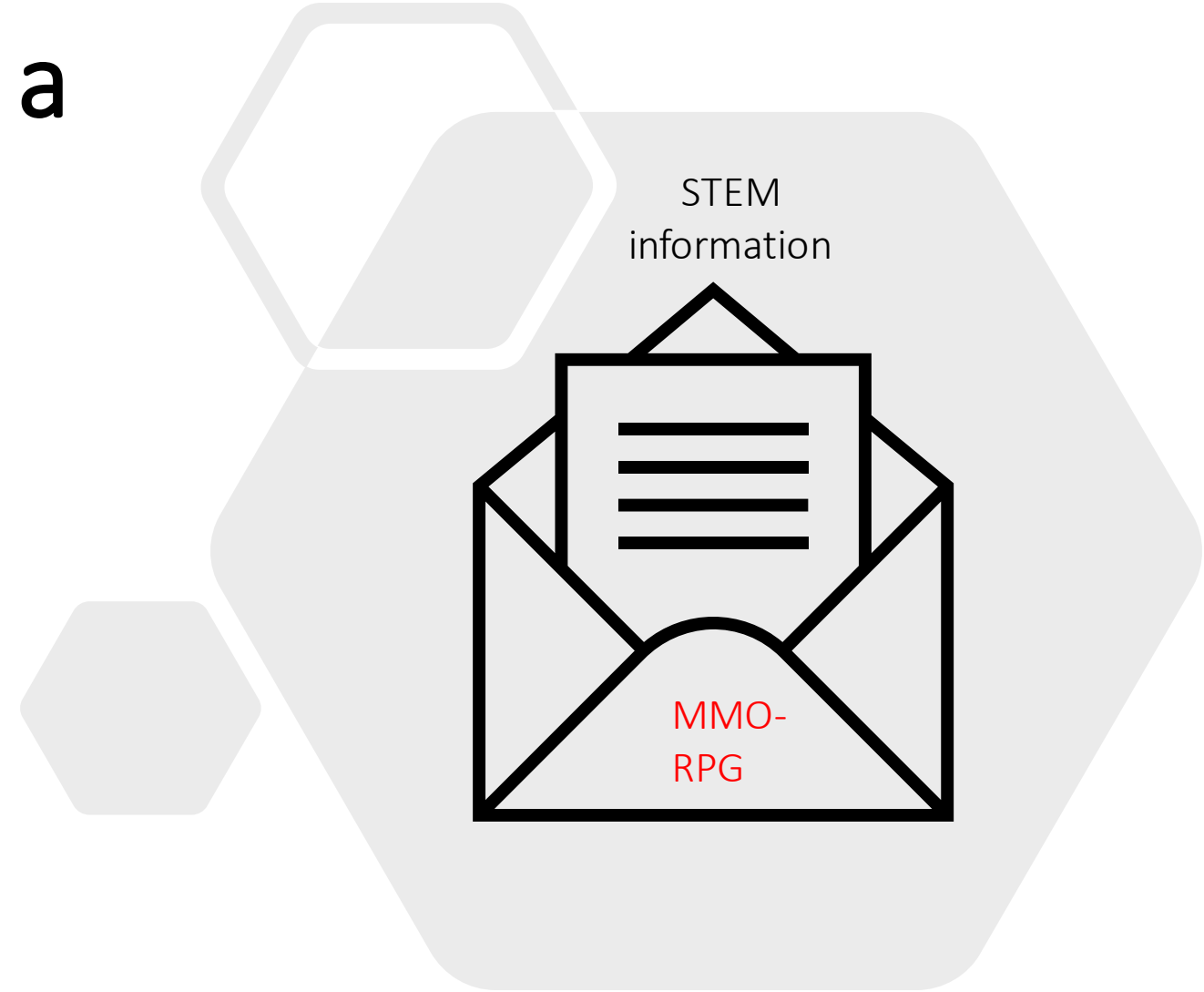
Teaching Fluid Dynamics through a narratively driven concept review MMO-RPG

Presenter & Project Lead: Tahzinul Islam

The team (York University): Moshi Wei, Prof. Cooper, Prof. Amirfazli

$15,000 CAD funded project



The project and team

Tahzinul Islam

- 1st year PhD, Mechanical Engineering (Heat & Mass Transfer)

Moshi Wei

- 3rd year PhD, Software Engineering (Artificial Intelligence)

Prof. Alidad Amirfazli

- Course director for fluid dynamics
- Expertise in droplet physics (heat & mass transfer)

Prof. Thomas Cooper for ‘oral examination’ strategy for learning

- Expertise in Solar Energy, Radiation heat transfer and Engineering Education (MIT & ETH)

Contents

I. The gap in mechanical engineering education (Introduction)

II. Serious Games as a proven method of motivation in learning (literature)

III. MMO-RPGs (Massively Multiplayer Online – Role-playing game)

IV. Game DEMO

V. Discussion – does it work? (pedagogical framework, fun, knowledge tree/tech tree/story tree

VI. Conclusion

The gap in mechanical engineering education

- **The big 3 problems**

1. Knowledge (cognitive)
   - Retention a problem
   - Even basic terminology such as ‘dynamic pressure’ are completely forgotten
   - Technical skills in applying equations a problem, BUT plug-and-chuck is common
   - Information overload (textbooks, slides, quizlet, assignments, quizzes, other activities and so on)
   - Risk of plug & chuck (short term memory)
2. Skills (psychomotor)
   - Almost ALWAYS taught in labs
   - Usually funding will deteriorate the quality of psychomotor training
   - Personal anecdote: 1 prototype during my entire (not even capstone) during my final year in UPM
   - York University spends much more funding on student projects and encourages using the **makerspace** to prototype designs for all courses
3. Technology (affective)
   - Attitude towards technology (sustainability, cradle to grave designs, etc.)
   - Real-world technologists who use the technology being learned in class (why do we care?)
   - Meaningful memories (teacher in solid mechanics or fluid dynamics who made a specific joke, or specific things happened during class, anecdote of cheaters during fluids and question), traditionally done via office hours (but with 100+ students?)

Serious Game

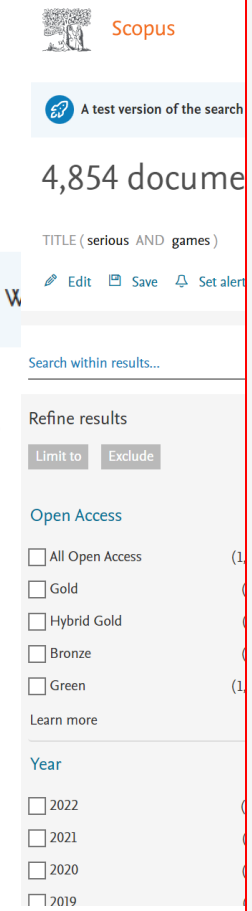
Scopus

A test version of the search results page is available. W

14,413 document results

TITLE-ABS-KEY (serious AND games)

Edit Save Set alert



5 document results

(TITLE (multiplayer) AND TITLE (engineering) AND TITLE (game))

