath the game’s surface.

⁶ Dave Lebling, et al. “Zork: A Computerized Fantasy Simulation Game.” IEEE Computer. vol. 12 no. 4, April 1979, pp 51-59.

Infocom's Founding

At the time of *Zork*'s development, Professor Al Vezza led the DM group and served as the Assistant Director of LCS. Professor J.C.R. Licklider helped obtain the funding for the group's projects through his contacts in Defense Advanced Research Project Agency (DARPA). The two were night and day in their professional styles. Where Licklider was charismatic and affectionately called "Lick" by his students, Vezza rarely spoke to LCS members and often made a beeline from the elevator to his office in the morning, shut the door, and never saw anyone. Some people at LCS were unhappy with his managerial style, saying that he was unfriendly and "never talked to people unless he had to, even people who worked in the Lab."⁷

One person who worked at LCS was a young graduate student named Joel Berez. He had been doing research within LCS when he caught wind of the *Zork* project. Although he was interested, Berez never worked on the mainframe version of *Zork*, and after graduation Berez left LCS and went to manage the family housewares business in Pittsburgh for the next two years.

In 1979, a number of DM group members wanted to work with each other outside of the research lab. To keep the group together, they decided to form a company. This was also a "dream of the leader of the group, Al Vezza...someday he would bring together all the people who'd been involved with the group to start a commercial venture using the same techniques that had been so highly successful,"⁸ and he too contributed money to get the new company off the ground. In retrospect, it seemed like a naïve thing to do, since they had no plan, product, or even an idea about what sort of work they would be doing.⁹ Each founding member was called upon to contribute some amount of money from \$400 to \$2,000, with the percentage of the resultant amount being proportional to the stock that each founder would receive. A company was thus born: Infocom, "the name least offensive to everyone."¹⁰

Meanwhile, Marc Blank was under heavy pressure from his parents to become a doctor. He had actually done his work on *Zork* while in medical school. Blank would "often leave for three-day weekends, come up to MIT, and just hack the whole time—he loved it."¹¹ Blank even intentionally planned longer stays, such as the time when he came up to MIT just before a major snowstorm, so that he had an excuse for not getting back to school for five days. Eventually, he graduated medical school, and got an internship in a Pittsburgh hospital.

Blank arrived in Pittsburgh a scant month before Berez was scheduled to leave. Not knowing anyone in the city, Blank contacted Berez. The two of them spent much time together, primarily discussing their days at MIT. They wanted to make *Zork*, which had been so popular on the mainframe, available to the people who were buying home computers in increasing numbers. This seemed impossible, due to the large discrepancy between mainframe memory and home computer memory, and the two of them took on the task as an intellectual challenge.

⁷ Mike Dornbrook, interview.

⁸ Roe R. Adams III. "EXEC INFOCOM: Adventures in Excellence". *Softalk Magazine*, October 1982, p. 35-40.

⁹ Tim Anderson, interview.

¹⁰ Stu Galley. "The History of Zork -- The Final (?) Chapter: MIT, MDL, ZIL, ZIP." *The New York Times*, vol. 4, no. 3, Summer 1985.

¹¹ Mike Dornbrook, interview.

Blank and Berez solved the problem about the same time that Tim Anderson and Dave Lebling, who were part of the group forming Infocom, hit upon selling *Zork* as Infocom's first product. Infocom needed the technical solution that Blank and Berez had created, so Blank, who never wanted to become a doctor in the first place, decided to leave his internship, and Berez left the family business, both to join Infocom. All told, ten LCS members formed Infocom, including Vezza, Licklider, Anderson, Lebling, Berez, and Blank (see Table 1).

Name	Roles
Tim Anderson	Co-author of <i>Zork</i>
Joel Berez	President in 1979, Board of Director
Marc Blank	Co-author of <i>Zork</i> , Board of Director
Mike Broos	Resigned as President in November 1979, Board of Director
Scott Cutler	Wrote first interpreter for TRS-80
Stu Galley	Official Clerk and Treasurer
Dave Lebling	Co-author of <i>Zork</i>
J. C. R. Licklider	Professor at MIT with many contacts in ARPA, Board of Director
Chris Reeve	Board of Director in 1981
Al Vezza	Assistant Director of LCS, Professor at MIT, Board of Director

Table 1. Original founders of Infocom and their roles.

On June 22, 1979, Infocom was officially incorporated.¹² The company created a P.O. Box and eventually established its first office in 6 Faneuil Hall Marketplace in Boston, Massachusetts. The first Board of Directors consisted of Al Vezza, Dave Lebling, Michael Broos, Stu Galley, and Joel Berez. In November of 1979 Lebling and Galley resigned as Directors, and Blank and Licklider filled their positions. Following that, Broos resigned as President, and Berez was elected to take over the position.

¹² Connolly, Michael. "The Commonwealth of Massachusetts Articles of Organization." June 22, 1979

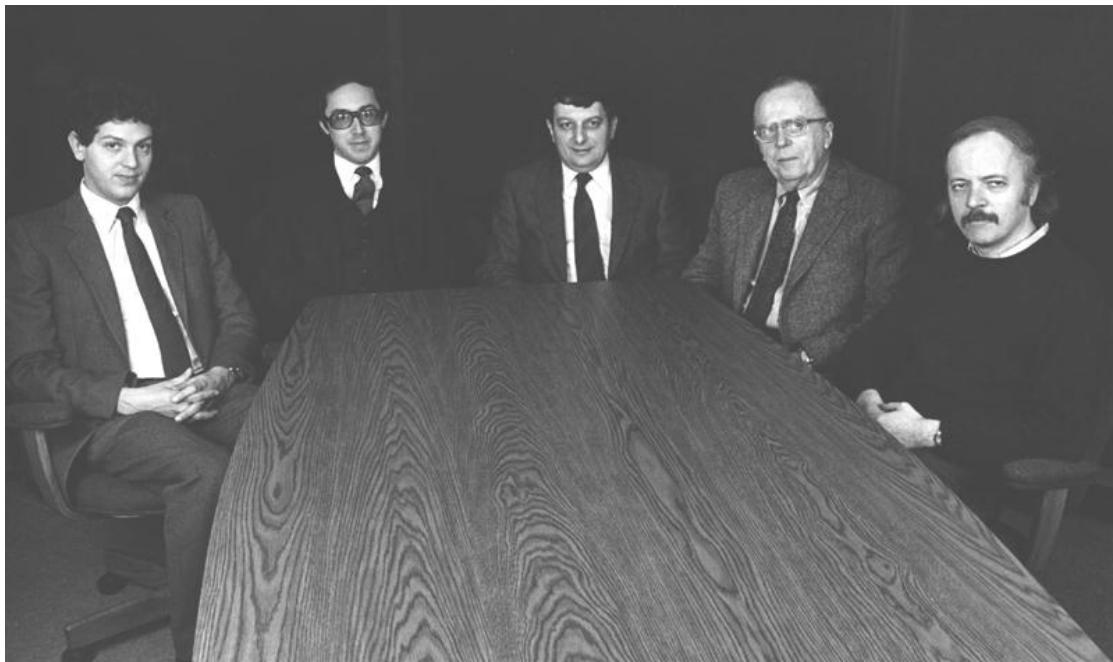


Figure 1. Infocom's Board of Directors. From left to right: Marc Blank, Joel Berez (President), Al Vezza, J.C.R. Licklider, Chris Reeve

Original Intentions

During the founding days, “nobody thought particularly about doing *Zork* as a product.”¹³ The original intent was “to do something serious.”¹⁴ However, once the company was founded, the employees quickly realized they needed to sell something, or they would be out of business before they were ever really in business. Since they didn’t have a new product ready to sell, they decided to try to market *Zork*. They already had a working prototype for a PDP-10, and Berez and Blank were excited about making *Zork* run on microcomputers. *Zork* was not considered a serious product, but the founders thought that it would bring in some revenue to give the company a start.

Infocom Takes Off

Around the time Infocom began, big, expensive mainframe computers dominated the market. In 1979, that all changed when Dan Bricklin and Bob Frankston released VisiCalc, the first electronic spreadsheet and “killer app” for the personal computer. People purchased personal computers just for the sole purpose of using VisiCalc. Apple, Commodore, Atari, IBM, and Radio Shack had a whole range of models available, but each one garnered a small percentage of the market.

¹³ Dave Lebling, interview.

¹⁴ Tim Anderson, interview.

Personal computers cost over a thousand dollars each, and owners tended to be wealthy and well educated. Doctors, businessmen, lawyers, and other professionals could afford the price tag. The owners of the personal computers also tended to enjoy reading—a factor that would prove critical to the success of Infocom’s games.

The emerging personal computer market presented a golden opportunity for Infocom, but its founders faced a difficult challenge: How could they make *Zork*, which barely ran on a PDP-10, work on comparatively tiny microcomputers?

Making *Zork* fit on personal computers

Berez and Blank spent one month in Pittsburgh together discussing the feasibility of porting the complex and addictive world of *Zork* to smaller computers. It was a daunting technical task—they would be faced with limitations on all fronts, from memory size to processor power. And to complicate matters, they would have to support multiple platforms, since there was no clear market leader in the home computer business.

Blank initially thought that compressing *Zork* to fit the stringent memory and code size limitations of a personal computer would be impossible. The mainframe version of *Zork* ran on a PDP-10 with 512 kilobytes of memory and required a megabyte of code. In contrast, the TRS-80 Model I and Apple II had 64 kilobytes of memory at most with an optional floppy drive that could hold 80 kilobytes. Motivated by Blank’s doubts, Berez felt there had to be a way to make *Zork* smaller. He looked at UCSD Pascal, a language used to compile Pascal to platform-independent byte-codes (called P-codes), which were then interpreted by a virtual machine. While UCSD Pascal made code portable, it would not make *Zork* much smaller. Taking the idea one step further, Berez came up with the idea of making a design for a virtual machine specifically designed for text-adventure games, which he called the Z-machine.

Berez and Blank sketched out the details of the Z-machine to convince themselves that it would allow *Zork* to run on a computer that had 32 kilobytes of memory and a floppy drive. They saw that they could minimize the code size by tailoring the machine’s instruction set for the specific operations of the game. In addition, Berez and Blank realized that it wasn’t absolutely necessary to keep all the program code loaded in main memory, thereby reducing the memory requirements. Instead, the Z-machine could leave the bulk of the code on disk and load certain sections into memory whenever the program called for it. This idea drove Berez and Blank to employ one of the earliest virtual memory managers for the personal computer.

The Z-machine was especially suited for games like *Zork* because its design revolved around an object tree structure representation. Objects represented the things in a game, such as rooms, items, players, enemies, and weapons. Furthermore, objects had attributes that described what they could do. For example, an object could be “takeable,” which meant that the player could carry it around the game. Each object also had parents, siblings, and children to represent their relationship to other objects. For example, suppose a game had a glass bottle and a knife in a kitchen. The kitchen would be the parent of the glass bottle and the knife, and the glass bottle would be the sibling of the knife. This hierarchical relationship made it simple to describe where objects resided.

Figure 2 shows a diagram of the Z-machine design.¹⁵ The Z-machine had two types of storage: memory and stack. The memory contains the code and object tree for the program, while the stack holds local variables and temporary values. The Z-machine executed one instruction at a time starting at the program counter (PC). Its basic instructions included:

- Manipulating an object tree (e.g. moving objects, testing for hierarchical relationships)
- Calling other routines
- Accessing global or local variables
- Printing information to the screen
- Reading input from the console
- Jumping to another instruction
- Computing simple arithmetic (e.g. add, subtract, mod)

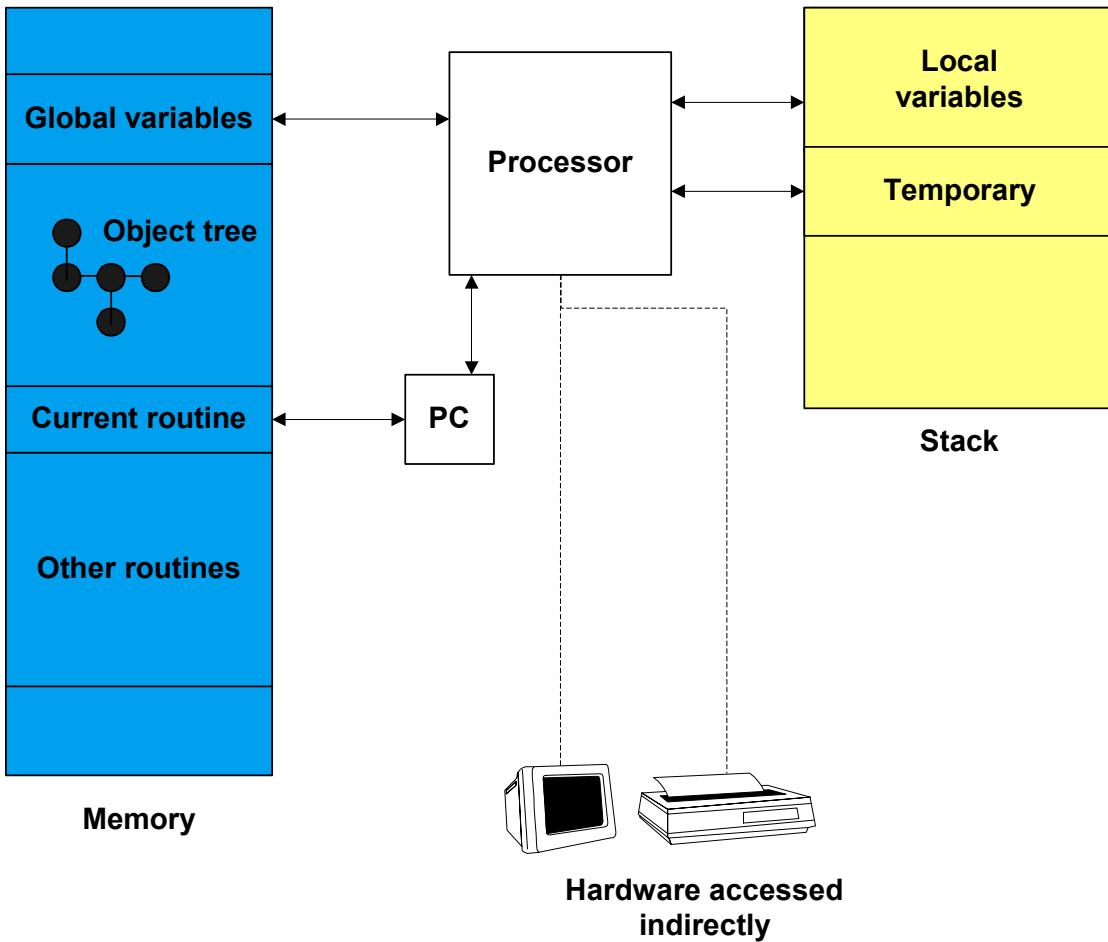


Figure 2. The Z-machine design. The memory contains global variables, the object tree, and the code for the program. The stack contains local and temporary variables. Z-machine instructions provide ways of indirectly accessing the hardware (e.g. printing to screen, reading input from console).

