



Virtual Reality: then and now

I first became interested in virtual reality while I was an undergraduate working in an Anthropology independent study project.

That's where I first became interested in online games, online identity, online performance, online identity and other areas of what the internet was at the time.

Over time I've picked a more nuanced approach to these areas of interest and picked others along the way. This essay (or series of essays) seek to put down and, where possible, tie together these areas of interest in a way that makes sense and can further the research I want to do.

Setting the context: Historical record

Current MMOs and fantasy games trace their lineage directly or indirectly from the earliest text-based games created by Hackers and MIT students in the 1970s. That's where we will start our historical review.

Most computing work outside research centers like SRI and academic settings was limited to mainframe computers and terminal access and assembly or precursors to the C programming languages.

While the first communication between ARPANet hosts (UCLA and Stanford) was in October 1969, the network, as we know it today, was a long way away.

There was no commercial internet, at least not as we know it today; all access to the ARPANet was through terminals at Academic institutions.

Outside the ARPANet, most contact was through [Bulletin Board Systems](#) with limited dial-up speeds and number of simultaneous connections dependent on the number of modems available, each requiring a dedicated phone line.

Text-based games

In the 1970s and 80s computers as we know them today did not exist. There was no concept of dialup providers and the BBSs of the time provided limited functionality.

It is no surprise that the earliest games originated in academic institutions and were limited to the terminals available at the time.

The vignettes in the following sections are meant as snapshots and not as exhaustive stories about the games. The intent is to create a timeline tying together the earliest text-based game to where we are today and where we may be going.

Adventure

The earliest reference to a text-based computer game is [Colossal Cave Adventure](#) or

Adventure for short.

The game was designed by Will Crowther for the PDP-10 mainframe computer and expanded upon in 1977 by Don Woods. In the game, the player explores a cave system rumored to be filled with treasure and gold. The game is composed of multiple locations; The player moves between these locations and interacts with objects in them by typing short commands which are interpreted by the game's natural language input system.

The program acts as a narrator, describing the player's location and the results of the player's attempted actions. It is the first well-known example of interactive fiction, as well as the first well-known adventure game, for which it was also the namesake.



Figure 1: Colossal Cave Adventure on VT100 terminal - [By Autopilot](#)

Colossal Cave Adventure was one of the first teletype games and was massively popular in the computer community of the late 1970s, with numerous ports and modified versions being created based on Woods' source code. Through its successors, it also influenced the creation of MUDs and the computer role-playing game genres. In 2019 was inducted into the World Video Game Hall of Fame by the International Center for the History of Electronic Games.

```
.run adven

WELCOME TO ADVENTURE!!  WOULD YOU LIKE INSTRUCTIONS?

yes

SOMEWHERE NEARBY IS COLOSSAL CAVE, WHERE OTHERS HAVE FOUND FORTUNES IN
TREASURE AND GOLD, THOUGH IT IS RUMORED THAT SOME WHO ENTER ARE NEVER
SEEN AGAIN.  MAGIC IS SAID TO WORK IN THE CAVE.  I WILL BE YOUR EYES
AND HANDS.  DIRECT ME WITH COMMANDS OF 1 OR 2 WORDS.  I SHOULD WARN
YOU THAT I LOOK AT ONLY THE FIRST FIVE LETTERS OF EACH WORD, SO YOU'LL
HAVE TO ENTER "NORTHEAST" AS "NE" TO DISTINGUISH IT FROM "NORTH".
(SHOULD YOU GET STUCK, TYPE "HELP" FOR SOME GENERAL HINTS.  FOR INFOR-
MATION ON HOW TO END YOUR ADVENTURE, ETC., TYPE "INFO".)

- - -

THIS PROGRAM WAS ORIGINALLY DEVELOPED BY WILLIE CROWTHER.  MOST OF THE
FEATURES OF THE CURRENT PROGRAM WERE ADDED BY DON WOODS (DON @ SU-AI).
CONTACT DON IF YOU HAVE ANY QUESTIONS, COMMENTS, ETC.

YOU ARE STANDING AT THE END OF A ROAD BEFORE A SMALL BRICK BUILDING.
AROUND YOU IS A FOREST.  A SMALL STREAM FLOWS OUT OF THE BUILDING AND
DOWN A GULLY.

east

YOU ARE INSIDE A BUILDING, A WELL HOUSE FOR A LARGE SPRING.

THERE ARE SOME KEYS ON THE GROUND HERE.

THERE IS A SHINY BRASS LAMP NEARBY.

THERE IS FOOD HERE.
```

Figure 2: Adventure Opening Screen

Zork

Zork was first released in 1977 by developers Tim Anderson, Marc Blank, Bruce Daniels, and Dave Lebling for the PDP-10 mainframe computer.