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Branch, P. (1)
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Claypool, M. (1)
Hall, R.J. (1)
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	Document title	Authors	Year	Source	Cited by
1	Rapidly Conveying a Project-Based Engineering Experience for Remote Learning: Successes and Limitations of Using Experimental Kits and a Multiplayer Online Game	Wu, L.L., Zhu, E., Callaghan, C., (...) Lewirn, A., Reichensmeyer, D.	2020	Advances in Engineering Education 8(4), pp. 1-9	5
2	Software engineering challenges of multiplayer outdoor smart phone games (Book Chapter)	Hall, R.J.	2015	*Computer Games and Software Engineering* pp. 183-198	0
3	A multiplayer game for teaching software engineering practices	Xiao, D., Miller, R.C.	2014	L@S 2014 - Proceedings of the 1st ACM Conference on Learning at Scale pp. 159-160	3
4	Multiplayer on-line role playing game style grading in a project based software engineering technology capstone sequence	Long, J.N., Young, L.S.	2011	ASEE Annual Conference and Exposition, Conference Proceedings	5
5	Networking and Online Games: Understanding and Engineering Multiplayer Internet Games (Book)	Armitage, G., Claypool, M., Branch, P.	2006	*Networking and Online Games: Understanding and Engineering Multiplayer Internet Games* pp. 1-218	69

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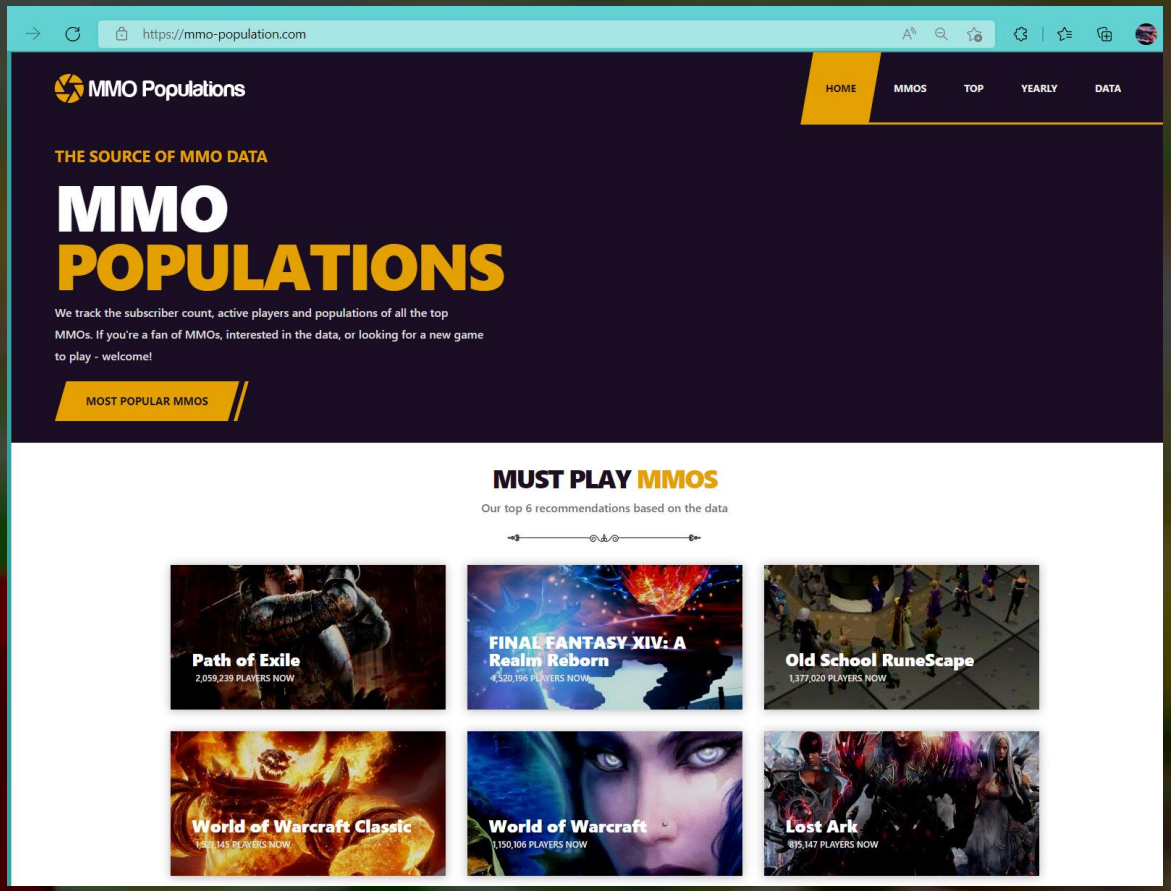
Massively Multiplayer Online Role-playing game

MMO-RPG

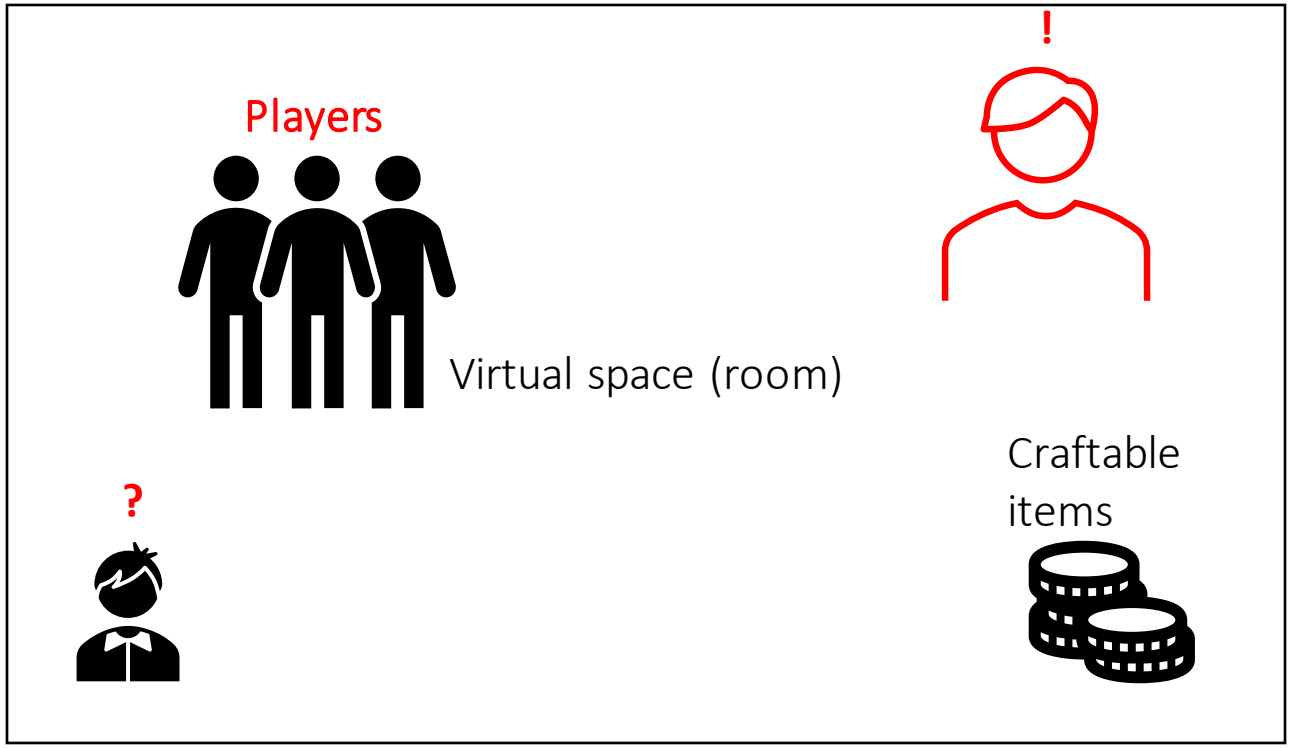


- A formula that works!
- Massive quests, items, crafting and Non-playable characters (NPCs)
- 3 broad game mechanics in MMO-RPGs (Skills, Items, Quests)