¹⁵ Graham Nelson, et al. “The Z-Machine Standards Document.”

The Z-machine made it easy to express adventure games compactly by providing instructions for common operations. The mainframe version of *Zork* duplicated code for tasks like moving objects from one place to another, checking objects for certain properties, modifying properties, testing for hierarchical relationships. In the Z-machine, these operations could be expressed in several bytes of code—a huge savings factor. Table 2 shows a listing of some of the basic instructions of the Z-machine.

Instruction	Description
MOVE	Move object X into object Y
REMOVE	Remove object X from everything (e.g. if it is destroyed)
FSET?	Test for attribute X in object Y
NEXT?	Get sibling for object X
FIRST?	Get child for object X
LOC	Get parent for object X

Table 2. Sample Z-machine instructions and their descriptions.

Several other techniques were used to make *Zork* even smaller. The Z-machine compressed text, which constituted a large portion of the data, by using a representation that required approximately five and a half bits per character instead of the usual eight.¹⁶ In addition, Infocom stripped out many unnecessary features of MDL, such as associative storage, and created a language called the Zork Implementation Language (ZIL). Realizing the mainframe version of *Zork* would still be too big to fit on a floppy, Lebling looked at a map of *Zork* and divided the game up into three sections. The latter two would be used for sequels to the original *Zork*.

With the Z-machine design completed, Berez and Blank began writing a two-stage compiler that would convert the high-level ZIL code first to assembly code and then to Z-machine byte-codes. Blank then wrote a Z-machine software emulator—which came to be known as a Z-machine Interpretive Program (ZIP)—for the DECsystem-20.¹⁷ In 1980, Scott Cutler, a member of the DM group who went on to work in New York, finished writing a ZIP for the TRS-80 Model I. And in 1981, working remotely from California, Bruce Daniels completed a ZIP for the Apple II.

The portability facilitated by the Z-machine design proved to be an important asset. The game files were stored as Z-machine byte codes, which could then be interpreted by a ZIP. To make all its software to run on a platform, all Infocom had to do was write one ZIP. This was especially important because Atari, Apple, Commodore, IBM, NEC, Radio Shack, and other companies had models of personal computers out of the market. While the Apple II constituted over 50% of the market by 1982, the other platforms shared the remaining percentage.

¹⁶ Marc Blank and Stu Galley, “How to Fit a Large Program Into a Small Machine.”

¹⁷ Stu Galley, “The History of Zork -- The Final (?) Chapter: MIT, MDL, ZIL, ZIP.”, *The New York Times*, vol. 4 no. 3, Summer 1985.

Infocom released *Zork* for the TRS-80 Model I in 1980, beginning its entry into the software entertainment industry. In the beginning, sales were slow. The TRS-80 version sold over 1500 copies, but *Zork* really became a hit after the Apple II version sold over 6000 copies. With two supported platforms and more on the way, Infocom began to take off.

Company Culture

In 1982, Infocom moved to an office on 55 Wheeler Street in Cambridge, Massachusetts, and soon a jocular, freewheeling company culture emerged. Most of Infocom's twenty-one employees were in their mid-20's, and they came from diverse backgrounds. Berez and Anderson had majored in electrical engineering and computer science. Blank had studied biology. Lebling came to LCS with a degree in political science, while Galley graduated from Caltech University with a physics degree. Mike Dornbrook, who was a friend of Berez and Blank, joined the company after receiving his MBA from Harvard Business School. Dornbrook's roommate, Steve Meretzky, also joined. (Meretzky originally detested computers, but he grew to love *Zork* after Dornbrook brought home an Apple II.) Donning Hawaiian shirts, Dave "Hollywood" Anderson came from Southern California as a product tester.

The youthful energy of Infocom created a general feeling of excitement within the company. The employees loved applying their creative skills to make computer games and they came into work with a sense of humor and a laid-back attitude. With sales exceeding \$160,000 in 1981, they had every reason to feel good. "They were very free-spirited," Lebling said. "More importantly, they were doing something well and having fun doing it."¹⁸

Company activities reflected the humor and playfulness of the culture. For instance, one November day, Dave Anderson decided to clean the goldfish pond located outside of the office. He moved the fish to another location, scrubbed the pond clean, and then returned the fish. The fish died the next day. For that, the company decided to put Anderson on "trial" for murder. Blank acted as the prosecuting attorney and Meretzky served on the defense. After the trial, the in-house newsletter, *InfoDope*, ran its first issue with the headline, "Trial Reveals Hollywood Framed in Fish Killings." Figure 3 shows this article.

¹⁸ Dave Lebling, interview.

INFODOPE

Infocom Cambridge, MA 11/22/83 Vol 1, #1

TRIAL REVEALS HOLLYWOOD FRAMED IN FISH KILLINGS

By Flaxo F. Gorilla III, Legal Affairs Writer

InfoTester Dave "Hollywood" Anderson was declared innocent by a jury of his peers in a sensational murder trial on Friday. The jury needed only five minutes to reach its verdict, declaring Anderson innocent of the charge of murdering three goldfish in the Apt Courtyard Fish Pond on Wednesday, November 16.

Hollywood, speaking at an Aku-Aku victory celebration following the trial, termed the prosecution's case "a deliberate, malicious frame-up" and the jury's verdict "a blow for justice." He vowed to bring a suit against District Attorney Mark Blanc for Defamation of Character, Falsification of Evidence, and Conspiracy to Delete Files. Several prosecution witnesses have already been indicted for perjury.

The most climactic moment in the trial came when Defense Attorney S. Eric Meretzy called a surprise witness to testify. Shock rippled through the crowd as Info-Chairman "Big" Al Vezza was summoned to the stand. Vezza, who refused to take the chair until handed a subpoena, stunned the court by fingering jury member Poh C. Lim as the true murderer.



Fish expert,
Mike Dornbrook
Never met a fish he
didn't like, says
"Icon" Dornbrook

(continued on page 2)

11/22/83

Page 2

Although cleared of all charges in the death of the fish, InfoDope has learned that Anderson has an alarming background that Prosecutor Blanc merely scratched the surface of. Anderson himself admitted to an InfoDope reporter that he "performed surgery on bunny rabbits without the benefit of anaesthetics" and once "built a device for holding female bunnies immobile, for the purposes of breeding."

One of the Prosecution's main points in developing Anderson's motive for the killing was the supposition that the deceased fish were Jewish and that Anderson was a member of the Neo-Nazi Party. This reasoning was blown about by the testimony of Mike "The Icon" Dornbrook, who explained that fish have never been known to harbor religious convictions. However, InfoDope has learned that Anderson has been a member of the Neo-Nazi Party since early infancy, and helped organize the notorious march through Skokie, Illinois during the 1970's.

Figure 3. The first issue of the InfoDope newsletter contained the article, "Trial Reveals Hollywood Framed in Fish Killings." The lead read:

"InfoTester Dave 'Hollywood' Anderson was declared innocent by a jury of his peers in a sensational murder trial on Friday. The jury needed only five minutes to reach its verdict, declaring Anderson innocent of the charge of murdering three goldfish in the Apt Courtyard Fish Pond on Wednesday, November 16."

As the names "InfoDope" and "InfoTester" suggest, the employees developed their own vernacular with "Info" preceding every word. "InfoJargon" had strict rules:

"When used correctly, the first letter after the prefix is always capitalized. Some examples: 'Friday Parties are a longstanding InfoTradition.' 'Remember, Monday is an InfoHoliday.' 'InfoPrez Joel Berez is fond of using InfoMemos to pass along important InfoInfo.'"¹⁹

Even the terminology of the games diffused into the company culture. Occasionally, the employees talked in "ParserSpeak":

STU: Steve, comma, pass me that bon-bon.

STEVE: Which bon-bon do you mean, the yummy fresh bon-bon or the crusty melted bon-bon.

STU: Yummy.

STEVE: (devouring the yummy fresh bon-bon) I see no yummy fresh

¹⁹ "InfoJargon," Infocom 20th Anniversary CD-ROM.

bon-bon here!²⁰

Not to be outdone, Blank even wrote poems using allusions to the Z-machine and ZIL:

```
<POEM?>
FSET, FCLEAR; PROB and RANDOM
Instructions often used in tandem.
PARSER, MAIN-LOOP, nested deep,
Code to make a grown man weep,
ONBIT, TURNBIT, sometimes WEARABLE,
Writing games becomes unbearable.
Alpha, beta, delta, gamma,21
Think I'll move to Alabama.
```

Infocom grew steadily to 32 employees by the end of 1983, but the employees remained close. “It was family,” Dornbrook said. “Everyone felt that way.” The humorous and fun-loving nature of the Infocom family came through in the work produced by the Infocom employees. They enjoyed their work, and their excitement was reflected in the level of quality and intelligence devoted to each new game.

Writing New Games: The Imps

Infocom quickly put their collective prosaic ability into writing quality games. After the release of *Zork*, Blank’s love of detective novels drove him to write *Deadline*, Infocom’s first mystery game. Lebling wanted to write something different, so he created a science-fiction game called *Starcross*, which was released in 1982. Game writers called themselves Imps, short for Implementors.

The culture was so open and the learning curve for game development so gentle, almost anyone could become an Imp. For instance, Meretzky’s duties were originally confined to testing games. As he played them, he began to think about stories that interested him. In 1983, Meretzky wrote his first game, a science-fiction game called *Planetfall*. Meretzky went on to become one of Infocom’s most prolific developers, turning out a total of nine games in his six years with the company.

Another Infocom tester who became a developer was Amy Briggs. Noting that most of the games were aimed at a male audience, Briggs wrote *Plundered Hearts*, the first Infocom romance game aimed at women. She would go on to create three more titles for Infocom, all in the span of two years. Table 3 shows a list of some of the Imps and a sampling of the titles that they wrote.

²⁰ “InfoJargon,” Infocom 20th Anniversary CD-ROM.

²¹ E-mail from Marc Blank, May 21, 1985 (Infocom 20th Anniversary CD-ROM).

Imp	Sample of games written
Mike Berlyn	<i>Suspended, Infidel, Cutthroats, Fooblitzky</i>
Marc Blank	<i>Zork, Zork II, Zork III, Deadline, Enchanter, Fooblitzky</i>
Amy Briggs	<i>Plundered Hearts</i>
Dave Lebling	<i>Zork, Zork II, Zork III, Starcross, Enchanter, Suspect, Spellbreaker</i>
Stu Galley	<i>The Witness, Seastalker</i>
Steve Meretzky	<i>Planetfall, Sorcerer, The Hitchhiker's Guide To the Galaxy, A Mind Forever Voyaging, The Leather Goddesses of Phobos, Stationfall</i>
Brian Moriarty	<i>Trinity, Wishbringer</i>

Table 3. A sample list of Imps and a few of the games that they wrote.

Making interesting text-adventure games was no simple task, however. For each game, new and creative puzzles had to be devised. Puzzles could be as simple as uncovering a grate by moving leaves, or as clever as obtaining a key stuck in a crevice by using a magnet. Because players could solve games in multiple ways, Imps had to account for many different outcomes. For example, in *Deadline*, if the player arrests a character without establishing a motive for the crime, the game ends with an acquittal:

"The jury in the Robner case has declined to convict Mr. Baxter and Ms. Dunbar. Appearances indicate that the verdict was difficult, and that several jury members were convinced that the two were guilty. However, no evidence was presented directly relating the Focus case with the murder of Mr. Robner. This left the question of motive unresolved. I appreciate your efforts in the case and am sorry to report this outcome to you."

If, on the other hand, the player establishes enough evidence to convict one character but not another, the game displays an ending that leaves much to be desired:

"Congratulations on your work in the Robner case. As I'm sure you are aware, Mr. Baxter was found guilty of two counts of first-degree murder and has been sentenced to two consecutive terms of first-degree murder in the death of Ms. Dunbar. Unfortunately, Baxter remained tight-lipped throughout the proceedings, and except for the revelation that Baxter and Dunbar were lovers, there was no motive established for her murder. The jury acquitted Mr. Baxter in the murder of Mr. Robner, as a motive had not been established. I am indeed sorry that a proper conclusion to the case could not have been made."

Beneath the simplicity of Infocom's games hid the complexity of an Imp's job to make sure stories flowed smoothly, characters stayed in character, and puzzles posed challenging yet not impossible problems. Stu Galley articulated the challenges of creating a game in his "Implementor's Creed":

I create fictional worlds. I create experiences.

I am exploring a new medium for telling stories.

My readers should become immersed in the story and forget where they are. They should forget about the keyboard and the screen, forget everything but the experience. My goal is to make the computer invisible.

I want as many people as possible to share these experiences. I want a broad range of fictional worlds, and a broad range of “reading levels”. I can categorize our past works and discover where the range needs filling in. I should also seek to expand the categories to reach every popular taste.

In each of my works, I share a vision with the reader. Only I know exactly what the vision is, so only I can make the final decisions about content and style. But I must seriously consider comments and suggestions from any source, in the hope that they will make the sharing better.

I know what an artist means by saying, “I hope I can finish this work before I ruin it.” Each work-in-progress reaches a point of diminishing returns, where any change is as likely to make it worse as to make it better. My goal is to nurture each work to that point. And to make my best estimate of when it will reach that point.

I can’t create quality work by myself. I rely on other implementors to help me both with technical wizardry and with overcoming the limitations of the medium. I rely on testers to tell me both how to communicate my vision better and where the rough edges of the work need polishing. I rely on marketers and salespeople to help me share my vision with more readers. I rely on others to handle administrative details so I can concentrate on the vision.