The original developers and other people affiliated with MIT formed Infocom in 1979 and expanded the game into three titles which were released commercially for a variety of personal computers beginning in 1980.

The structure and play style of Zork is similar to Adventure and both programs

act as the narrator, describing the player's location and the results of the player's attempted actions.

Blank and Joel Berez created a way to run a smaller portion of Zork on a range of microcomputers, letting them commercialize the game as Infocom's first products. company published all three episodes beginning in late 1981.

Multiplayer Games

Both Adventure and Zork are single-player games. The next logical step is to make the games multiplayer.

MUD1/Essex MUD, the first of many

In 1978 Roy Trubshaw, a student at the University of Essex in the UK, started working on a multi-user adventure game in the MACRO-10 assembly language for a DEC PDP-10. He named the game MUD (Multi-User Dungeon), in tribute to the Dungeon variant of Zork, which Trubshaw had greatly enjoyed playing. Trubshaw converted MUD to BCPL (the predecessor of C), before handing over development to Richard Bartle, a fellow student at the University of Essex, in 1980.

The game revolved around gaining points till one achieved the Wizard rank, giving the character immortality and special powers over mortals.

MUD1 or Essex MUD ran on the University of Essex network, and became more widely accessible when a guest account was set up that allowed users on the [JANET](#) academic computer network to connect on weekends and between the hours of 2 AM and 8 AM on weekdays. It became the first Internet multiplayer online role-playing game in 1980, when the university connected its internal network to ARPANet.

MUD1 game was closed down in late 1987, reportedly under pressure from CompuServe, to whom Richard Bartle had licensed the game. This left MIST, a derivative of MUD1 with similar gameplay, as the only remaining MUD running on the University of Essex network. MIST ran until the machine that hosted it, a PDP-10, was retired in early 1991.

1985 saw the birth of a number of projects inspired by the original MUD, both free and commercial.

We'll look at four flavors of MUD descendants

DikuMud

The original DikuMud, to separate it from all the derivative games using the same code, was heavily influenced by earlier MUD games.

It was written in 1990 and 1991 by Sebastian Hammer, Tom Madsen, Katja Nyboe, Michael Seifert, and Hans Henrik Stærfeldt at DIKU (Datalogisk Institut Københavns Universitet) — the department of computer science at the University of Copenhagen in Copenhagen, Denmark.

The games using DikuMud's codebase are mostly "hack and slash" games, where the players assume a class and face monsters in a hard-coded virtual world.

TinyMUD

TinyMUD is a descendant of Essex MUD and created some of the concepts we still see indirectly in our modern computer games.

TinyMUD was created in 1989 by James Aspnes. From the beginning it sought to distance his game from the hack and slash MUDs in the Diku tradition and claimed that the "D" in TinyMUD stood for dimension or domain rather than dungeon.

TinyMUD was one of the first games that allowed players to modify and expand the world, by adding new objects to the database for all players to interact with.

This is an example of available commands from "Three's Unabridged Dictionary of Commands" by Chrysalis (1990):

```
@chown <object>=<player>. Changes the ownership of an object.
@create <name> [=<cost>]. Creates a thing with the specified
name.
@describe <object> [=<description>].
@dig <name>. Creates a new room
@fail <object> [=<message>].
@find [name]. Displays the name and number ... whose name
matches <name>.
@link <object>=<number>; @link <object>=here; @link
<dir>|<room>=home.
@lock <object>=<key>.
```



```
@name <object>=<new name> [<password>]. Changes the name of
<object>.
@ofail <object> [=<message>].
@open <dir>[;<other dir>]* [=<number>].
@osuccess <object> [=<message>].
@set <object>=<flag>; @set <object>=!<flag>. Sets (or, with
'!', unsets)
@success <object> [=<message>].
@unlink <dir>; @unlink here.
@unlock <object>. Removes the lock on <object>.
```

TinyMUD is important, not just because of its own popularity and the concepts it pioneered, but also because of the importance of their successors and the impact that it had on later graphical games.

TinyMUSH

TinyMUSH is a derivative of TinyMUD, just like DikuMUD, but with a different emphasis.

As far as I can trace, the original TinyMUSH was released in 1990 (see [The MUDline](#) for more information).

Most (if not all) the current flavor of text-based virtual realities are based on TinyMUSH to some degree.