MMO-RPG

- Idea is simple, put a bunch of players in a virtual space (room for example) and fill this space with meaningful NPCs and SIQ
- SIQ = Skills, Items and Quests

- Virtual hangout spaces:
  - Think of traditional Zoom meetings
  - Translation of Zoom in 2D to a more immersive 3D format (modern computing enables this!)
  - Facebook's Metaverse will capitalize on this in the coming decades



Springer Link

Research Article | Open Access | Published: 08 February 2018

What is a virtual world? Definition and classification

Carina Girvan

Educational Technology Research and Development **66**, 1087–1100 (2018) | Cite this article

24k Accesses | **55** Citations | **7** Altmetric | Metrics

Abstract

In 2008, articles by Bell and Schroeder provided an initial platform from which to develop a coherent definition of the term 'virtual worlds'. Yet over the past ten years, there has been little development of the term. Instead there is confusion in the literature, with the introduction of new terms which are at times used to classify the type of virtual world and at others are used synonymously with the term. At the same time there has been a resurgence of interest in the potential of virtual reality which further muddies the conceptual waters. While the lack of a clear and common understanding of a term is not uncommon, there are implications for researchers and practitioners. To address these issues, this paper presents a new framework for the definition of virtual worlds, arguing what it is for a world to be virtual, the user experience that is a necessary part of this and the technical features which afford this. For the first time the relationships between commonly confused terms and technologies are identified to provide a much needed conceptual clarity for researchers and educators.

Introduction

Thus far, definitions of virtual worlds lack an essential conceptualisation of what a virtual world is. The propensity towards a techno-centric definition has its advantages as it allows for a myriad of user experiences, however it results in confusion between technologies with similar technical features, most likely because a virtual world, much like a smart phone, relies on a combination of different technologies. For example, it is unclear how Bell's (2008) definition of a virtual world could not as easily be applied to a MMORPG, whilst at the same

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Contents lists available at SciVerse ScienceDirect

Computers & Education

journal homepage: www.elsevier.com/locate/compedu

A systematic literature review of empirical evidence on computer games and serious games

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Serious games
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Engagement

ABSTRACT

This paper examines the literature on computer games and serious games in regard to the potential positive impacts of gaming on users aged 14 years or above, especially with respect to learning, skill enhancement and engagement. Search terms identified 129 papers reporting empirical evidence about the impacts and outcomes of computer games and serious games with respect to learning and engagement and a multidimensional approach to categorizing games was developed. The findings revealed that playing computer games is linked to a range of perceptual, cognitive, behavioural, affective and motivational impacts and outcomes. The most frequently occurring outcomes and impacts were knowledge acquisition/content understanding and affective and motivational outcomes. The range of indicators and measures used in the included papers are discussed, together with methodological limitations and recommendations for further work in this area.

Paper 1

Research Review

Engineers at Play: Games as Teaching Tools for Undergraduate Engineering Students

Cheryl A. Bodnar,[a] Daniel Anastasio,[b] Joshua A. Enszer,[c] and Daniel D. Burkey[d]

[a]Rowan University, [b]Rose-Hulman Institute of Technology, [c]University of Delaware, [d]University of Connecticut

Abstract

Background Many students may not respond strongly to instruction that they do not perceive as engaging. One pedagogical approach to help engage students involves the use of games. Educational games can provide students with a motivating and stimulating environment while providing them with immediate feedback to promote learning.

Purpose This systematic review examines research focused on the implementation of games to teach undergraduate engineering students; it summarizes prevailing features and cites examples from a variety of engineering disciplines.

Scope/Method The systematic review was conducted through a detailed search of Science Direct journals and the Scopus, Web of Science, Compendex/Inspec, and ERIC Education Research Abstract databases using terms pertinent to games in engineering education. A total of 191 papers was included after application of the inclusion/exclusion criteria. After screening those to determine if assessment of student learning outcomes was performed, 62 papers were found suitable for more detailed analysis.

Conclusions Research on the implementation of games in undergraduate engineering classrooms has shown that, despite diverse forms of assessment applied, there is a general trend that both student learning and attitudes are improved by game-based activities. However, since only a relatively small subset of the literature demonstrates a systematic, validated approach in assessment, significant opportunities remain for future research.

Keywords games; undergraduate; student experience; systematic review; gamification

Paper 2

Virtual Laboratories in Engineering Education: The Simulation Lab and Remote Lab

B. BALAMURALITHARA, P. C. WOODS

Multimedia University, 63100 Cyberjaya, Malaysia

Received 9 April 2007; accepted 29 August 2007

ABSTRACT: Computing and communication technology has had a significant impact on the engineering education system. This technology has improved online and collaborative learning. Besides that, it improves the students learning experiences. One of the distinguishing elements of engineering education is the laboratory requirement. In this paper, we discuss the current trends and key issues in virtual laboratories-simulation environment laboratories and remote laboratories via the Internet. © 2008 Wiley Periodicals, Inc. Comput Appl Eng Educ 17: 108–118, 2009; Published online in Wiley InterScience (www.interscience.wiley.com); DOI 10.1002/cae.20186

Keywords: simulation lab; remote lab; engineering education; Internet

Paper 3

Game in view:
RuneScape (a successful MMO, 1999-present)


75/75
73/73
1/1
61/61
31/31
31/31
69/69
25/25
9/9
50/50
25/25
5/5
0/70
29/29
22/22
75/75
1/1
35/35
1/1
41/41
1/1
1/1
1/1
Total level: 732


Old School RuneScape
The Bank of Gielinor
Rearrange mode:
Swap
Insert
Withdraw as:
Item
Note
Quantity:
1
5
10
X
All
10hp4lufu: Handmade Pures & Mains! Gpstall®C,0M
10hp4lufu: Buy & $ell for Crypto/Paypal/Cashapp+more! Gpstall®C,0M
Kanuttlovell:
10hp4lufu: 100% Risk free anti-ban Buy&Sell! Gpstall®C,0M
10hp4lufu: Over 1250+ reliable reviews! Gpstall®C,0M
10hp4lufu: We deliver you gold 'Safely' - ask us 'How'? Gpstall®C,0M
10hp4lufu: 100% Risk free anti-ban Buy&Sell! Gpstall®C,0M
10hp4lufu: 100% Risk free anti-ban Buy&Sell! Gpstall®C,0M
Von Escellus: *
All
Game
Public
Private
Channel
Clan
Trade
Report

Animal Magnetism - OSRS Wiki

https://oldschool.runescape.wiki/w/Animal_Magnetism

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Animal Magnetism is a quest during which the player helps Ava in Draynor Manor. The quest is required to access Ava's devices, robust ranged cape slot items.