None of my goals is easy. But all are worth hard work. Let no one doubt my dedication to my art.²²

The experience of the Imps gave rise to an efficient system of producing games. “Infocom had putting out games down to a science: a team consisted of one author, one interpreter, and some QA,” said Lebling.²³ “And we could bring a game to market in nine months, for under \$500,000.” Each successive Infocom game would sell over 100,000 copies. “It was phenomenal—we had a basement that just printed money,” said Tim Anderson.²⁴

²² Galley, Stu. “The Implementor’s Creed.” <http://infocom.gerf.org/Articles/creed.html>.

²³ Dave Lebling, interview.

²⁴ Tim Anderson, interview.

The Lure of Interactive Fiction



Figure 4. The Softsel bestseller list for December 12, 1983. Infocom's games dominated the list. *Zork* took the top spot, followed closely by *Deadline* and *Zork II* in 6th and 7th place, respectively.

to fix computer. Hmmm... Robots are tough. Nothing door, then Floyd will rush in. Floyd knocks, open door again. Floyd trembles slightly as he waits for you to open the door.

> OPEN THE DOOR

"The door opens and Floyd, pausing only for the briefest moment, plunges into the Bio Lab. Immediately, he is set upon by hideous, mutated monsters! More are heading straight toward the open door! Floyd shrieks and yells to you to close the door."

> CLOSE THE DOOR

Infocom's games flew off the shelves. In 1983, they dominated the Softsel bestseller list, the main index of software sales. Figure 4 shows the Softsel list for December 12, 1983. *Zork* claimed the top spot, ahead of graphical games like *Lode Runner* and *Zaxxon*. In addition, *Deadline*, *Zork II*, and *Zork III*, *Planetfall*, *Witness*, *Enchanter*, *Suspended*, *Starcross*, and *Infidel* all ranked in the top 40 as well.

The "Implementor's Creed" and the well-structured system of game development succeeded in creating a unifying vision for Infocom games. Buyers of Infocom games could be assured that they were purchasing an exciting, engaging experience. The prose in the games described vivid places and lively characters.

One of the best examples of a character that illustrates why people enjoyed Infocom's games was Floyd the Robot in *Planetfall*. In *Planetfall*, the player starts out onboard the Stellar Patrol Ship Feinstein. He eventually befriends Floyd the Robot, who proves to be a bubbly and loyal sidekick. To win the game, the player must somehow pass through a room full of killer mutants and obtain a card. Floyd takes center stage:

"Looks dangerous in there," says Floyd. "I don't think you should go inside." He peers in again. "We'll need card there I know! Floyd will get card. can hurt robots. You open the door. Then you close door. When Floyd knocks, open door again. Okay? Go!" Floyd's voice trembles slightly as he waits for you to open the door.

From within the lab you hear ferocious growlings, the sounds of a skirmish, and then a high-pitched metallic scream!

> **WAIT**

Time passes...

You hear, slightly muffled by the door, three fast knocks, followed by the distinctive sound of tearing metal.

> **OPEN THE DOOR**

Floyd stumbles out of the Bio Lab, clutching the mini-booth card. The mutations rush toward the open doorway!

> **CLOSE THE DOOR**

And not a moment too soon! You hear a pounding from the door as the monsters within vent their frustration at losing their prey.

Floyd staggers to the ground, dropping the mini card. He is badly torn apart, with loose wires and broken circuits everywhere. Oil flows from his lubrication system. He obviously has only moments to live.

You drop to your knees and cradle Floyd's head in your lap. Floyd looks up at his friend with half-open eyes. "Floyd did it ... got card. Floyd a good friend, huh?" Quietly, you sing Floyd's favorite song, the Ballad of the Starcrossed Miner:

O, they ruled the solar system
Near ten thousand years before
In their single starcrossed scout ships
Mining ast'roids, spinning lore.

Then one true courageous miner
Spied a spaceship from the stars
Boarded he that alien liner
Out beyond the orb of Mars.

Yes, that ship was filled with danger
Mighty monsters barred his way
Yet he solved the alien myst'ries
Mining quite a lode that day.

O, they ruled the solar system
Near ten thousand years before
'Til one brave advent'rous spirit
Brought that mighty ship to shore.

As you finish the last verse, Floyd smiles with contentment, and then his eyes close as his head rolls to one side. You sit in silence for a moment, in memory of a brave friend who gave his life so that you might live."

Players actually cried after learning of Floyd's death. Amazed by the level of emotion evoked by Infocom's games, one reporter wrote:

“Floyd was a good robot. He was helpful. He was courageous. He was fun-loving. Your friend is gone and you’re alone. How do you feel? You don’t feel like that very often. Maybe after you read *Charlotte’s Web*. Maybe when they shot Bambi’s mother. Maybe when Raskolnikov got religion in the Siberian slave labor camp. But this scene is from a computer game. A game!”²⁵

Infocom managed to get its users addicted by allowing them to play a well thought out role, while concurrently solving puzzles, all on an exciting and new technological platform. The worlds created by Infocom were limited only by the players’ imaginations. As one reviewer described it, “The underground empire [of *Zork*] can be here, right under you. You almost feel it pulsing.”²⁶

The attraction of Infocom games was multi-faceted. At times, the games could bring the simple pleasure of reading a light, fast-paced novel, whose course could be affected by the reader. Other times, the games provided the intellectual satisfaction of solving a complicated logic puzzle. Without an image of the protagonist, players could identify with the main character and even imagining themselves in the role. A typical Infocom game allowed the user to feel as though he or she were living the life of a police detective, medieval hero, or space ranger.

People with many different interests enjoyed Infocom’s games. The games enticed brilliant programmers and illustrious computer science researchers, such as John McCarthy, the inventor of LISP. Infocom’s writers even had professional novelists, such as the science-fiction author Larry Nevin, hooked. Douglas Adams, the author of *The Hitchhiker’s Guide to the Galaxy* loved the games so much that he insisted that he would only work with Infocom to make a computer game version of his novel. And comedian and actor Robin Williams was said to be so addicted that he would call Marc Blank in the middle of the night, begging for hints.²⁷

Infocom’s games were extremely well written, and they provided uses with hours of enjoyment. But to claim this was the only reason for the success of their games is to tell only half of the story. The other half of the story lies in just how Infocom got people to buy their games in the first place: Infocom’s unique publishing and marketing strategies were crucial factors in the success of their games.

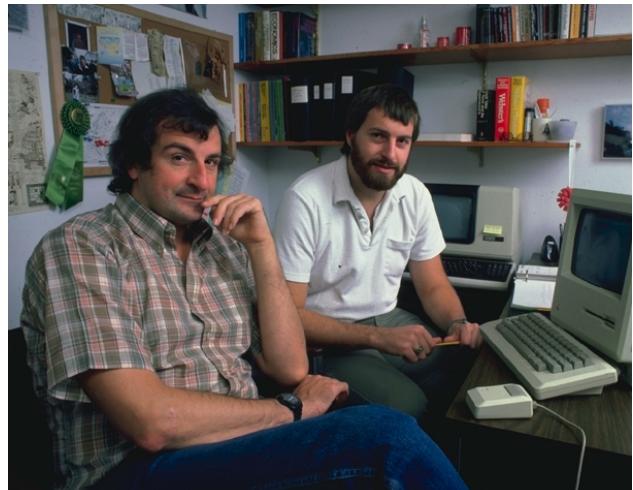


Figure 5. Douglas Adams (left) and Steve Meretzky (right) worked together to create a computer game version of *The Hitchhiker’s Guide to the Galaxy*.

²⁵ “Call Yourself Ishmael Micros Get the Literary Itch”, Softline, September-October 1983, vol 3.

²⁶ Zork review, <http://21ct.host.sk/zork.html>.

²⁷ Mike Dornbrook, interview.

Publishing Games

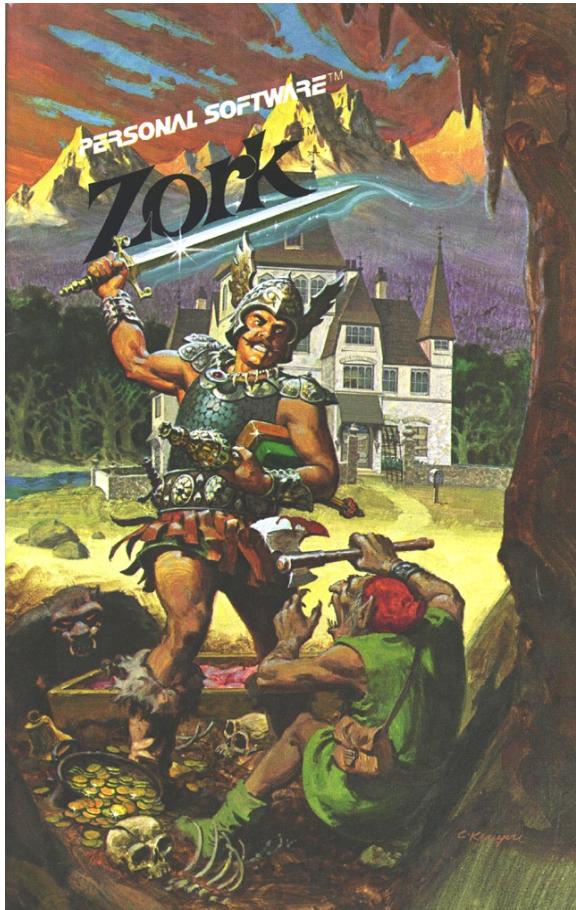


Figure 6. Personal Software's cover for *Zork*.

stick with Personal Software and endure what it perceived to be a problem of very poor marketing, or it could leave Personal Software, and thus no longer have a publisher at all. Personal Software solved this problem for Infocom, when it decided to focus exclusively on VisiCalc and offered to sell back all the rights to *Zork* in September 1981.²⁸ Personal Software soon changed its name to VisiCorp, and Kapor himself would eventually leave to found Lotus.

Personal Software let Infocom know that it still had a substantial amount of leftover inventory, which it could either throw out or sell back to Infocom. In November 1981, both companies announced an “amicable separation”²⁹ after Infocom decided to buy back the remaining inventory and the rights back to *Zork*. Infocom pooled some \$32,000 between the members of the company, and hauled the misrepresented boxes of *Zork* back to Al Vezza’s

Infocom began publishing *Zork* through a local company called Personal Software. Infocom planned on being a software development house, not a publisher. Unfortunately, Personal Software gave little attention to *Zork*, even when it sold modestly well. The manager of distributing *Zork*, Mitch Kapor, was also the man in charge of distributing the immensely popular and incredibly profitable VisiCalc. As a result, *Zork* was marketed exactly the same way as any other computer game—that is, all wrong.

When *Zork* was released to the public, excitement about Infocom quickly faded into confusion. The packaging of the game was not representative of what was inside the box. Instead of portraying *Zork* as a contemplative, puzzle-adventure game with no graphics, relying on the player’s imagination, the box suggested that there was a strapping, mustached hero who solved any puzzles that might come his way with a swing of his one-handed broadsword. Many Infocom employees thought that the cover (Figure 6) failed to capture the essence of the game.

Infocom had a dilemma: it could either

²⁸ Minutes of the Board of Directors, September 3, 1981.

²⁹ Minutes of the Board of Directors, November 19, 1981.

house.³⁰ Vezza's children and Infocom employees then threw out everything but the disks that contained *Zork*. Armed with only these disks, Infocom "threw caution to the wind"³¹ and decided to publish their own software. This would turn out to be one of the best moves they ever made.

Marketing

With the change from Personal Software to in-house publishing, Infocom's employees gained a dimension of creative freedom previously unrealized in their relationship with Personal Software. For the first time, they could produce a software package that was truly suited to the contents of their games. This allowed Infocom to showcase the games themselves, and it led to a new wave of interactive fiction products.

Infocom repackaged all the disks salvaged from the Personal Software inventory of *Zork* and began distributing *Zork* itself in October 1981. The Infocom strategy for software distribution was untraditional; instead of just showing off its products in software and computer stores, Infocom titles were also seen in bookstores. Infocom also adhered to a slightly different marketing model. Most software companies at the time distributed their latest release to a retail outlet, which implied that their last release was no longer worth playing. Infocom titles remained on the shelves even as new titles were introduced. *Zork*, for instance, stayed on the *Billboard Top 50 Best-Selling Software Titles* list for three years after its 1981 release.

At that time that Infocom made the switch to self-packaging, Mike Dornbrook noticed that the volume of letters written to Infocom begging for hints was steadily increasing. As Infocom's user population consisted mainly of wealthy, upper-middle class people, and the authors of these letters often would promise "anything" in return for a small hint, Dornbrook saw a market opportunity, and formed the Zork User's Group (ZUG) to handle a typewritten pay-per-hint service. He also created newsletters entitled the *New Zork Times* to discuss hints and showcase the latest Infocom products.

It was not until April of the next year, though, that Infocom's self-publishing changed from a necessity to a boon. Blank, while developing the game *Deadline*, was unable to fit all of

³⁰ Al Vezza, interview.

³¹ Stu Galley. "The History of Zork -- The Final (?) Chapter: MIT, MDL, ZIL, ZIP."

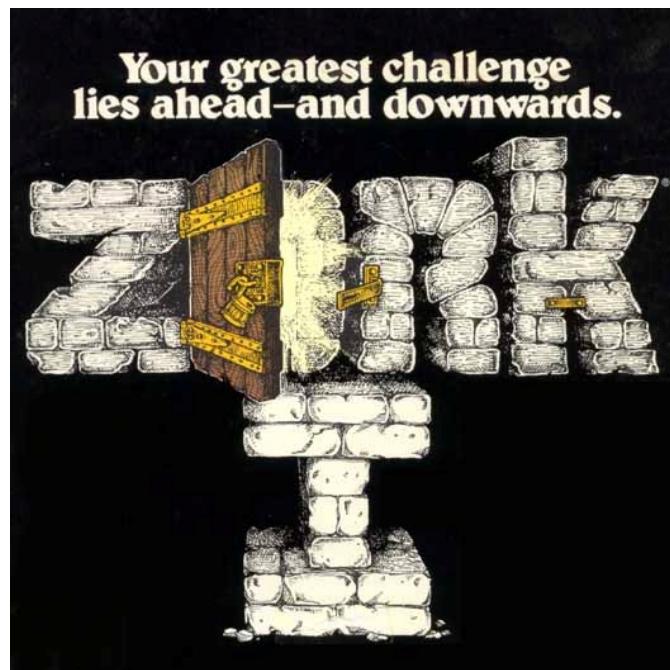


Figure 7. The second cover for *Zork*. This cover was created by the ad agency Giardini/Russel following Infocom's departure from Personal Software as its publisher.

the game's pieces into the 80 kilobytes of disk space. Working with the newly hired advertising agency Giardini/Russel, Blank created several artifacts that were essential to the story line, including "photos, interrogation reports, lab reports and pills found near the body,"³² and included them in the packaging for *Deadline* (see Figure 8).