[PennMUSH](#) has been around since the early 1990s. According to the PennMUSH README:

PennMUSH is a TinyMUD derivative, and one of the branches along the MUSH line. "Vanilla" TinyMUSH, which added the "v" registers and functions to the basic TinyMUD building commands, was written by Larry Foard. The code was later expanded by Jin, of MicroMUSH. In January of 1991, MicroMUSH changed its name to MicroMUSE, and the code there continued to develop under the MUSE name. At that same point in time, Moonchilde took the last public release of that code and began a series of improvements and extensions.

That code was released as PernMUSH, named for the

MUSH that Moonchilde was running. The last released version of that code was version 1.15, at the end of November 1991. PernMUSH itself had switched over to TinyMUSH 2.0, which Moonchilde had co-written with Glenn Crocker (Wizard of TinyCWRU); there was no longer a reason for Moonchilde to maintain this code.

In January of 1992, Amberyl began working on the PernMUSH 1.15 code release, for TinyKrynn. She took over the code, which no one was supporting, and is continuing to work on extending this code, as well as improving its compatibility with TinyMUSH 2.0.

All games running TinyMUSH and derivative servers are social, role-playing oriented environments.

For the longest time, MUSHes and the PennMUSH flavor in particular were synonymous with mudding and playing online. It wasn't until much later that I discovered other types of games, other servers and other activities you could do online.

MOO

MOO stands for MUD Object Oriented. It's another descendant from TinyMUD.

Unlike TinyMUSH and its derivatives, MOOs are used primarily for social and research-related projects.

LambdaMOO

The first MOO I want to discuss is LambdaMOO; the term refers both to the code running the game, an evolution of the original MOO code, and the community built using the LambdaMOO software.

Many early researches and research topics in online communities and online issues originated in LambdaMOO.

The LambdaMOO software was created by Pavel Curtis in 1990 at Xerox PARC.

One of the most interesting and impactful issues that happened in LambdaMOO is [Julian Dibbell's A Rape in Cyberspace](#), later expanded into the book [My Tiny Life: Crime and Passion in a Virtual World](#). In the story, the author narrates

the real life consequences of virtual actions and the way that these virtual actions may impact people's lives in unexpected ways.

MediaMOO and MOOSECrossing

MediaMOO and MOOSECrossing were two MOO-based projects created by [Amy Bruckman](#) while a doctoral student at MIT's Media Lab.

[MediaMOO](#) wasn't just a social environment. It was targeted to media researchers and required an application to become a member.

MOOSECrossing was designed for school children to work in collaborative environments. This project was the main focus of Amy Bruckman's [PhD Dissertation](#) at MIT's Media Lab.

All three of these examples show the social and educational potential of these text-based game systems.

Graphical games and tools

There has also been a lot of work done in graphical virtual worlds that lead to the current crop of Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR) experiences that we see today and perhaps some experiences that we don't see today because they are proprietary experiences for specific companies or industry verticals.

SIMNET

One of the first multiuser networked environments available was SIMNET. According to Duncan C. Miller's *SIMNET and Beyond: A History of the Development of Distributed Simulation*:

SIMNET stands for SIMulator NETworking. Initiated in 1983, it was the first "shared virtual reality" distributed simulation system, which continues to have significant influences.

SIMNET pioneered the protocols necessary for a shared networked environment where the different network participants can interact with the same environment in real time, independent from their location.

In addition of the protocols, some of the researchers moved on to the gaming industry. Some of these companies founded from SIMNET research became foundational to the gaming industry as we know it. Sony Computer Entertainment Of America acquired RTIME, inc, a company founded by SIMNET researchers, and used RTIME's assets as the basis of their online gaming network.

Lucasfilm's Habitat



Figure 3: Lucasfilm's Habitat

[Lucasfilm Habitat](#) was an earlier example of consumer-grade graphical virtual communities.