Contents [hide]

Animal Magnetism (#116)

Released	12 December 2006 (Update)
Members	Yes
Quest series	None
Official difficulty	Intermediate
Lead developer(s)	Matt H

Details [edit | edit source]

Start point	Speak to Ava in Draynor Manor.
Official difficulty	Intermediate
Description	Draynor Manor has a new resident and, adventurers rejoice, she is a damsel in distress. Far from being Sleeping Beauty, she finds the Manor's beds not to her liking and is suffering from insomniac nights. If you fancy yourself able to aid Ava in her search for a good night's sleep, who knows what the budding scientist will produce as a reward?
Official length	Medium

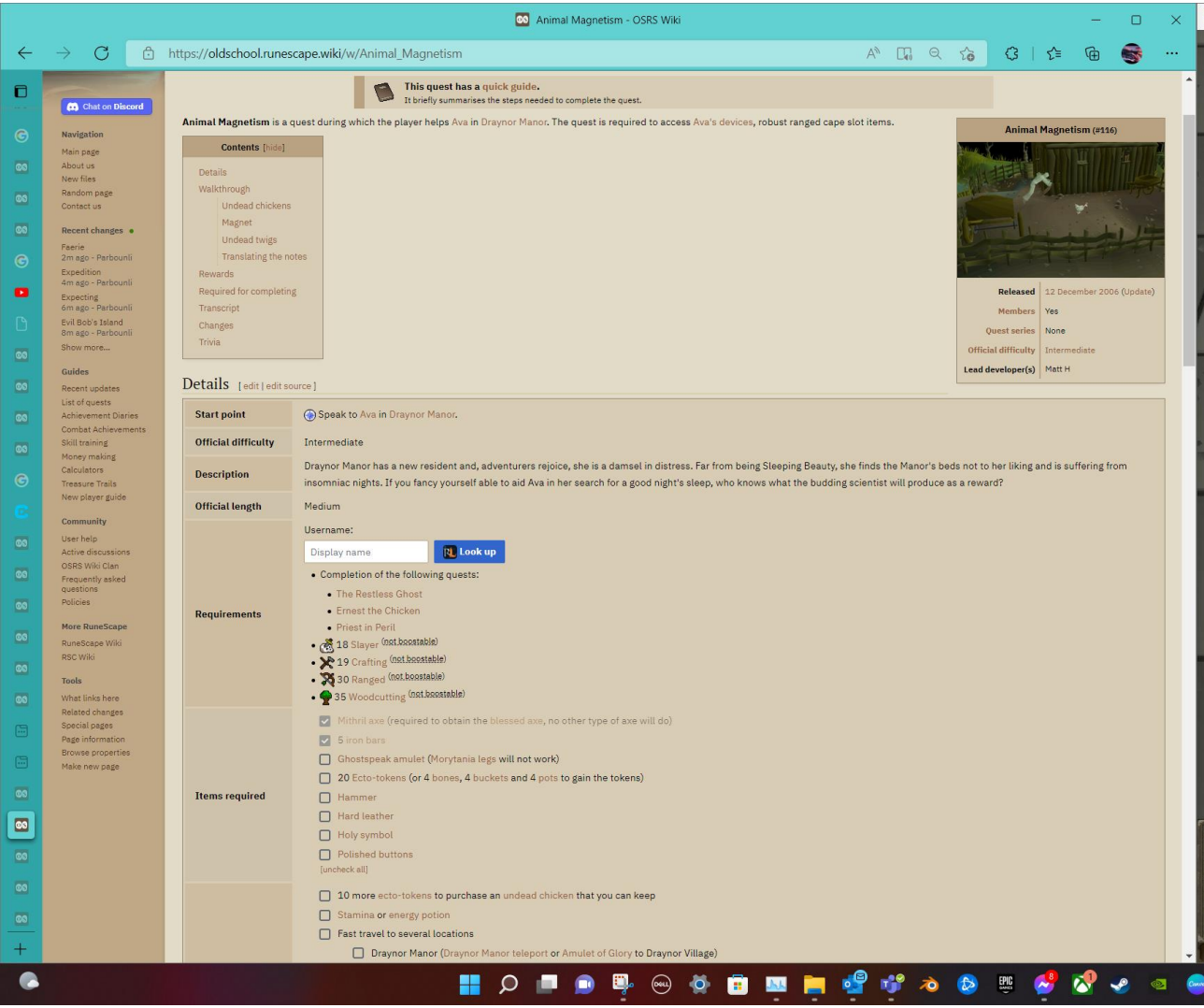
Requirements	Username: Display name Look up
	• Completion of the following quests:
	  • The Restless Ghost
	  • Ernest the Chicken
	  • Priest in Peril
	• 18 Slayer (not boostable)
	• 19 Crafting (not boostable)
	• 30 Ranged (not boostable)
	• 35 Woodcutting (not boostable)

Items required	☐ Mithril axe (required to obtain the blessed axe, no other type of axe will do) ☐ 5 iron bars ☐ Ghostspeak amulet (Morytania legs will not work) ☐ 20 Ecto-tokens (or 4 bones, 4 buckets and 4 pots to gain the tokens) ☐ Hammer ☐ Hard leather ☐ Holy symbol ☐ Polished buttons


Old School RuneScape
5,418,367
History
Grand Exchange: Set up offer
Buy offer
Choose an item...
Click the icon on the left to search for items.
Quantity:
Price per item:
+1
+10
+100
+1k

What would you like to buy? iron*
Iron arrow(p+)
Iron arrow(p++)
Iron arrowtips
Iron axe
Iron bar
Iron battleaxe
Iron bolts
Iron bolts (p)
Iron bolts (p+)
Iron bolts (p++)
Iron bolts (unf)
Iron boots
All
Game On
Public On
Private On
Channel On
Clan On
Trade On
Report


History
Grand Exchange: Set up offer
Buy offer
Iron bar
It's a bar of iron.
211
Quantity:
1
Price per item:
211 coins
+1
+10
+100
+1k
211 coins
Confirm


Animal Magnetism - OSRS Wiki
https://oldschool.runescape.wiki/w/Animal_Magnetism
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New files
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Guides
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Tools
This quest has a quick guide.
It briefly summarises the steps needed to complete the quest.
Animal Magnetism is a quest during which the player helps Ava in Draynor Manor. The quest is required to access Ava's devices, robust ranged cape slot items.
Contents [hide]
Details
Walkthrough
Undead chickens
Magnet
Undead twigs
Translating the notes
Rewards
Required for completing
Transcript
Changes
Trivia
Animal Magnetism (#116)
Released 12 December 2006 (Update)
Members Yes
Quest series None
Official difficulty Intermediate
Lead developer(s) Matt H
Details [edit | edit source]
Start point
Speak to Ava in Draynor Manor.
Official difficulty
Intermediate
Description
Draynor Manor has a new resident and, adventurers rejoice, she is a damsel in distress. Far from being Sleeping Beauty, she finds the Manor's beds not to her liking and is suffering from insomniac nights. If you fancy yourself able to aid Ava in her search for a good night's sleep, who knows what the budding scientist will produce as a reward?
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Display name
Look up
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Ernest the Chicken
Priest in Peril
18 Slayer (not boostable)
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Mithril axe (required to obtain the blessed axe, no other type of axe will do)
5 iron bars
Ghostspeak amulet (Morytania legs will not work)
20 Ecto-tokens (or 4 bones, 4 buckets and 4 pots to gain the tokens)
Hammer
Hard leather
Holy symbol
Polished buttons
[uncheck all]
10 more ecto-tokens to purchase an undead chicken that you can keep
Stamina or energy potion
Fast travel to several locations
Draynor Manor (Draynor Manor teleport or Amulet of Glory to Draynor Village)