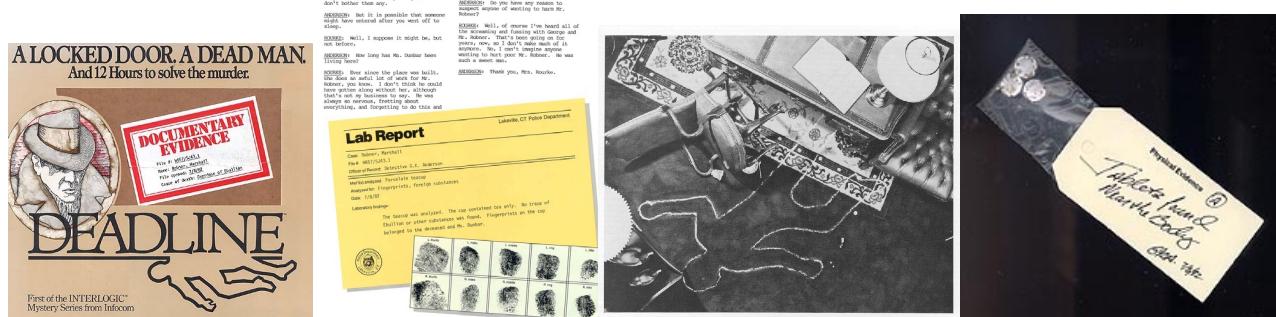


Figure 8. Some of the included package materials in *Deadline*.

The new packaging was unprecedented in the game industry and was extremely well received. Reviewers and customers alike raved about the detail that had gone into the additional materials, which heightened the overall sense of believability that was already an Infocom trademark. A standard had been set, one to which Infocom would adhere over the next few years. And, in addition to the positive effects on game realism, the essential, difficult to duplicate game pieces had the important side effect of discouraging software piracy.

Infocom employed Giardini/Russel to help them create ever-more extensive packaging for their next 16 games. By 1984, Infocom was spending close to \$60,000 on average for each game,³³ so marketing director Dornbrook decided to bring package design in-house. The Imp who wrote each game would collaborate with several people, including an art director and a few writers, to create the extra bits that went into each package. Several artifacts had to be specially sought out, such as ancient "Zorkmid" coins, scratch-n-sniff cards, and glow-in-the-dark stones.

When people found out that Infocom was creating unique, extensive, creative packages for every new game, with each new release outdoing the previous ones, the publicity began to spread like wildfire. Articles raving about Infocom products, both on the inside and outside of the box, appeared in all the major computing magazines, as well as more mainstream fare like *Time*, *Newsweek*, *Discover*, and even *Rolling Stone*.



Figure 9. A Stellar Patrol card from *Planetfall*. Imp Steve Meretzky disliked the *Tech*, MIT's school newspaper, and decided to put its phone number—excluding the first digit—on the front. Sure enough, the *Tech* received dozens of phone calls from curious players.

³² Rec.games.int-fiction FAQ, <http://bang.dhs.org/faq/2.html>.

³³ Rec.games.int-fiction FAQ, <http://bang.dhs.org/faq/2.html>.

These articles typically included full-color pictures of the box and descriptions of the game contained inside; Infocom was getting free advertising in magazines with national circulation. Dornbrook even recalled a guest on *The Tonight Show*, who, unbidden and unknown to Infocom, brought the flying-saucer package of *Starcross* on the show.³⁴

Figure 10. An article from *Discover* (March 1984) featuring Infocom's games.

Infocom's own ads also stood out from the rest of the crowd. They often contained bold headlines, complemented by sharp, rhythmic explanations harping on the qualities of Infocom's games. They also made fun of the poor quality of graphical games (see Figure 11). One ad pictured a brain on one side and proclaimed, "We unleash the most powerful graphics technology."³⁵ Another ad took a swipe at makers of graphical computer games. It included a shot of blocky, primitive-looking figure and asked, "Would you shell out \$1000 to match wits with this?"³⁶

³⁴ Mike Dornbrook, interview.

³⁵ “We unleash the most powerful graphics technology” advertisement. Infocom 20th Anniversary CD-ROM.

³⁶ "Would you shell out \$1000 For this?" advertisement, Infocom 20th Anniversary CD-ROM.

Figure 11. Advertisements that raved about the enjoyment of playing Infocom's text-only games while making fun of the current state of computer graphics.



With the incredible publicity and the groundbreaking efforts to make exciting, flashy packaging, Infocom sales went through the roof. *Zork I* posted modest sales of \$160,000 in 1981, but *Zork I*, *Zork II*, *Zork III*, *Deadline*, and *Starcross* combined for sales of \$1.65 million in 1982. In 1983, Infocom produced five more games, reaching sales of over \$6 million, and increased that number to \$10 million in 1984 and 1985.³⁷

The supply of Infocom titles was quickly outstripped by the overwhelming demand. Infocom games flew off the shelves, prompting the company to advertise, "We're making them as fast as we can!"³⁸ The Zork User's Group had over 20,000 members before being folded into Infocom itself. But perhaps the best indication of how well the games were selling, and how much they were being played, was the success of *Invisiclues*.

Invisiclues, the innovative creation by Dornbrook, were hint booklets for each game, explaining how to solve some of the most difficult puzzles. They were written in invisible ink to prevent spoiling later clues and to make it difficult to photocopy. These booklets sold so well that other computer book manufacturers lodged complaints with Softsel, as

BOOKS		
Invisiclues • Infocom		
1	1	7
2	2	45
3	—	1
4	3	8
5	8	5
6	4	41
7	5	89
8	9	9
9	6	15
10	—	3

Figure 12. *Invisiclues* locked the #1 spot on the Softsel bestseller list for computer books (November 1984).

³⁷ Infocom 1984 Annual Report; Mike Dornbrook, interview.

³⁸ "We're making them as fast as we can" advertisement, Infocom 20th Anniversary CD-ROM.

Invisiclues booklets commonly took up nine or ten of the top ten slots. To placate them, Softsel lumped all *Invisiclues* as one title, which upset people at Infocom until they realized this arrangement would guarantee them a lock on the number one slot every week.

Innovations Over the Years

Spurred by their financial success and amazing publicity, Infocom's belief that its text-based games were the best games on the market was strongly reinforced. The company culture was already geared towards this notion, with advertisements poking fun at companies producing blocky graphics-based games (see Figure 13 for screenshots of computer graphics at the time).

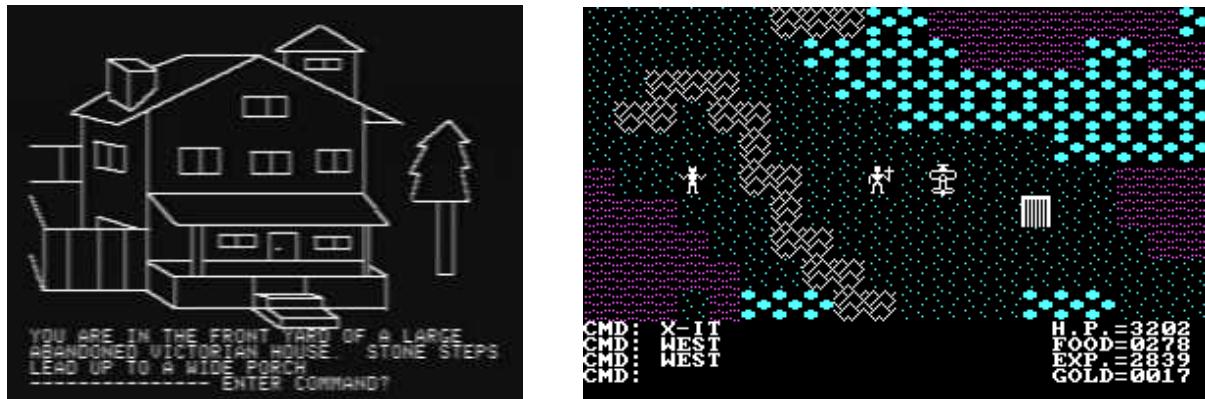


Figure 13. Screenshots of two graphical computer games of the time. Left: *Mystery House*, released in 1980 by Sierra On-line. Right: *Ultima II*, released in 1982 by Origin Systems.

The president of Sierra On-line, a major competitor, even called to complain that these ads were too vicious. Sales figures confirmed what the developers already knew: text-based games were the best vehicle for delivery, and it was not worth spending time or money on graphics.

For this reason, Infocom games produced only minor innovations through the years. Even when the game developers did innovate, they created evolutionary, rather than revolutionary, innovations. For instance, one improvement was to refine the abilities of the parser over the years, so that it could make sense out of increasingly complex sentences. Infocom also introduced the idea of having scheduled events in their games, so that certain important things would happen only if the player were there at the right time in the game. And finally, while *Zork* was mainly the player interacting with the environment (e.g. rooms, objects) later Infocom games incorporated non-player characters (e.g. witnesses, superior officers, friends) who could interact with the environment as well.

Infocom Shifts to Business Products

As the games business soared, Infocom began looking for ways to continue its growth. For the first time, the company had the money to do what it had originally intended to do: make business software. In 1982, Infocom created a Business Products division to begin work on a new relational database called *Cornerstone*. This marked the beginning of a fundamental shift in the company.

Why Business Products?

The company made the decision to create business software long before the games business took off. From the start, Infocom's founders had intended to do more than just computer games; they wanted to be the leading software developers for personal computers. They tossed around various ideas for their first product, which included medical, database, office, and educational software. However, *Zork* seemed like the most viable option at the time because a working prototype already existed, and Berez and Blank were willing to work for IOUs to make it run on personal computers.

The decision to move beyond games was also driven by the higher profit margins in business software. The customers of business software were typically willing to spend more money than mass consumers. Infocom could therefore charge significantly more for its products. Whereas a copy of Lotus 1-2-3 listed for \$495, each of Infocom's games sold for \$30 to \$50. The profitability of business software had even directly affected Infocom: when Personal Software pulled out of the games publishing business to focus on VisiCalc and sold back the rights of *Zork*, it told Infocom, "...games have a limited market (6000 units average) and at a limited price (under \$100), while business software sells regularly and more profitably."³⁹

Infocom's employees strongly believed that the same talent and skills that had made them successful in the games business could be applied to making successful business software. Many employees had experience at LCS tackling and solving tough problems. They had made *Zork* to show that they could make a better parser and improve various aspects of *Adventure*. In a memo dating back to spring of 1978, Blank talks about office automation systems and remote data entry. Showing confidence in the company's versatility, he wrote, "We have accumulated a great deal of expertise in these areas, having already implemented systems in each of these areas, and probably have a good idea of how to implement anything we choose along these lines."⁴⁰

Many of the founders also believed that Infocom needed to diversify its product line to continue to grow. In particular, Vezza believed that while the games made money, they would "not last forever."⁴¹ Vezza believed that consumers had fickle tastes. At any point, people might cease to enjoy Infocom's games, abandoning them in favor of something else. The business

³⁹ Minutes of the Board of Directors, August 19, 1981.

⁴⁰ Memo from Marc Blank to AV, PDL, SWG, TAA, Re: R&D Suggestions, March 21, 1978.

⁴¹ Dave Lebling, interview.

products market, however, differed in that respect. Customers of business software tended to invest heavily into applications and stick with them for a relatively long period of time.

To diversify its products, two options existed for Infocom: produce different kinds of entertainment software or tackle business products. Mort Rosenthal, Vice-President for Marketing and Finance, came into a meeting on January 12th, 1982 to discuss “two strategic alternatives for the company, ‘consumer’ v. ‘business’”. Table 4 is a reproduction of part of the report that Rosenthal presented to the Infocom. After much discussion, all present preferred the “business strategy.”⁴²

Strategic Statement	Markets	Two Strategic Alternatives					
		Tactics		Environmental		Infocom's	
		Historical	Products	Opportunities	Threats	Strengths	Weaknesses
Develop and Market Innovative Consumer Oriented Software for “personal” and Entertainment Usage on Diverse Hardware	Consumer. Home Orientation, High Growth Expected? Relatively Small Current Markets. Low Prices. Price Sensitivity	Building Technology. Gaining Market Experience	Personal DB applications. Nutricalc. Calculator. Home Educational Packages. Zorkish. Wumpus. Super Doctor	Secondary Market For Most Software Companies. No Consolidation (giant competitor), Ease of Entry <u>Could</u> be Pioneer. Poor Marketing in General. Diversity of Hardware	Competition from Non-Software Industries with Greater Resources. Diversity of Products and Markets. Lack of Defined Product Needs, Luxury Items, <u>Must</u> Be Pioneer	Technology. New Product Turnover. Consumer Software Marketing Experience. Adaptability. Speed	Lack of True Consumer Product Experience. Large Marketing Effort (and Resources Required)
Develop and Market User Friendly <u>Integrated</u> Information Processing Software on Diverse Hardware, Maintaining Presence in the Consumer Market	Business Market. High Growth. High Prices	Building Technology. Observing Marketplace	Take Existing “Good” Products and Innovate on them. Database Systems and Applications. Word Processing Systems. Communications. Personal Data Base Systems and Applications	General Lack Of Sophistication in Marketing. Greater Diversity of Installations. Greater Resources of Customers. Lack of Standardization. Defined Business Needs of Customers. Established Products From Which to Derive New Products	Consolidation of Market Control. Lots of Competitors some with Similar Capabilities and/or Strategy. Established Products and Product Categories. No Standards	Integration Ability. Adaptability. Technology. Speed of Development Capabilities. Experience with other “Big” Projects.	Lack of Business Product, Marketing, Experience. Lack of End-User Experience. Development Resources (required) are Large.

Table 4. Mort Rosenthal’s “Two Strategic Alternatives” for the company to pursue, presented at the Board meeting on January 12, 1982.