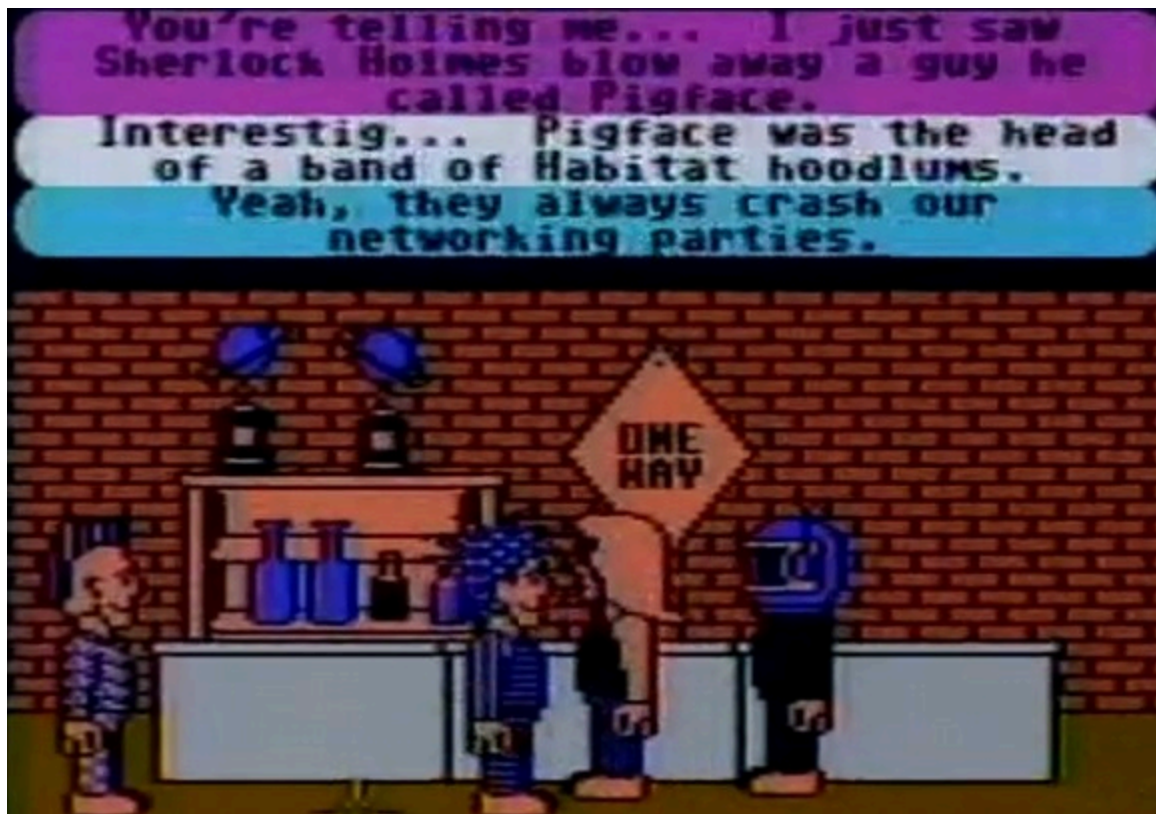


Figure 4: Example of Avatar player interaction

It was created by Lucas Arts, now known as [Lucasfilm Games](#), for [Quantum Link](#) an online service for [Commodore 64](#) and [Commodore 128](#) (which later became [America Online](#)) with a first, beta, release in north America in 1986.

A stripped down version of Habitat was released as Club Caribe both in North America in in 1989.

The graphics are quaint by modern standards but we can't forget the hardware that the world ran in.

LucasArt licensed the game to Fujitsu who released Club Caribe in Japan in 1990.

With the limited graphical resources in the front-end and backend Habitat still demonstrated the feasibility of multiuser online games. Modern Massively Multiplayer Online (MMO) games take advantage of better hardware and the lessons that we've learned since Habitat and text-based multi user games.

Single Player Games

We will take a slight detour into some graphical computer games that are the basis for current MMOs and we'll also see how we got from single player to MMO Role

Playing Games (RPGs).

The [Ultima Game Series](#) and [Ultima Online](#) show one progression towards MMOs

[Warcraft](#) and [World of Warcraft](#)

Multiuser Games and LAN Parties

MMOs

Second Life

What's Next: AR, VR, MR and XR

Virtual reality is not new

VRML and X3D

<https://en.wikipedia.org/wiki/VRML>

<https://en.wikipedia.org/wiki/X3D>

It's the hardware, stupid, or is it?

Oculus Rift

Microsoft Hololens

Google Glass: How not to do it

WebVR: the browser gets involved

WebXR and beyond

The more things change...

Research and researcher evolution

How has ethnographical work changed?

Participant observation online: challenges ahead

Ethical considerations

Mixing the real and the virtual

Meeting your virtual friends IRL

Gender presentation and gender identity

Transmedia storytelling

Participatory Culture

Game studies

Computers as cultural artifacts

Identity

Gender presentation and gender dynamics

Real impact of virtual events

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Games and Game Engines

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- [Zork](#)
- [TinyMUD](#)
- [TinyMUSH](#)
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- [Warcraft](#)
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