Old School RuneScape
Grand Exchange
History
Select an offer slot to set up or view an offer.
Collect
Sell
Ensouled hellhound head
4,271 coins
Empty
Buy
Hammer
69 coins
Buy
Hard leather
297 coins
Empty
Buy
Diamond dragon bolts (e)
2,054 coins
Empty
Sell
Iron mace
87 coins
Account Shop!
GAMExBCS: [High 50 DH] [100K Min - 150M Max [Try to win with High!]
Yuong Laray: We buy & sell Osrs for the best rates! Gpstall@C,0M
GAMExBCS: [Low 49 DL] [100K Min - 150M Max [Try to win with Low]
Yuong Laray: Safe, Anti-ban trades guaranteed! Ask us how! Gpstall@C,0M
GAMExBCS: Porzingis Jr Has Traded : 20M @ [13:58:18:A M]
Yuong Laray: Cryptos/Cashapp/Zelle/Paypal - Gpstall@C,0M
GAMExBCS: [Porzingis Jr Won 40M With a Roll of: (62)!] @ [13:58:23:A M]
Yuong Laray: Account Shop! Zerkers / Mains / Pures! Gpstall@C,0M
Von Escellus:
All
Game
Public
Private
Channel
Clan
Trade
Report

Ernest the Chicken - OSRS Wiki

https://oldschool.runescape.wiki/w/Ernest_the_Chicken

Rubber tube [edit | edit source]

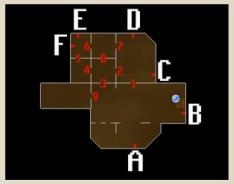
On the west side of the grounds look for a compost heap, north of the belladonna special patch near a patch of cabbages. Search the compost heap, requiring a spade and you will get a key. Go back into the manor through the front door then go through the door to the room behind the stairs containing the aggressive skeleton and take the rubber tube. If you are low level, the skeleton will attack you, so it is recommended to get the tube and leave as quickly as possible.

The rubber tube and the skeleton.

Oil can [edit | edit source]

Go to the western room on the 1st floor[US], search the bookcase on the western side on the wall to gain access to a secret room. Go down the ladder into the basement where there will be doors and levers around you. Follow the steps given below to obtain the oil can:

Note: It is **not** possible to use Telekinetic Grab to pick up the oil can.
Note: The levers can be reset by leaving the room and returning.



1. Pull Levers A and B down.
2. Enter Door 1.
3. Pull Lever D down; leave C up.
4. Enter Doors 2 and 3.
5. Pull Levers A and B up.
6. Enter Doors 3, 4 and 5.
7. Pull Levers E and F down.
8. Enter Doors 6 and 7.
9. Pull Lever C down.
10. Enter Doors 7 and 6.
11. Pull Lever E up.
12. Enter Doors 6, 8 and 3.
13. Go through Door 9 and grab the oil can.

Leave the basement and leave the secret room by pulling the lever on the eastern wall.

Finally, go back the top floor and talk to Professor Oddenstein. Give him the items, he will fix his machine which turns Ernest back into a human.

Congratulations, quest complete!

Rewards [edit | edit source]

- 4 Quest points
- 300 Coins
- Access to the Killerwatt Plane *(Members only)*

Required for completing [edit | edit source]

Completion of Ernest the Chicken is required for the following:

- Animal Magnetism

Transcript [edit | edit source]

Old School RuneScape

https://oldschool.runescape.wiki/w/Ernest_the_Chicken

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Walkthrough [edit | edit source]

Starting out [edit | edit source]

Talk to Veronica standing just outside the courtyard of the Draynor Manor. She wants you to find her fiancé, Ernest, who had gone to the manor an hour ago for directions and has not come back yet.

Enter the manor and climb up the staircase in the centre room. Then climb up the spiral stairs immediately west to find Professor Oddenstein. He will explain that Ernest was turned into a chicken when he was helping on an experiment with his 'pouletmorph' machine. However, to change him back, the professor needs parts that were stolen and hidden by the poltergeists in the manor.

You need to help him find a pressure gauge, a rubber tube, and an oil can in any order.

Pressure gauge [edit | edit source]

To get the pressure gauge, fish food and poison are required. Fish food is in a blue box, one is found on the 2nd floor[US] in the room directly south of the main staircase. Poison is in a green bottle, one is found on the 1st floor[US] in the small north-western room south of the kitchen.

Use the poison on the fish food to create poisoned fish food. Go to the south-eastern room, **grab the spade** next to the door leading outside, if you do not already have one to get the rubber tube. Leave the manor by exiting the door in the south-eastern room, go to the south-western corner of the manor grounds to the fountain. **Use** the poisoned fish food on the fountain to kill the piranhas then search the fountain to get the pressure gauge.

Rubber tube [edit | edit source]

On the west side of the grounds look for a compost heap, north of the belladonna special patch near a patch of cabbages. Search the compost heap, requiring a spade and you will get a key. Go back into the manor through the front door then go through the door to the room behind the stairs containing the aggressive skeleton and take the rubber tube. If you are low level, the skeleton will attack you, so it is recommended to get the tube and leave as quickly as possible.


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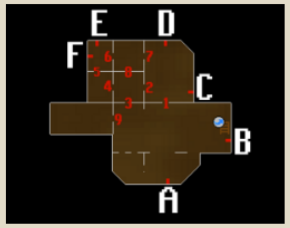

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5. Pull Levers A and B up.
6. Enter Doors 3, 4 and 5.
7. Pull Levers E and F down.
8. Enter Doors 6 and 7.
9. Pull Lever C down.
10. Enter Doors 7 and 6.
11. Pull Lever E up.
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13. Go through Door 9 and grab the oil can.

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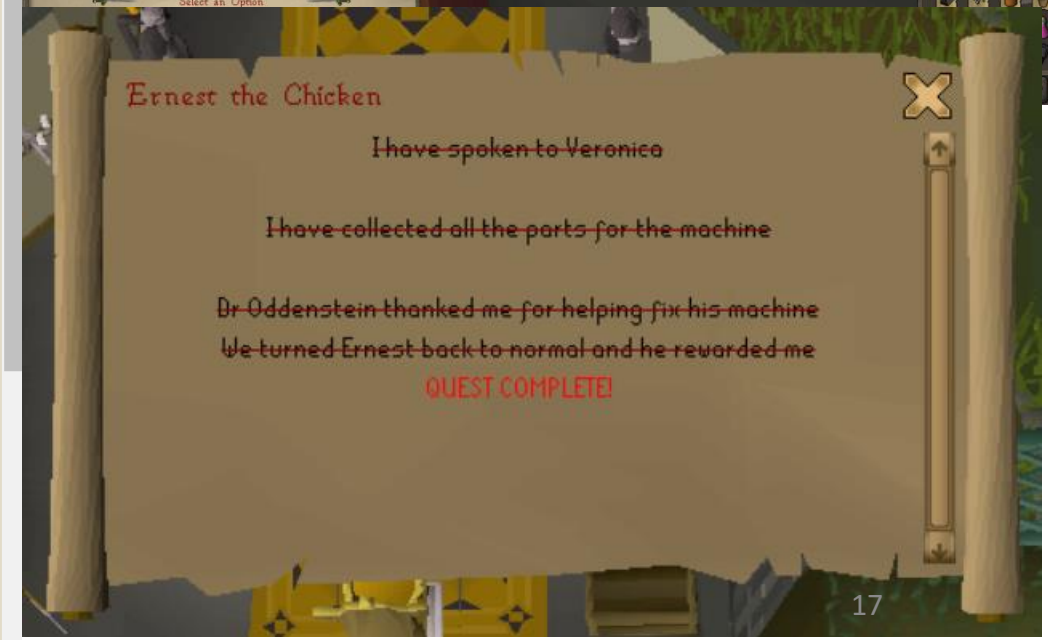
Rewards [edit | edit source]