⁴² Board of Directors Meeting Notes, January 12, 1982.

Additionally, many Infocom employees believed that some of Infocom's founders, and particularly Vezza, felt embarrassed to be part of a company that made computer games. *Zork* was just a way to raise enough money to get started. No one had intended it to become the centerpiece of Infocom's business, nor did anyone expect it to take off and spawn so many titles. The embarrassment over the games made some employees eager to forge ahead with Infocom's original goals.

The Origins of Cornerstone

Mike Hammer led a group within LCS (known as Project MAC) that worked on the same floor as the Dynamic Modeling group. Two members of this group, Brian Berkowitz and Richard Ilson, had done some consulting with Hammer "involving doing a survey of existing data management systems and also some UI designs for future products"⁴³. Berkowitz and Ilson found that they had a "great deal of synergy working together." With their experience, they felt that they could probably create a database themselves.

Because Berkowitz and Ilson enjoyed working together, they began looking for other projects that they could work on together. Their experiences had taught them that current relational databases were crude and difficult-to-use. The leading database, dBASE II (Figure 14), used a cryptic, command-line interface that made it hard to perform even the most basic operations. Perhaps, they thought, they could adapt their prior work to make a relational database system for the personal computer that would be powerful and yet easy-to-use.

Berkowitz and Ilson began shopping around to see to whom they could sell their idea. They had close contact with the people at Infocom, since they had all worked on the same floor. Berkowitz and Ilson talked to Blank, Berez, and Vezza about working with Infocom to make such a database. "These guys claimed that they were always interested [in making databases]. Games were a way of kicking off the company. They felt games were a jumping off point."⁴⁴

Both sides felt there was a natural fit. For Berkowitz and Ilson, Infocom had many connections to distributors and proven success in publishing software. For Blank, Berez, and Vezza, this was a chance

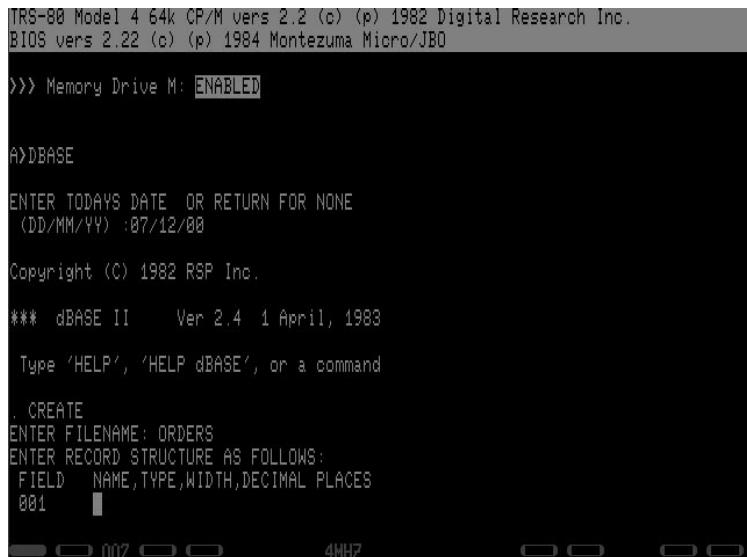


Figure 14. A screenshot of dBASE II, the leading relational database in 1982. dBASE II used a cryptic interface that made it hard to perform even the most basic operations, such as creating a database.

⁴³ Brian Berkowitz, interview.

⁴⁴ Richard Ilson, interview.

for Infocom to do something more than making games; it was a step towards creating the next “killer app.”

Developing Cornerstone

Ilson and Berkowitz joined the company in October 1982 to work exclusively on developing the new database,⁴⁵ codenamed *Infobase* and later renamed to *Cornerstone*. Starting from scratch, they worked under the assumption that *Cornerstone* should be built using Infocom’s virtual machine technology. The virtual machine design had been a key reason for Infocom’s initial growth, since it made it easy for Infocom to make its software available on almost all types of personal computers. Additionally, the Z-machine technology allowed big programs to fit on small floppy disks. Ilson and Berkowitz found, however, that they had to build a new language, compiler, and interpreter because *Cornerstone* required more functionality than the games did.

Infocom marketed *Cornerstone* as a “relational DBM [database management] system for IBM PC which allows non-programmers to build and use sophisticated DB applications.” As Berkowitz described it, “*Cornerstone* was intended to focus on mid-level applications, i.e., those beyond what could be achieved using simple file management applications (like Filemaker) but could be developed without resorting to a programming language (like dBASE provided).”⁴⁶ The target audience was “professionals, middle managers, and small businesses.”⁴⁷ First-time users would not be the intended users.

Unlike dBASE, *Cornerstone* was designed to have a friendly interface. It had a menu-driven interface that allowed the user to easily navigate the program. It also had context-sensitive help. When the user pressed the help key, the program would have some idea of what the user was trying to do, and tailor the help with that in mind; the help would explain the available commands, error messages and even allowable data types. For example, asking for help while creating a field would cause the program to describe how to create a field and what options were available.

Ilson’s background as a typist drove some of the ideas behind user interface. Command-completion was another feature of *Cornerstone*. When the user typed the first few letters of a function or command, the program would produce a listing of the valid options available to the user. Command-completion also worked with user-specific information like the name of fields in a client’s database.

The database was also very flexible. Many fields were variable length; the user was not limited in how many characters he/she could have. Fields were multi-valued, allowing the user to have multiple phone numbers in a contact field without having to create separate entries. *Cornerstone* also had extensive data types: strings, numbers, dates, times, and so on. Dates could be displayed in one of over 100 different formats.

⁴⁵ Minutes of the Board of Directors, October 20, 1982.

⁴⁶ Brian Berkowitz, interview.

⁴⁷ Board of Directors Meeting notes, August 1, 1984.

Most importantly, *Cornerstone* had relational abilities. *Cornerstone* had the ability to perform simple joins so that a user could view data from multiple records given certain constraints. This would allow a user, for example, to track certain product orders from various companies. Because of the menu-driven interface, these functions could all be done with the program's help, and the user would not need to understand the nuances of relational databases. Figure 15 shows a screenshot of *Cornerstone*.

```
Select a command from the menu. Use arrow keys or type the command.
    UPDATE      SELECT      VIEW      COLUMN      DETAILED
    USE        SAVE       REPORT     SORT       PRINT      ALL-DONE
VIEW Product_Orders          36 Records           NOT SORTED *
> ORDER NO:      38
  NAME: Medford Motor Service
  ORDER DATE: FRI, 27 JAN 84
  ORDER TIME: 5:27 pm
  PART NUMBER      QTY LIST PRICE      PRICE PRODUCT N PO LINK      DATE
  J-0130            1    15.00        15.00 Ball      BJan      Jan
                           Bearing
  J-0504            4    25.00        100.00 Wheel      WJan      Jan
                           Lock
  TOTAL PRICE: $    115.00
  TOTAL QTY:      5
>
  ORDER NO:      39
  NAME: Roman Olds Dealers
  ORDER DATE: FRI, 27 JAN 84
  ORDER TIME: 6:00 pm

File: Product_Orders           Previous mode: Initial           Files viewed: 1
```

Figure 15. A screenshot of *Cornerstone*. The database shows product orders from various companies.

Changes in Management

The change to business software also brought changes in management. Up until 1983, Berez had served as President and performed all the duties normally associated with a Chief Executive Officer. When work on *Cornerstone* began, it was obvious that the company needed more capital. Both Berez and Vezza met with various venture capital firms in search of additional funding. Some venture capital firms were wary of giving money to young entrepreneurs who had little business experience, but they would be more comfortable dealing with Vezza, an older, seasoned leader. The Board of Directors became convinced that the company needed an official CEO who had experience and clout to attract investors.

In the Board meeting of August 18th, 1983, Vezza stepped outside so that the rest of the Board could vote on a proposal to make him the CEO beginning January 1984.⁴⁸ Reeve,

⁴⁸ Minutes of the Board of Directors, 18 August 1983.

Licklider (by Reeve proxy) and Blank approved, and the proposal passed 3-0-2.⁴⁹ With that, Vezza was officially made CEO, and Berez was appointed Chief Operating Officer. “The board is strongly supportive of your aspirations, plans and policies for the company as you have set them forth in Board meetings, and it assures you of strong support in your work as CEO,” the offer letter to Vezza stated.⁵⁰

The news of Vezza’s CEO appointment shocked some of Infocom’s employees. Some believed Vezza did not project the authority and leadership to perform the job well, nor did he share their love of the computer games that had made Infocom profitable. Upon hearing the news, one employee claimed that his “net value just fell in half.” “What do you mean?” another employee asked. The response: “I don’t value my stock as much as I did before Al was in charge.”⁵¹

Raising Money

Soon after his promotion, Vezza began more discussions with investors to raise money for *Cornerstone*. Ray Stata, founder of Analog Devices, Inc. and a friend of Vezza, took an interest in the company. Stata offered to secure a \$2 million three-year subordinated loan from the Bank of Boston in exchange for options to buy \$2 million in stock and a position on the Board.⁵² On December 15, 1983, the Board approved the loan, increased the number of Directors from five to six, and elected Stata to the Board. Stata’s endorsement of the company seemed to help the company’s image. In the Board meeting of January 25th, 1984, “Mr. Vezza noted that even more potential investors have shown interest in us, following Mr. Stata’s investment.”

Although Stata’s investment helped their fiscal situation, Infocom found it difficult it to raise additional funding. Venture capitalists were reluctant to invest large amounts of money on a company that had leaders with no prior business experience.⁵³ Vezza also believed that the relaxed, fun-loving engineering culture also worked against the company. He believed that East Coast venture capitalists wanted to invest in serious, professional-looking companies. Investors would initially be impressed with Infocom’s bottom-line and potential for growth, but they would be displeased by a lack of a serious atmosphere after they visited Infocom. One firm reportedly told Vezza, “You have a bunch of talented, undisciplined bunch of people, and you’re not going to be able to control them.”⁵⁴ That Infocom managed to become a multi-million dollar company just made them arrogant, Vezza said.

Venture capitalists also disliked that Infocom was involved in two entirely different markets with the business and games divisions of the company. “One thing that became obvious was that there were some people who loved the games and didn’t think the business products

⁴⁹ Board of Directors Meeting notes, August 18, 1983. Berez and Vezza abstained due to their involvement in the proposal.

⁵⁰ Letter to Al Vezza from Board of Directors. Attached to the Minutes from the Board of Directors Meeting on August 18, 1983.

⁵¹ Mike Dornbrook, interview.

⁵² Letter from Albert Vezza to Stuart Galley, January 5, 1984.

⁵³ Al Vezza, interview.

⁵⁴ Al Vezza, interview.

made any sense," said Blank. "There were also people who thought, 'What are these stupid games?' but loved the business products."⁵⁵

There was also a strong desire among Infocom management to retain control of the company. In 1984, Gulf & Western, the parent company of publishing giant Simon & Schuster, was interested in buying the games side of the company for an estimated \$20 million.⁵⁶ Blank and Berez were in favor of the deal, but Vezza wanted to retain control so that Infocom could focus on business products. The deal was rejected, partly because Gulf & Western wanted to impose its own organizational structure on Infocom.⁵⁷

Infocom, however, managed to get some additional funding. On October 24, 1984, the Board approved the borrowing of \$500,000 from Massachusetts Capital Resource Company (MCRC), a state-run venture capital firm dedicated to helping Massachusetts-based companies. But the MCRC investment was the only venture capital Infocom received.

Trouble Arises: The Beginning of the End

Game sales climbed at a dramatic rate through 1983, and the sky seemed to be the limit for Infocom. In 1983, sales topped \$6 million, and all projections indicated the company would continue to grow exponentially (see Figure 16). The high-tech industry also buzzed with excitement. Analysts predicted record growth for computers. "There was a sense of euphoria," said John Brackett, the General Manager of the Business Products division. "Everybody thought that for 1984 and 1985 the computer industry would double every year. Infocom financed *Cornerstone* with money they were expecting to walk in the door."⁵⁸

Unfortunately, this money never came. In 1985, the high-tech industry experienced a downturn that particularly hurt software companies. *Cornerstone* received rave reviews when it was released in January 1985, but things were getting worse for Infocom. With skyrocketing costs, depleting resources, internal clashes, and flat game sales, Infocom faced a serious crisis.

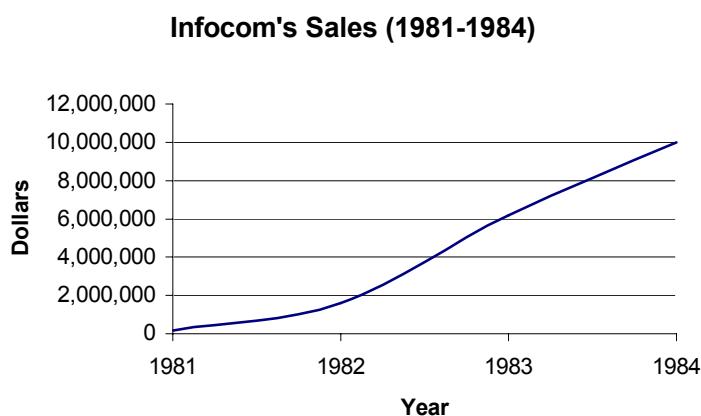


Figure 16. Infocom's sales from 1981 through 1984.

⁵⁵ Marc Blank, interview.

⁵⁶ Joel Berez, interview.

⁵⁷ Board of Directors Meeting notes, November 9, 1983.

⁵⁸ John Brackett, interview.

Skyrocketing Costs

Starting in 1984, dramatic changes occurred in the company. The Business Products division hired rapidly, expanding the number of employees to 100 in 1985, up from 32 the previous year. Infocom hired three product managers, who each had assistants and secretaries under them. Fourteen people were hired into the marketing department. This growth forced Infocom to move again. In December 1984, the company relocated its office to 125 CambridgePark Drive. The new office cost over \$600,000 per year,⁵⁹ a large amount compared to Infocom's 1983 net income of only \$526,000.⁶⁰

Infocom had many other expenses aside from the high rent on their new office space. It purchased a second DECsystem-20 for the development of *Cornerstone* in May 1984. Another \$85,000 was spent for a full-page “teaser” advertisement in the *Wall Street Journal*.⁶¹ All combined, *Cornerstone*-related expenses totaled \$2.5 million in 1984.⁶² And to add to Infocom's financial woes, personal conflicts began to surface within the company.

Clashes Within the Company

As Infocom expanded, the employees in the games business grew more resentful that the profits from their hard-earned efforts were being taken away and channeled into development of *Cornerstone*. Some felt relegated as second-class citizens. Dan Horn, who led the Microcomputer Division in charge of creating new ZIPs for the gaming side of Infocom, described the situation: “*Cornerstone*...alienated everyone into two different camps: business and games. Games, the group that started and consistently funded the company, was then second fiddle, and there were even talks of stopping game production once *Cornerstone* succeeded!”⁶³ While some wondered why Infocom was venturing into databases, others took a more pragmatic approach. Lebling, for instance, thought, “If this succeeds, it will be a very good thing.”⁶⁴

The employees in games, however, felt the squeeze in their budget. Projected to earn at least \$12 million in 1985,⁶⁵ game developers still had to create new titles, but they received little funding to explore new types of computer games. “I wanted to do something with graphics, but I was told there was no money,” said Blank.⁶⁶

The shift to business software also affected the company culture. No longer did the company consist only of a close-knit group of friends who had fun together. The developers on the games and business products maintained a “good, cordial working relationship,”⁶⁷ but some

⁵⁹ “Infocom, Inc. Certificate of Vote”, December 19, 1984

⁶⁰ Infocom 1983 Annual Report (\$526,000 figure after taxes)

⁶¹ Mike Dornbrook, interview.

⁶² Infocom 1984 Annual Report.

⁶³ Dan Horn, interview, 11/20/00.

⁶⁴ Dave Lebling, interview.

⁶⁵ Mike Dornbrook, interview.

⁶⁶ Marc Blank, interview.

⁶⁷ Rich Ilson, interview.

employees directed their growing animosity towards the new employees in the Business Marketing department. “They weren’t even on the same planet,” said Tim Anderson. “These guys were showing up at work at nine [o’clock] in suits.”⁶⁸

These internal conflicts sparked talk about splitting up the company. Licklider believed that it was a good idea because “...employees might feel they’re contributing to their own company rather than engaged in rivalry with the other division.”⁶⁹ In an ominous statement at a Board meeting on June 29, 1983, Blank “admitted pessimism about the schedule and technical quality [of the business products division]. He’s afraid that division might sink the company unless it’s made more separate.”

Despite the warning signs, the idea to spin off a new company was never actively pursued. The Board still felt there were advantages of keeping the company together. For instance, the Business Products division could use the expertise from the games side and take advantage of Infocom’s distribution channels. Even people in the games business recognized that *Cornerstone* could be instrumental to Infocom’s long-term success. More importantly, the logistics involved with splitting the company made it a tricky proposition. Infocom’s lawyers told the Board that the only way of separating the company without incurring a large tax liability was a “complex plan to liquidate the original company.”⁷⁰

Morale sank as *Cornerstone* depleted the company’s resources, and by the summer of 1984, the Board had started to look for ways of improving the situation. They called in a professor from the Harvard Business School to study the company and suggest ways of restructuring the company. Even his recommendations did little to alleviate the problems. In a Board meeting on June 6, 1984, Stata offered his own critique of Infocom’s situation: “I won’t be polite any more—company management is terrible!”⁷¹

Other complaints about the management surfaced. Employees claimed that the problem was twofold. First, they felt there was no one at the top able to make difficult decisions. “We sat there bemoaning the fact that the company was not in a position to make decisions because there was no strong leader,” Ilson said. “We needed a leader to say, ‘Let’s look at the realities of the situation. We’ve got to change our plan.’” Second, the current management did not “trust and respect each other.”⁷² Employees believed that Blank, Berez, and Vezza had difficulty working together due to personal differences.⁷³

Problems with *Cornerstone*

With its future hanging in the balance, Infocom released *Cornerstone* in January of 1985. Reviewers hailed its ease-of-use. The friendly menus, as well as the simplicity to enter data and perform joins, made it stand out from other relational databases. A *PC Week* columnist wrote,

⁶⁸ Tim Anderson, interview.

⁶⁹ Minutes of the Board of Directors, April 22, 1983.

⁷⁰ Minutes of the Board of Directors, June 9, 1983.

⁷¹ Notes from the Board of Directors Meeting, June 28, 1984.

⁷² Notes from the Board of Directors Meeting, June 28, 1984.

⁷³ Mike Dornbrook, interview; Richard Ilson, interview

"*Cornerstone* is the best program I have ever used....the program is so easy to use, explaining its use is almost redundant. If you need a relational database, buy *Cornerstone*."⁷⁴ Reviewers were also amazed that the entire program fit on a single floppy disk. Infocom had successfully applied its virtual machine technology to squeeze over 75,000 lines of high-level code into a single floppy.

Cornerstone faced stiff competition from other databases on the market—especially from dBASE III which was released around the same time—but it was several technical problems that really kept it from becoming an instant hit. The most glaring problem was that it was not programmable. Users could not tailor the user interface, build applications, or create macros. Every operation was performed by built-in functions. Users of dBASE II, on the other hand, could extend the product's functionality by using an esoteric programming language. "No matter easy [a database] was, you still needed it to be customized for what you were doing," Ilson said. "With dBASE, people would spend a long time making something work, but you could always do what you wanted it to do."⁷⁵

Performance also proved to be a critical problem. Because the IBM PC emerged as the dominant platform by 1985, the portability of *Cornerstone* was no longer an asset. In fact, the overhead of using a virtual machine made *Cornerstone* slow on an IBM PC-XT, the main platform of the time. A *PC Magazine* review stated:

"This is not a program for handling very large databases, although it can process files containing up to 32,700 records. After watching *Cornerstone* devote 3 hours to importing a 30,000-record ASCII file and nearly half an hour to sorting it, we gave up on running the remaining PC Labs tests on the largest file size."⁷⁶

Cornerstone sold over 10,000 copies in its first year and accounted for \$1.8 million in sales, well off the company's projections of a \$4.7 million gross profit.⁷⁷ The company had

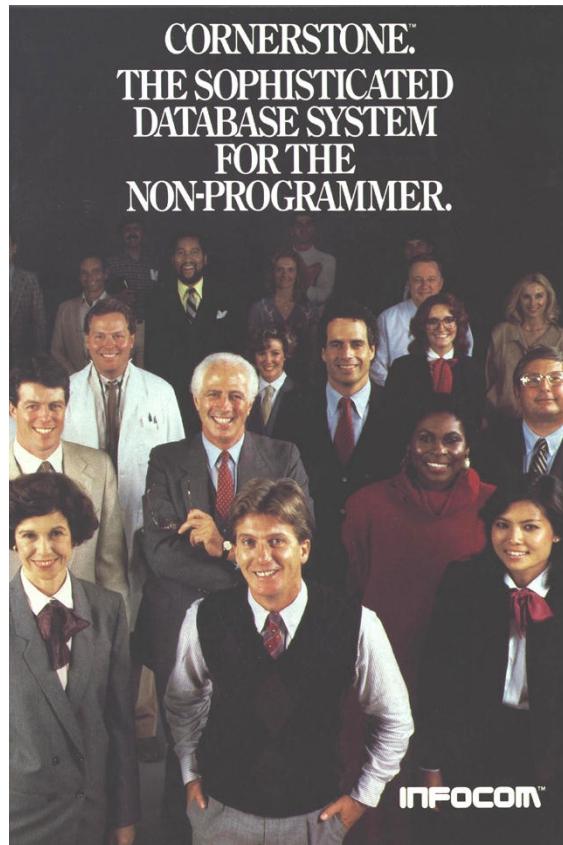


Figure 17. An ad for *Cornerstone*.

⁷⁴ Leichtman, Kerry. *PC Week*. May 7, 1985.

⁷⁵ Richard Ilson, interview.

⁷⁶ Robert Kendall. "Cornerstone." *PC Magazine*. April 26, 1988. pp. 159-161.

⁷⁷ "Business Products Strategic Plan Overview", June 22, 1984.

spent money that it had not yet earned, and to make matters worse, 1985 saw an unexpected revenue slowdown in the games business that put the company in even more financial trouble.

Flat Game Sales

Although Infocom's games continued to sell reasonably well, weakening signs began to emerge. 1985 saw three new titles: *Wishbringer*, *A Mind Forever Voyaging*, and *Spellbreaker*. Just two years ago, Infocom had held six of the top 20 titles on the Softsel bestseller list. Figure 7 shows that by 1985, Infocom's titles held half that number, three of the top 20. *Zork I* had remained on the list for nearly three years, but it had dropped to tenth overall.

For the first time in the company's history, revenues from the games business failed to grow. The company grossed \$10 million in 1985, tying its revenue from 1984. That fell below even Infocom's most conservative projection of \$12 million (see Figure 17).⁷⁸

RECREATIONAL SOFTWARE			
This Week	Last Week	Weeks on Chart	
1	1	40	Gato • Spectrum Holobyte • IBM PC, MAC, PCjr, TIP
2	3	136	Flight Simulator II • Sublogic • IBM PC, AT, TIP
3	6	8	Wishbringer • Infocom • IBM PC, MAC, C64, AT
4	4	132	Microsoft Flight Simulator • Microsoft • IBM PC
5	2	39	Hitchhiker's Guide to the Galaxy • Infocom
6	7	10	Spy Hunter • Sega (Simon & Schuster) • IBM PC, C64, AT
7	9	22	F-15 Strike Eagle • Microprose • IBM PC, C64, AT
8	8	21	Karateka • Broderbund • IBM PC
9	5	88	Sargon III • Hayden Software • IBM PC, MAC, C64
10	11	152	Zork I • Infocom • IBM PC, MAC, C64, AT, TIP
11	13	89	Ultima III • Origin Systems • IBM PC, MAC, C64, AT
12	12	105	Lode Runner • Broderbund • IBM PC, MAC, C64, AT
13	10	12	King's Quest II • Sierra On-Line • IBM PC
14	15	152	Wizardry • Sir-Tech Software • IBM PC
15	14	40	King's Quest • Sierra On-Line • IBM PC
16	16	7	Fahrenheit 451 • Telarium/Spinnaker • IBM PC, MAC, C64
17	—	7	Airborne! • Silicon Beach Software • MAC
18	—	1	Amazon • Telarium/Spinnaker • IBM PCjr, C64
19	20	5	Dragonworld • Telarium/Spinnaker • IBM PCjr, C64
20	19	7	Rendezvous with Rama • Telarium/Spinnaker • IBM PC

Figure 18. The Softsel bestseller list for December 1985.

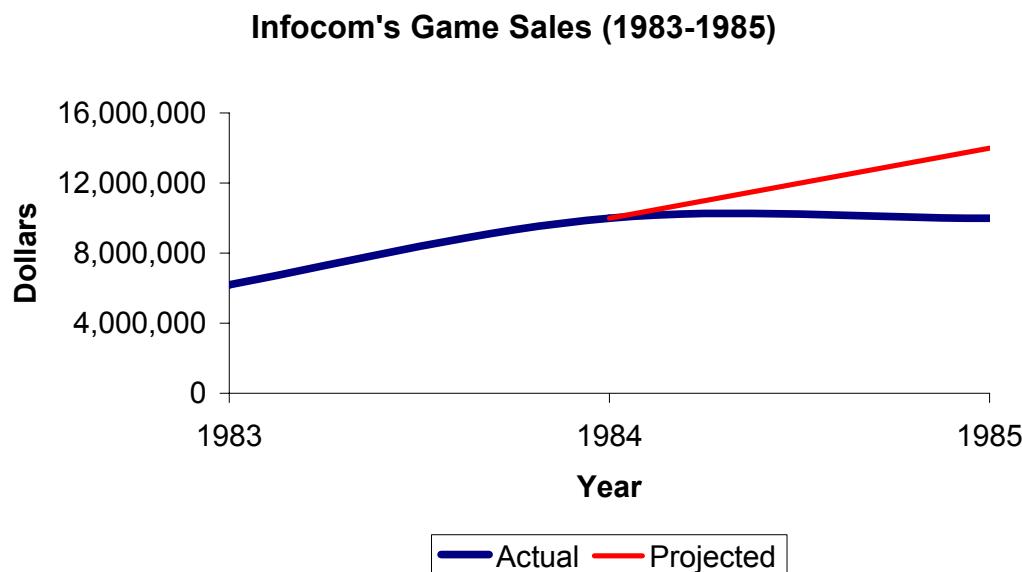


Figure 17. Infocom's game sales from 1983-1985 showing the difference between the actual and projected game sales.

⁷⁸ Mike Dornbrook, interview.

Struggling to Make It

By 1985, Infocom was in serious financial trouble. Sales had fallen below expectations. Debts and layoffs were inevitable, and by late 1985, it became clear that needed outside money to keep the company afloat. After several failed attempts to raise money, the company agreed to a merger with Activision, a computer game company based in California. Although Infocom's employees looked at the deal as a means to keep Infocom in business, by May 1989 Infocom existed only as a brand name, and as a legacy of pioneers in the computer gaming industry.

Layoffs and Debts

Transitioning to business products led to severe monetary problems for Infocom. Debts were increasing, and revenue from games was not coming in fast enough to support the increasing number of employees. By 1985, Infocom was plummeting. In September of that year, the lack of income finally led to layoffs as a means to cut costs. The company had to eliminate anything that was not making money. Because the games business was still profitable, Infocom laid off the *Cornerstone* team, including the recently hired marketing team. November and December came with more rounds of layoffs as the company tried to keep itself in business. By the end of the 1985 layoffs, only 40 employees remained.

With the rounds of layoffs, the morale at Infocom sank even lower. Logistical problems associated with the layoffs arose as well. For example, when porting an interpreter to Atari ST, a developer needed to speak with Brian Berkowitz about source code that Berkowitz had written. When he asked where he could find Berkowitz, the response was, "Oh, he was fired last week."⁷⁹

Those employees that did manage to remain with the company took salary cuts to help keep costs down. In June 1985, Mike Morton, the last employee ever hired by Infocom, was to start his new job with the company. The day before his first day of work, he received a telephone call from the personnel department, with the following message, "We're all taking a 15% pay deferral for the next six months. Do you still want to start tomorrow?" (Morton ended up joining Infocom even with the pay deferral.)⁸⁰

Pay cuts and layoffs together were still not enough to avoid bankruptcy. Thus, Infocom also engaged in several types of "creative accounting."⁸¹ Employees lied to creditors and banks, claiming checks they never wrote were already in the mail. They purposely "forgot" to sign checks to bide them more time. They promised money that they did not have nor were they expecting to obtain in the near future.