- 4 Quest points




Old School RuneScape
Walk here
Key
Game features
Agility shortcut
Alter
Bank
Clan Hub
Combat Achievements
Death's Office
Distraction & Diversion
Dungeon
Hairdresser
Holiday event
House portal
Kourend task
Makeover Mage
Map link
Minigame
Poll booth
Quest
Raid
Task Master
Transportation
Tutors
Bank Tutor
Bond Tutor
Clue Tutor
Combat Tutor
Cooking Tutor
Crafting Tutor
Dungeoneering Tutor
Deadman Tutor
Fishing Tutor
Hunter Tutor
Ironman Tutor
Leagues Tutor
Lumbridge Guide
Mining Tutor
Prayer Tutor
Security Tutor
Smithing Tutor
Woodcutting Tutor
Training
Agility training
Anvil
Bird house site
'You are here'
Intra-map links
Map labels
Icon tooltips
Effects
Search
RuneScape Surface
Kingdom of Asgarnia
Kingdom of Kandarin
Kingdom of Misthalin
Morytania
Tirannwn
Karamja
Feldip Hills
Isle of Souls
Ape Atoll
Kharidian Desert
Mos Le'Harmless
GAMExBCS: [Slots [3S] 100K Min - 150M Max A Safe Bet! X3]
GAMExBCS: [Slots [3S] 100K Min - 150M Max A Safe Bet! X3]
MrCrispyNut: 1
GAMExBCS: [Slots [3S] 100K Min - 150M Max A Safe Bet! X3]
GAMExBCS: [Craps [IC* [* 100K Min - 150M Max You Play Safe!]
Frost ASH1: fårhåååån has cashed in: 7M @ 14:00:30
Frost ASH1: fårhåååån has Won 14M with a Roll of (67)
You've started a new quest: The Restless Ghost
Von Escellus: *
All
Game
Public
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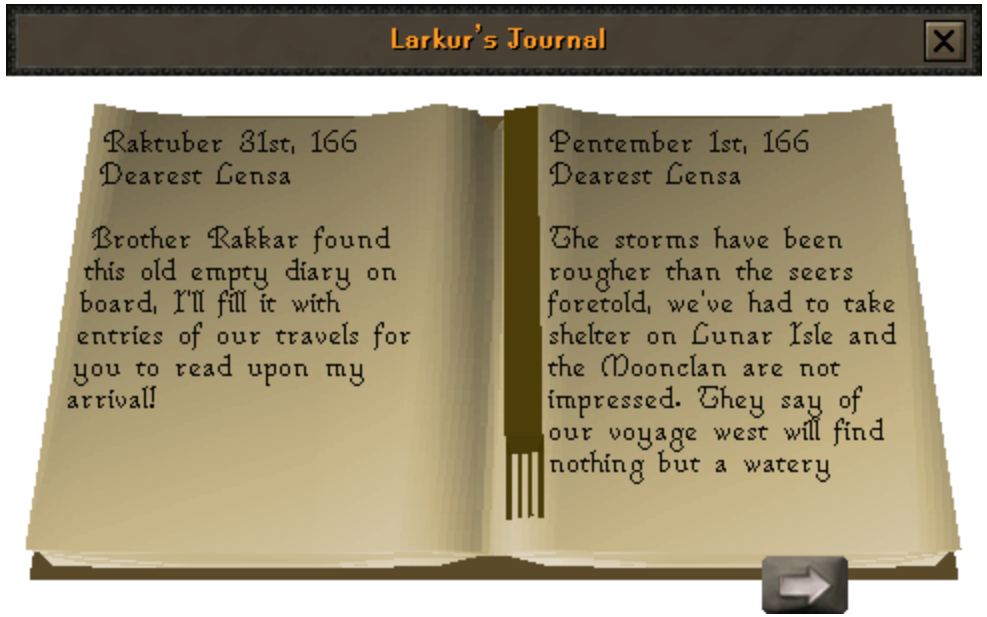
9/10/2022

- Thousands of in-game books on the story, lore and quests
- Players read through, internalize and live in this fantastical world painted by in-game items and books