⁷⁹ Mike Morton, interview.

⁸⁰ Mike Morton, interview.

⁸¹ Mike Dornbrook, interview.

Looking for Help

While stalling as long as possible, Infocom looked for outside money to pay off its debts. Many investors were spooked by the 1985 high-tech downturn and had no interest in supporting a company that was bleeding cash quickly. Infocom approached Gulf & Western again, but no real offer materialized.

Even in 1985, many employees had hopes that the company would succeed. “It was clear that we had problems,” said Ilson. “It was not clear that we weren’t going to surmount them.”⁸² However, to make their financial situation even worse, in 1985 the Bank of Boston cut back on the credit line of every high-tech company in which they had invested and called in Infocom’s loan. Said Dornbrook, “They bounced checks to get our attention. They didn’t even give us a phone call!”⁸³ To raise money, Infocom employees decided to buy stock options in their company, putting up their own houses as collateral. “The bank was so embarrassed...that they put up additional \$500,000 credit,” said Dornbrook.⁸⁴

Activision Takes Over

The extra credit line did not help for very long, and Infocom kept looking for outside money. Berez had flown to Chicago to visit a customer when he ran into Jim Levy, the CEO of Activision.⁸⁵ Because Activision had just gone public, Levy told Berez that his company had cash available and expressed interest in doing more than just investing in Infocom. He offered to buy Infocom and cover its outstanding debts.

Levy’s offer was the only real, available option to Infocom, so on February 12, 1986, the Board approved a merger between Activision and Infocom for \$7.5 million.⁸⁶ (Much of the settlement price was in Activision common stock and may have had a different value by the final payment on June 13, 1986).

Infocom employees were, on the whole, pleased with the news. “At the time, it [the merger] was ideal,” said Tim Anderson. “We needed it to survive.”⁸⁷ There were, however, other reasons why the majority of Infocom employees looked at the merger favorably. Activision had a very similar corporate culture to



Figure 18. Jim Levy (left) and Joel Berez (right) cut the “InfoWedding” cake, commemorating the merger of Activision and Infocom.

⁸² Rich Ilson, interview.

⁸³ Mike Dornbrook, interview.

⁸⁴ Mike Dornbrook, interview.

⁸⁵ Joel Berez, interview.

⁸⁶ Minutes of Special Meeting of the Board of Directors, February 12, 1986

⁸⁷ Tim Anderson, interview.

Infocom's. Additionally, Levy, was a true fan of Infocom games. Infocom held a surprise "InfoWedding" with Levy and Berez to commemorate the merger. Levy happily played along as "Rabbi" Galley pronounced Activision and Infocom, "Corporation and Subsidiary." "The way Levy handled [the wedding] was better than any speech he could have given," said Meretzky.⁸⁸

About six months after the merger, Bruce Davis replaced Jim Levy as the CEO of Activision. Bruce Davis worked at Activision before the merger, and was always against the Infocom deal. Many Infocom employees believed that Davis, after becoming CEO, worked to dismantle Infocom in whatever way he could.

One striking example of this was the situation involving the Activision packaging plant. Activision owned its own packaging plant, and under Davis, Infocom was forced to use this packaging plant in order to give the plant added business. Infocom used the Activision packaging plant at a cost of \$0.90 per package, up from \$0.45 per package with their old company. Additionally, the new packaging plant had frequent problems with assembling games using the wrong disks or missing instruction booklets. The new packaging company was "[screwing] things up and charging us more" to do so.⁸⁹

Another result of the Activision merger and another cause of the eventual downfall of Infocom was the manner in which Infocom games were marketed after its merger with Activision. Infocom games used to be sold like books; one could find a game on the shelf from one or two years ago just as easily as one could locate the latest release. Activision management favored a shorter shelf life for each game, however. To fill the shelves, Activision ordered Infocom to produce more games per year: eight games were to be made each year, instead of four or five. Activision expected these games to be created with the same number of employees and at the same quality level as Infocom's previous games.

Computer Graphics Come of Age

Infocom struggled to make money under Activision. Activision's changes had spread the company's resources thin and decreased the overall quality of Infocom's games. Games like *Nord and Bert Couldn't Make Head or Tail of It* and *Plundered Hearts* sold approximately 10,000 copies each, far less than their predecessors, which typically sold over 30,000 copies.⁹⁰ Two other factors also contributed to the decline of Infocom's sales. First, computer graphics came of age, making it harder for Infocom's text-only games to compete. Second, because of a lack of funding and the company's pride in its own abilities, Infocom essentially stopped innovating in the games division altogether.

Graphics improved at a drastic rate since the release of *Zork* (see Figure 20). In 1985, Nintendo released its first console, the Nintendo Entertainment System, which allowed users to play much improved, graphical games directly on their television. Sega Systems followed Nintendo with the release of its own console system in 1986. Graphics in computer games

⁸⁸ Steve Meretzky, interview.

⁸⁹ Mike Dornbrook, interview.

⁹⁰ Tim Anderson, interview.

steadily improved as well. The mid-1980s saw popular titles as Epyx's *Summer Games*, Sierra On-line's *Space Quest*, Electronic Art's *Skate or Die*, and Origin System's *Ultima IV*.



Figure 20. A sample of computer graphics in the mid-1980s. Left: *Super Mario Brothers*, released by Nintendo in 1985. Right: *Space Quest*, released by Sierra On-line in 1986.

As computer graphics improved, Infocom continued to feel the repercussions of *Cornerstone*'s commercial failure. The company had spent little money experimenting with new ideas and innovating in games. Infocom's text-only games had to be churned out like clockwork just to keep the company afloat, and there was neither the time nor the resources to pursue a new path with graphical games.

Money was not the only reason, though, that Infocom did not innovate in games in the mid-1980s. At least equally as powerful a force standing in Infocom's way of game innovation was, ironically, Infocom's own success in the games market "The best thing about the Infocom games was good writing and good puzzles," said Lebling. "We worked with a staple of authors that could write....We thought we were the best; we *were* the best at what we did."⁹¹ Infocom's game developers felt that text-only games would continue to be superior, and this directly fueled a resistance to using graphics. In 1989, when they did put graphics into one of their interactive fiction games, *Shogun*, Lebling said, "There was definitely a feeling that people had compromised their principles."

Infocom did make some attempts to innovate. As previously noted, later releases of games had better text parsers, non-player characters, and scheduled events. The problem with most of these innovations was that they were invisible to the end user. Unlike graphical improvements such as better frame rates, or more polygons per second, these innovations were all "behind the scenes" improvements, which often made little impact.

⁹¹ Dave Lebling, interview, 11/5/00.

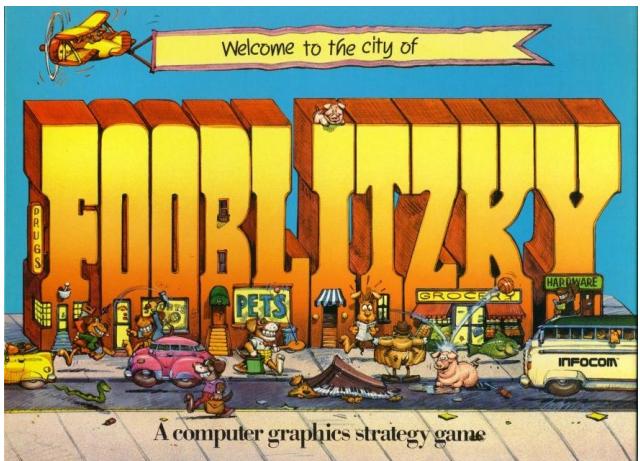


Figure 21. A picture of the cover of *Fooblitzky*, Infocom's first graphical game. To make the game portable across many platforms, the lowest common denominator of graphic hardware had to be used.

unimpressive to watch. As a result, *Fooblitzky* became a commercial flop. The failure of its first foray into graphics just reinforced the belief that Infocom should continue to do what it was good at making, namely text-based adventure games, and it should leave graphics behind.

Unfortunately for Infocom, graphics was a classic example of a disruptive technology in the computer gaming market. Clayton Christensen, a Harvard Business School professor, argues in The Innovator's Dilemma that companies often fail because they discount new, disruptive technologies either because the markets are too small or because their customers do not want what these technologies provide.⁹² He explains that a disruptive technology is one that usually starts with inferior performance than the present, sustaining technology.

Exactly such a scenario happened with computer graphics. The computer graphics of the early 1980s were primitive and slow. Infocom made text-only games that outsold graphical ones, beating out competitors like Epyx, Sierra On-Line, and Broderbund. Even in late 1985, *The Hitchhiker's Guide to the Galaxy* held the number one spot on the Softsel best-seller list.

But in spite of Infocom's continued success, there was evidence that the disruptive technology of graphics was taking over. Home computer power grew rapidly, making better graphics possible. Additionally, the demographics of computer ownership changed. No longer were personal computers available only to the rich, well-educated doctors, lawyers, and professionals. As personal computers became more mainstream, the market shifted from text-based software towards less intellectual, more graphical types of games.

To make a bigger impact, Infocom created one graphics-based game called *Fooblitzky*. *Fooblitzky* was a multiplayer, graphical, scavenger hunt released in March 1986. Graphics made the computer games slower for low-end computer users, but even worse, the graphics that were present in *Fooblitzky* were necessarily of low quality. One of the tenets of the games development at Infocom was platform portability. This principle did not work well with graphics because computer systems had different graphics-drawing abilities, which forced Infocom to use the "lowest common denominator"⁹² so that its games would be able to run on any platform.

Consumers found *Fooblitzky* difficult to play and the graphics

⁹² Tim Anderson, interview

⁹³ Christensen, Clayton. The Innovator's Dilemma.

While Infocom did not embrace this disruptive technology, those companies that did thrived. Most notably was Sierra On-line, which released *King's Quest I*, a graphical interactive fiction game, in 1983. *King's Quest I* was created for the IBM PCjr, and it was initially a commercial failure, as the PCjr platform never caught on with consumers. However, in 1984, the Tandy 1000 came out, and *King's Quest I* sales skyrocketed as the Tandy 1000 became an industry leader.⁹⁴ In the following years, the graphics of *King's Quest II, III, IV*, and *V* brought further success to Sierra On-line.

As Christiansen suggests, a disruptive technology often overtakes the industry leader and maintains its top position until another disruptive technology comes along. By 1987, Sierra On-line and graphical computer games dominated Infocom's text-only games, and the company continued its slide downward. In the words of one Infocom employee:

“The reason that text adventure isn't alive anymore is that the technology to present visual representations of a story advanced very quickly. Some companies picked up on that but you'd notice that the reality of gaming is now *EverQuest*—massive multiplayer, real time, online, and graphically amazing. This is the market that Infocom was destined to own but let slip through their fingers because of bad business decisions. Imagine if you will *Sorcerer*, *Planetfall*, and *Deadline* with the *EverQuest* engine, amazing.... but lost forever.”⁹⁵

The End of Infocom

From 1987 to 1989, Infocom continued to create games under Activision at a loss of approximately \$200,000 per fiscal quarter.⁹⁶ One anonymous Infocom employee even wrote a song to the tune of Bill Joel's “Allentown” summarizing the plight of the company:⁹⁷

Well we're working here at Infocom
And they're shutting the DEC 20's down
Out in Menlo Park they write a report
Fill out a form, see you in court.
Well our founders didn't see it at all.
Had an office down at Faneuil Hall.
Thought they'd get rich selling Cornerstone,
Ed Reuteman, Tommy Smaldone.
And we're living here at Infocom,
But our recent games were all a bomb.
And it's getting very hard to pay.

And we're waiting here at Infocom,
For the public offering we never found.
For the promises Al Vezza made,
If we worked hard, if we behaved.
So the Golden Floppies hang on the wall,

⁹⁴ “History of King's Quest” <http://members.aol.com/KQswst104/history.html>

⁹⁵ Dan Horn, interview, 12/11/00.

⁹⁶ Rosenberg, Ronald. “Computer-games Firm Moving to California.” *The Boston Globe*, May 22, 1989.

⁹⁷ “Infocom”, Infocom 20th Anniversary CD-ROM.

But they never really helped us at all.
No they never taught us what was neat,
 Graphics and sound, sizzling heat.
 And we're waiting here at Infocom,
For the latest Apple download from Tom,
And they're all supposed to ship today.

Every tester had a pretty good shot,
 To become an Imp and earn a lot,
But that was all before those Mountain View crooks,
 Started writing off good will on our books.
 Well I'm living here at Infocom,
Even the rotisserie standings are glum,
 So I won't be logging in today,
 And it's getting very hard to pay,
 And we're living here at Infocom.

Finally, Activision had enough. On May 5th of 1989, Activision laid off fifteen of the remaining twenty-six Infocom employees. The eleven others were offered the chance to move from Cambridge to Silicon Valley, where Activision was headquartered, but only five accepted the offer. Most employees were disgusted by Activision's management or just wanted to stay in Massachusetts. Infocom's sales, marketing, public relations and customer support teams were all incorporated into Activision, which had renamed itself to Mediagenic in 1988. In 1992, Mediagenic went bankrupt, resulting in a vast reorganization and a merger with The Disc Company. Mediagenic eventually renamed itself back to Activision and continues to make games today under this name.

Even after Infocom closed its Cambridge office, the company continued to leave traces of its existence. Activision released a few titles, such as *BattleTech* and *Arthur*, under the Infocom name, but none of the employees from the Cambridge office had anything to do with it. The enduring popularity of its games prompted Activision to release a CD-ROM collection of Infocom's titles, *The Lost Treasures of Infocom*.

Conclusion

Why Infocom Succeeded

Infocom succeeded at producing popular computer games for a combination of reasons. First, it was able to make its games widely available to the mass consumer market. The company was able to compress *Zork* so that it could run on personal computers and not just mainframes. Blank and Berez accomplished this by designing the Z-machine, which allowed them to express text-adventure games in a compact form. But the Z-machine did much more. It also made it easy to port software; Infocom only had to write a single interpreter for all of its software to work on a particular platform. This portability gave Infocom a distinct advantage over its competitors in a time when no single model of personal computers dominated the market.

Second, Infocom's games sold well because they were easy-to-use and fun to play. A player had to insert a disk, turn the computer on, and the program would start. Playing the games was simple and intuitive as well: type in English sentences, such as, "Hit the troll with the axe" and the program would respond. The ability of the games to parse sentences, instead of relying on simple, two-word inputs ("go north"), allowed users to focus on solving puzzles rather than on figuring out how to play them. Like a reader engrossed in a good book, players found themselves hooked for long periods of time. They enjoyed interacting with stories, using their ingenuity to solve puzzles, and imagining worlds in which they manipulated the main characters.

While the technology behind the games helped drive Infocom's success, the engineering culture proved to be equally as important. Many of the people who created games knew how to write prose that engaged players. They tacitly knew how to design clever puzzles and what made a text-adventure game fun. In addition, they developed the skills and tools to bring a game to market quickly. They made their games distinguishable by packaging them in stylish boxes and including custom-designed paraphernalia. Their efforts resulted in games that resonated with quality, the product of careful attention to details and a desire to make each game somehow better than the previous one.

The popularity of the games gave Infocom a strong and recognizable brand name, which in turn, helped perpetuate Infocom's success. Its marketing department fanned customer anticipation and loyalty with sequels, hint books, sleek ads, and humorous newsletters. TV news programs featured Infocom's games, and major newspapers and magazines heaped lavish praise for the company that invented interactive fiction. Word-of-mouth helped popularize *Zork* and its subsequent titles.

Lastly, Infocom's games were the right products for the right time. They filled a niche for highly educated, well-read audiences who comprised a large portion of personal computer ownership of the early 1980s. The abysmal quality of computer graphics gave Infocom the chance to excel at what it did best: making text-only games.

Why Infocom Failed

Making games, however, had just been a way to get the company started. Some of Infocom's leaders never considered the popularity of their games as a success; they felt embarrassed that their company had become synonymous with games. This helps explain why they were willing to divert their focus away from games and bet the entire company's future on *Cornerstone*. However, the decision to make *Cornerstone* did not cause Infocom's failure—the way the company managed the transition to business products did.

First, the company's leaders failed to raise enough money to mitigate the risks involved with entering into a new business. Shifting to databases was risky because Infocom had to invest heavily in building software from scratch, hiring experienced programmers to do the job, and marketing an entirely new product. The potential payoffs were high, but Infocom made itself vulnerable by expanding with the assumption it would have the money to support the new business. Had Infocom been able to raise enough money to fund *Cornerstone* for a longer period of time, the company would have had a better chance of surviving.

Second, the company overspent its own assets to create its Business Products division. Infocom started as a small, self-financed company operated with great frugality. A \$10 million company in 1984, Infocom tried to fund a new business mostly with money out of its own pocket, as it had done before. From 1984 to 1985, the number of employees skyrocketed from 32 to 100. The move to 125 CambridgePark Drive cost over \$600,000 per year in rent. Infocom spent \$85,000 for an advertisement. Another DECsystem-20 was purchased for development. Such expenses made it difficult to stay profitable, and led to Infocom's posting its first annual loss in 1984.

Third, the company failed to isolate the games and business divisions from each other. The employees in the games business felt resentful because the money that they had made for the company was used for a completely different purpose. The company left the game developers with few resources, precluding them from creating something other than traditional, text-based games. By channeling all of the games profits into the Business Products division, Infocom inextricably tied the fate of both of its divisions together. With little outside capital to weather bad times, the future of the games division rested on *Cornerstone*.

Infocom's nightmare was realized when *Cornerstone* failed to turn a profit. *Cornerstone* sold over 10,000 copies, but that was hardly enough to pay for its expenses. Despite its ease-of-use, *Cornerstone* lacked the performance and functionality that competitors like dBASE II had. Its slow performance can be attributed to Infocom's efforts to achieve portability by applying the similar byte-code technology used in the Z-machine. While this portability was vital to Infocom's success in the early 1980s, the IBM PC unexpectedly dominated the market by 1984—after work on *Cornerstone* had already begun. When *Cornerstone* was released in 1985, portability no longer provided much of an advantage. In fact, the virtual machine used to run *Cornerstone* made it noticeably slower than competing database products.

Infocom suffered some additional misfortune when the high-tech industry sank far below expectations in 1985. The downturn caused sales to dip and put Infocom in a precarious

position. It also prompted the Bank of Boston to call in Infocom's loan and forced the company to lay off its Business Products division. Activision came to the rescue, but no one at Infocom expected Jim Levy, a person friendly to Infocom's corporate culture, to be replaced by Bruce Davis, who changed many of the processes that had made the games business profitable in the past.

The final death knell of Infocom came as a result of its weak game sales under Activision. That Infocom's leaders never felt the games would continue to thrive became, in many ways, a self-fulfilling prophecy. They focused their efforts and resources on *Cornerstone* but never gave much thought to developing cutting-edge games that exploited the state-of-the-art hardware. Little investment went back into research and development. Although Infocom experimented with many different genres of text-adventure games, the technology behind each game essentially remained the same. When the market for text-only games declined in favor of flashier, graphical games, Infocom's revenues stagnated.

But management was not the only reason to blame for the declining game sales. The engineering culture fostered a conviction to making text-only games. The employees took pride in their ability to write, and they mocked games that used primitive graphics. Their ads boldly declared, "We draw our graphics from the limitless imagery of your imagination—a technology so powerful that it makes any picture that comes out from a screen look like graffiti in comparison."⁹⁸ Indeed, they had evidence to support their claims: Infocom's games consistently outsold other titles. Even Infocom's own graphical game, *Fooblitzky*, did not sell well. With all their vested tools, skills, and experience, the developers consciously resisted innovating in graphics. Like most disruptive technologies, graphics did not seem like a potential threat to Infocom's core business at the time.

Lessons from Infocom

What can be learned from Infocom? First of all, a working strategy for one kind of business does not necessarily translate to a working strategy for another business. In the games business, Infocom spent self-financed capital and grew the company with its profits. Although Infocom raised some outside money, it tried a similar self-financed approach with *Cornerstone* and failed. Infocom also attempted to maintain portability and squeeze its software onto floppy disks. This worked well for its games, but it provided little advantage for *Cornerstone*. Thus, a company should re-think its approach when trying to transfer strategies for success to entirely different businesses.

Second, companies must ensure that they buy enough time to improve and refine new products. The first version of *Cornerstone* may have been a commercial flop, but its shortcomings were going to be addressed in future versions. However, *Cornerstone* never got the chance to evolve beyond its first version because Infocom spent money with the expectation that it would be profitable from the start. Unable to sustain *Cornerstone*'s losses, Infocom had to cut it immediately. Had Infocom been able to stay afloat, *Cornerstone* might have improved to the point where it became immensely profitable for the company. Christensen calls this lesson a

⁹⁸ "We unleash the most powerful graphics technology" advertisement, Infocom 20th Anniversary CD-ROM.

“learning” strategy. He argues that companies should not assume that they will get products right the first or even the second time:

“I must therefore plan to be wrong and to learn what is right as fast as possible. I cannot spend all of my resources or all of my organizational credibility on an all-or-nothing first-time bet, as Apple did with its Newton or Hewlett-Packard did with its Kittyhawk. I need to conserve resources to get it right on the second or third try.”⁹⁹

Perhaps most importantly, the story of Infocom shows that success and failure are not simple matters. In the same way scientific and engineering revolutions cannot be explained by a single phenomenon or “eureka” moment, one cannot attribute Infocom’s failure to a single decision or mistake. It would be a gross oversimplification to say, for example, that Infocom failed because it decided to enter the database market, or because it did not make graphical games. Infocom’s success and failure was a product of many factors: the environment, the company’s technical expertise, management, engineering culture, and just plain luck.

⁹⁹ Christensen, Clayton M. The Innovator’s Dilemma. pp. 241

References

- Adams, Roe R. "EXEC INFOCOM: Adventures in Excellence." *Softalk Magazine*. October 1982. pp. 35-40
- Addams, Shay. "The Wizards of Infocom." *Computer Games*. February 1984. pp. 34-37, 52.
- Anderson, Tim. Interview conducted by Stanley Hu, Hector Briceno, Wesley Chao, Andrew Glenn, Bruce Tsuchida, Ashwin Krishnamurthy. October 30, 2000.
- Anderson, Tim, and Stu Galley. "The History of Zork." *The New York Times*, vol. 4, nos. 1-3. Winter, Spring, and Summer 1985.
- Ardai, Charles. "Titans of the Computer Gaming World." *Computer Gaming World*. August/September 1987. pp. 38-39, 46-47
- Barol, Bill. "Zorked Again." *Newsweek*. December 23, 1985. page 70.
- Berez, Joel. Telephone interview conducted by Stanley Hu. November 20, 2000.
- Berez, Joel, Marc Blank, and David Lebling. "ZIP: Z-language Interpreter Program." (Infocom internal document)
- Berkowitz, Brian. E-mail interview conducted by Hector Briceno. December 1, 2000.
- Blank, Marc. Telephone interview conducted by Stanley Hu. December 6, 2000.
- Blank, Marc and Stu Galley. "How to Fit a Large Program Into a Small Machine. *Creative Computing*. July 1980. pp. 80-87.
- Brackett, John. Interview conducted by Stanley Hu, Ashwin Krishnamurthy, Bruce Tsuchida. December 2, 2000.
- Bulkeley, William M. "A Leading Producer of Computer Games Focuses Its Attention on Business Software." *The Wall Street Journal*. July 18, 1984. p. 29.
- Christensen, Clayton M. The Innovator's Dilemma. Harvard Business School Press. 1997.
- Crider, B. "The Limits of Friendliness." *PC World*. pp. 196-201.
- Cutler, Scott. E-mail interview conducted by Stanley Hu. November 29, 2000.
- Doherty, Paul. *Infocom Fact Sheet*. <ftp://ftp.gmd.de/if-archive/infocom/info/fact-sheet.txt>

- Dornbrook, Michael, et al. *The New York Times*. (Summer 1982 – Fall 1987)
- Dornbrook, Michael. Interview conducted by Stanley Hu, Wesley Chao, Andrew Glenn, and Bruce Tsuchida. November 1, 2000.
- Dyer, Richard. “Masters of the Game.” *The Boston Globe Magazine*. May 6, 1984.
- Egmond, Stephan van, et al. *rec.games.int-fiction Frequently Asked Questions*.
<http://bang.dhs.org/faq/1.html>
- Elmer-De Witt, Phillip. “Putting Fiction on a Floppy.” *Time*. December 5, 1983. p. 76.
- Galley, Stu. Interview conducted by Stanley Hu, Hector Briceno, Andrew Glenn, Bruce Tsuchida. November 8, 2000.
- Greenlee, Steven. “Where Are They Now?” *Computer Game Review*. April 1996. pp 82-88.
<http://www.csd.uwo.ca/Infocom/Articles/where.html>
- Horn, Dan. E-mail interview conducted by Stanley Hu. November 20, 2000.
- Horn, Dan. E-mail interview conducted by Andrew Glenn. December 11, 2000.
- Hochberg, Burt. “They Take the High-Tech Road to Adventure.” *Games*. August/September 1987. pp. 14-17, 52.
- Ilson, Richard. Telephone interview conducted by Stanley Hu. November 8, 2000.
- Jacobson, Barry. E-mail interview conducted by Stanley Hu. November 29, 2000.
- Kendall, Robert. “Cornerstone.” *PC Magazine*. April 26, 1988. pp. 159-161.
- Kuhn, Thomas. The Structure of Scientific Revolutions. University of Chicago Press. 1996.
- Lebling, David. Interview conducted by Stanley Hu, Wesley Chao, Andrew Glenn, and Ashwin Krishnamurthy. November 5, 2000.
- Lebling, David. “Zork and the Future of Computerized Fantasy Simulations.” *Byte*. December 1980. pp. 172-182.
- Lebling, David, et al. “Zork: A Computerized Fantasy Simulation Game.” *IEEE Computer*. vol. 12, no. 4, April 1979. pp 51-59.
- Leichtman, Kerry. “Accessibility was key to Cornerstone’s construction.” *PC Week*. December 10, 1985. pp. 87-88

Meretzky, Steve. Interview conducted by Stanley Hu and Hector Briceno. November 20, 2000.

Meretzky, Steve. *Infocom's 20th Anniversary CD-ROM*.

Morton, Mike. Interview conducted by Andrew Glenn. December 9, 2000.

Nelson, Graham, et al. "The Z-Machine Standards Document." Version 1.0.
<http://www.gnelson.demon.co.uk/zspec/>

Reeve, Chris. Telephone interview conducted by Stanley Hu. November 19, 2000.

Rosenberg, Ronald. "Computer-games Firm Moving to California." *The Boston Globe*. May 22, 1989. p. 8.

Sandberg-Diment, Erik. "The Executive Computer; A Flexible Database for Business." *The New York Times*. May 5, 1985. Section 3, p. 13, col. 1.

Sandberg-Diment, Erik. "Personal Computers; New Data Base Software is Not Hard to Master." (dBASE II review) *The New York Times*. November 15, 1983. Section C, p. 5, col. 1.

Sinclair, David and Julian Linder. "The Infocom Gallery."
<http://www.crosswinds.net/~dsinclair/>

Suplee, Curt. "Through the Zorking Glass: Home Computer Games to Plot Your Own Adventure". *The Washington Post*. December 22, 1983. Section 1.

Taubes, Gary. "Games With a Real Byte to Them." *Discover*. March 1984.

Vezza, Albert. Interview conducted by Stanley Hu, Andrew Glenn, Wesley Chao, Hector Briceno, Bruce Tsuchida. November 27, 2000.

Weissberg, Richard. E-mail interview conducted by Stanley Hu. November 29, 2000.

Wilson, Johnny. "A History of Computer Games." *Computer Gaming World*. November 1991.
<http://speedracer.nmsu.edu/~jholder/if/ch3-if.html>

"Call Yourself Ishmael Micros Get the Literary Itch." *Softline*. September-October 1983. vol 3.

"Learning ZIL." (Infocom internal document)

Zork source code. (1982)

Infocom Board of Directors Meeting Minutes. (1981-1985)

Infocom Annual Report. (1983, 1984)