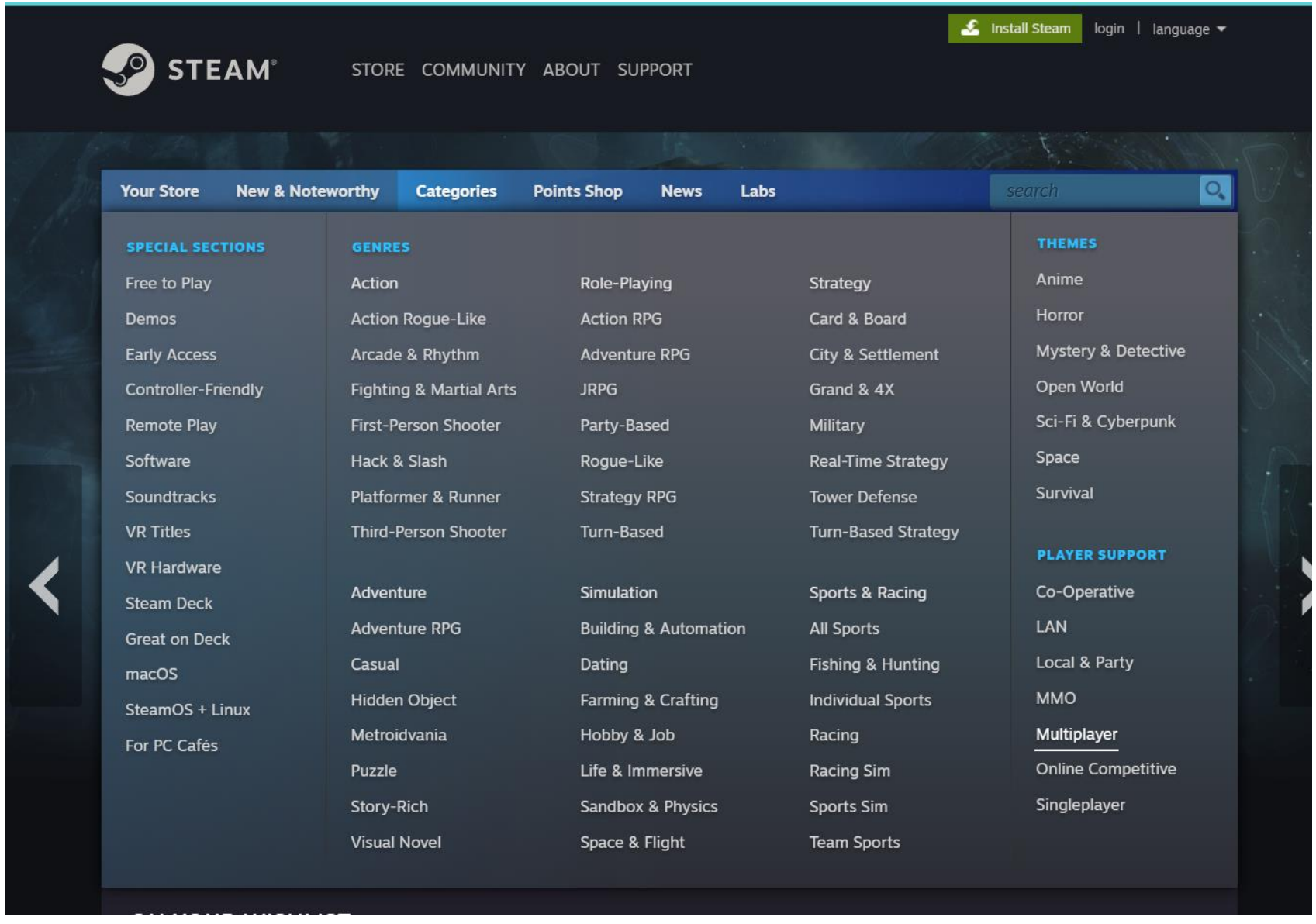
1. Skills

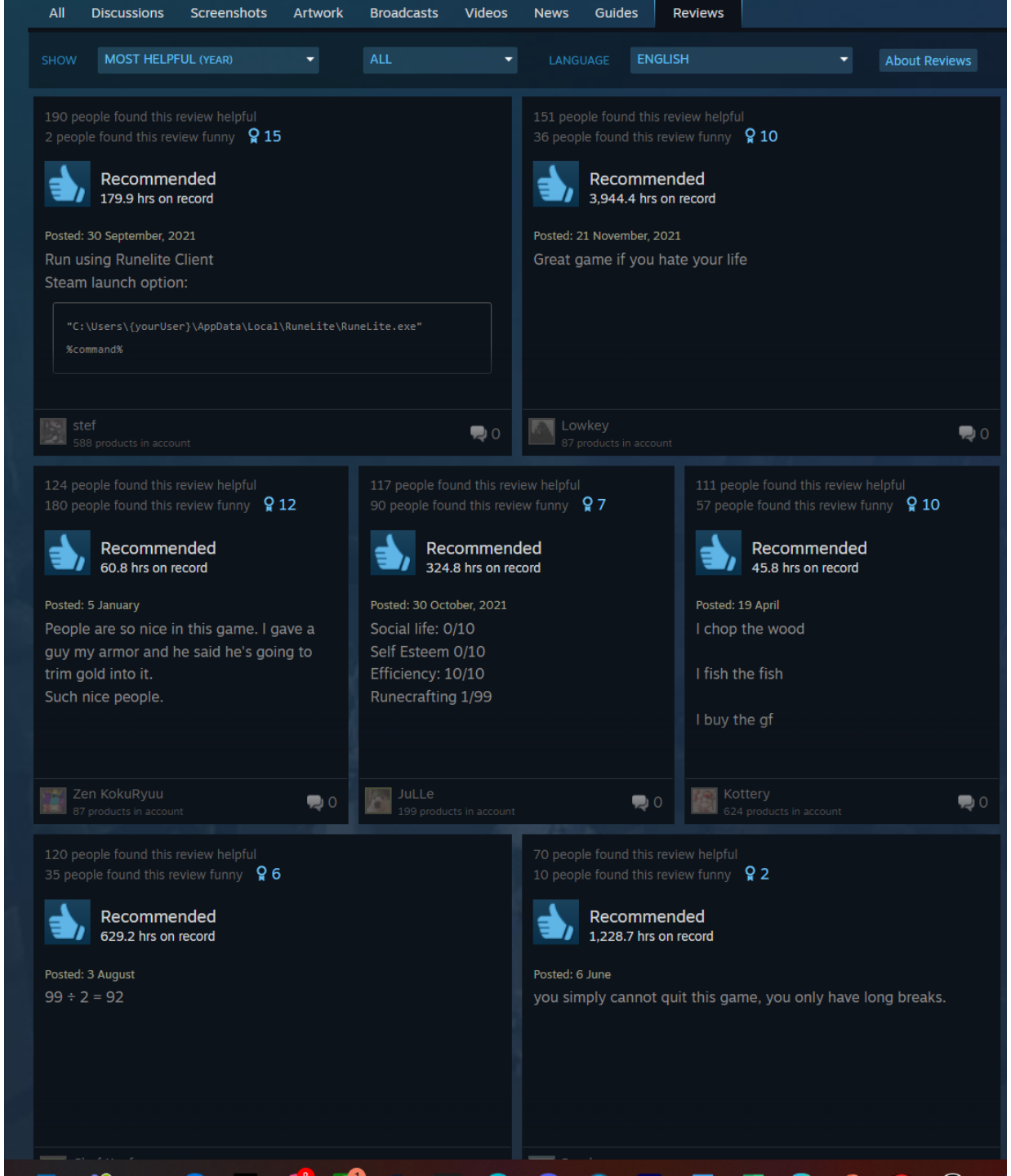
3. Quests

2. Items & crafting

The magic formula for immersive, FUN, virtual worlds
= Skills + Items + Quests

PC gaming: Steam store





89 people found this review helpful
61 people found this review funny 8

Recommended
7,039.4 hrs on record

Posted: April 19

i like this game i think

25 people found this review helpful
1 person found this review funny 0

Recommended
1,616.5 hrs on record

Posted: January 5

A surprising amount of people haven't played Runescape before.

Do you like setting goals, achieving those goals with work and realizing the many rewards that come with hitting those goals? If so then that's basically peak RuneScape

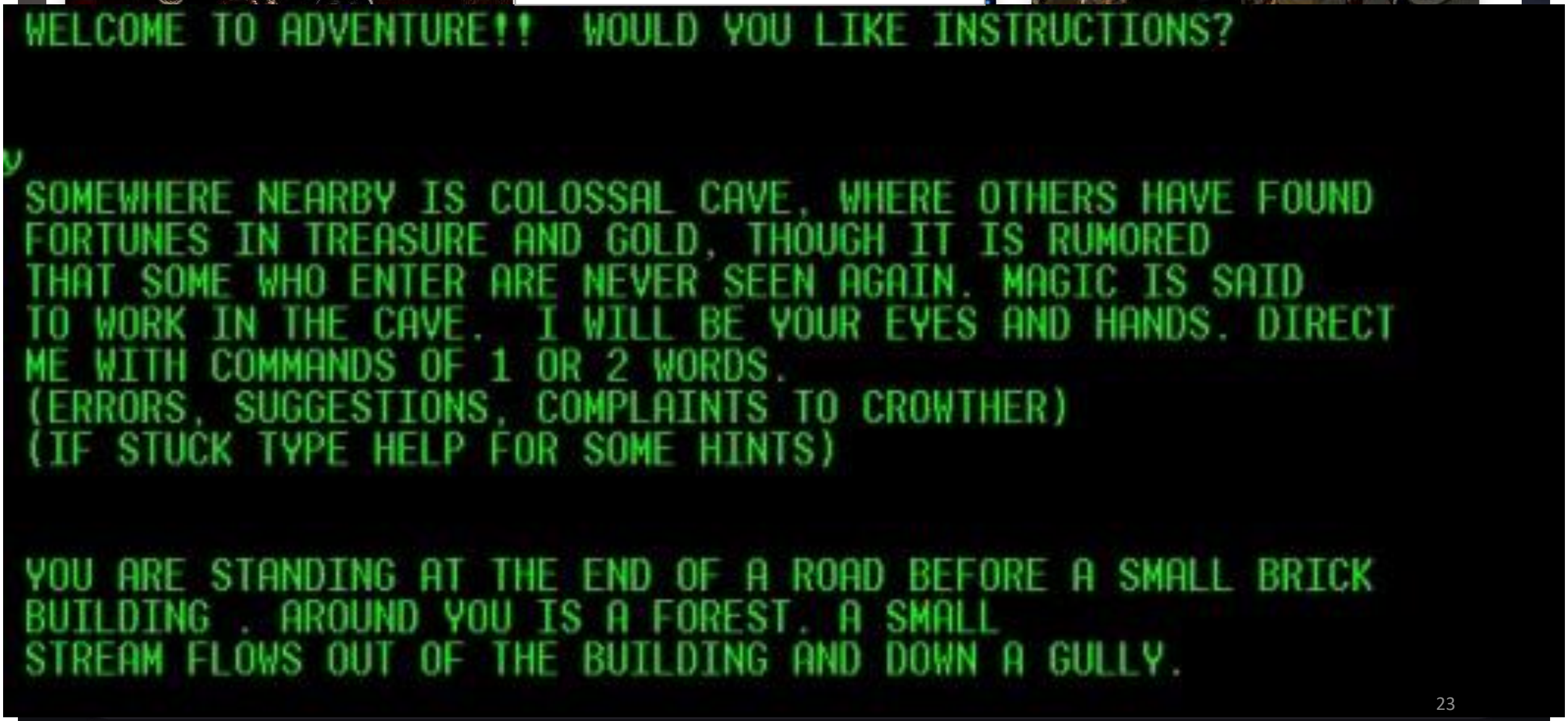
Most people have heard about how crazy grindy the game is but it is different than most games in that when you do actually grind something to a high level you get pretty great rewards for that work. Additionally there's no pressure to get max skills in everything, just play how you feel like playing and do some quests or level up something you enjoy doing. You can make the game a grind if you want because there's always a faster/better way to do something but you can also play very casually and be happy.

Membership: I would say that membership is required to play the game. It's not like there's no content for free players, to the contrary the free version of RuneScape probably has more content than most full games but the free-to-play methods/quests are clearly not as good as the membership ones. I would advise to play the free version for a week if you're a first time player and then download runelite and get membership to fully understand how much you were missing out on.

This game is very much alive and well with various modes to play, minigames, and the best quests in gaming but you have to get past the elephant in the room. When RuneScape 2 (OSRS basically) came out it was played in a web browser and it was super impressive for being a browser game. Now it is 2022 and there's loads of improvements but it is still

Arukoru
0

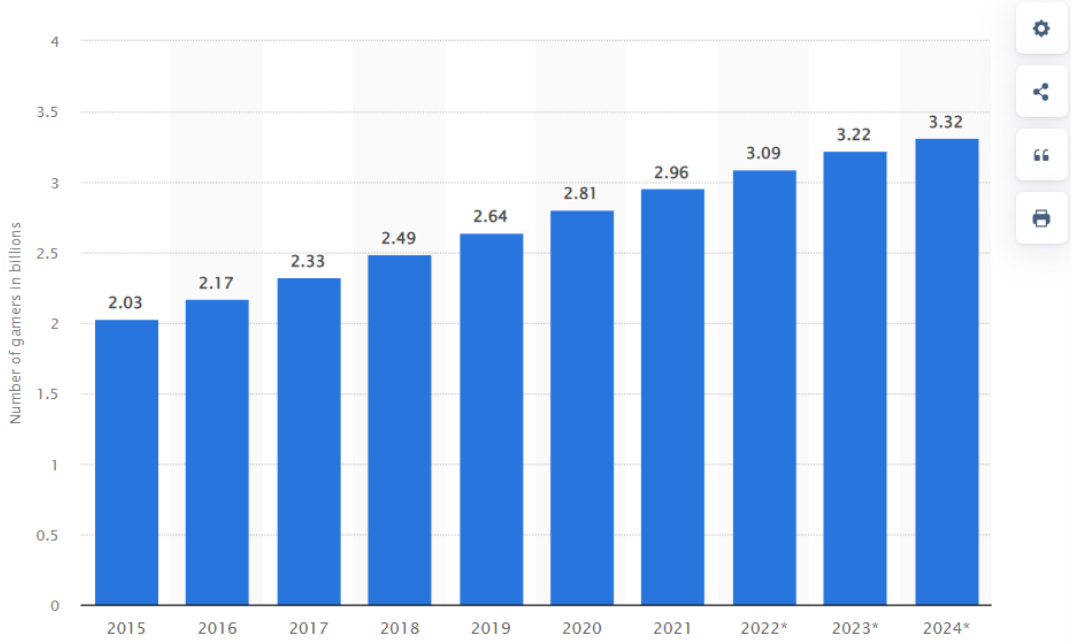
Multi-User Dungeons (MUDs)



PREMIUM

Number of active video gamers worldwide from 2015 to 2021, with forecasts from 2022 to 2024

(in billions)



Details: Worldwide; Newzoo; 2014 to 2021

DOWNLOAD

PDF XLS PNG PPT

SOURCE DETAILS FAQ

Sources
Newzoo; VentureBeat

Survey by
Newzoo

Published by
VentureBeat

Source link
venturebeat.com

Release date
July 2021

Number of video gamers worldwide 2015-2021, with forecasts up until 2024

Published by J. Clement, Aug 26, 2022

The video gaming industry is huge and shows no signs of slowing down. While there were almost two billion video gamers across the world in 2015, this figure is expected to rise to over 3.3 billion gamers by 2024.

Timeline

Uncharted territory

2017 – Bachelors' FYP on psychomotor training in VR

2021 – Conference paper in ASEE on using popular game mechanics in Serious Games

Summer 2022 – gather.town 2D RPG demo a success

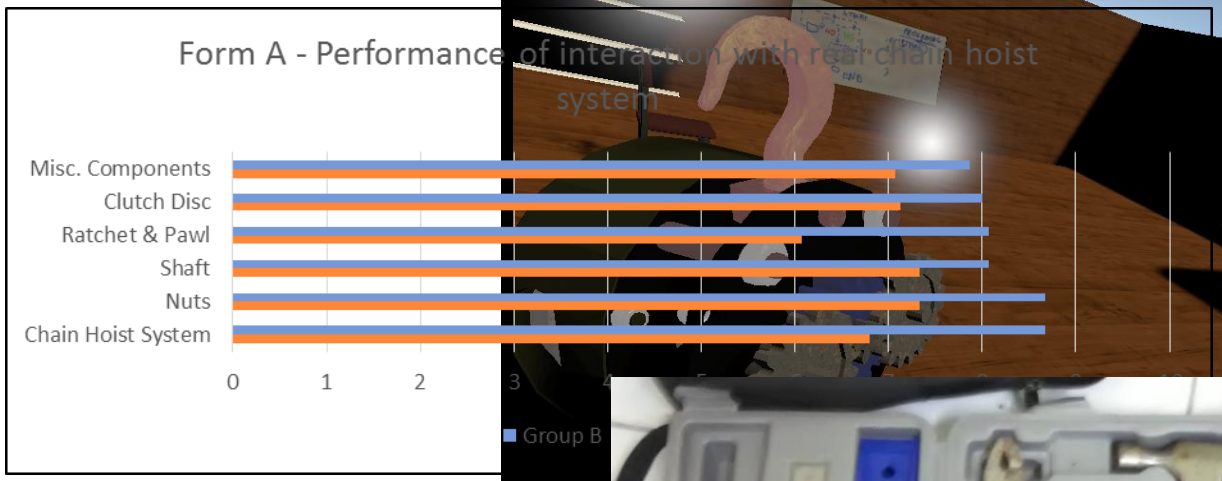
Fall 2022 – proof of concept of MMO-RPG in 3D

- We are here!
- Pilot testing

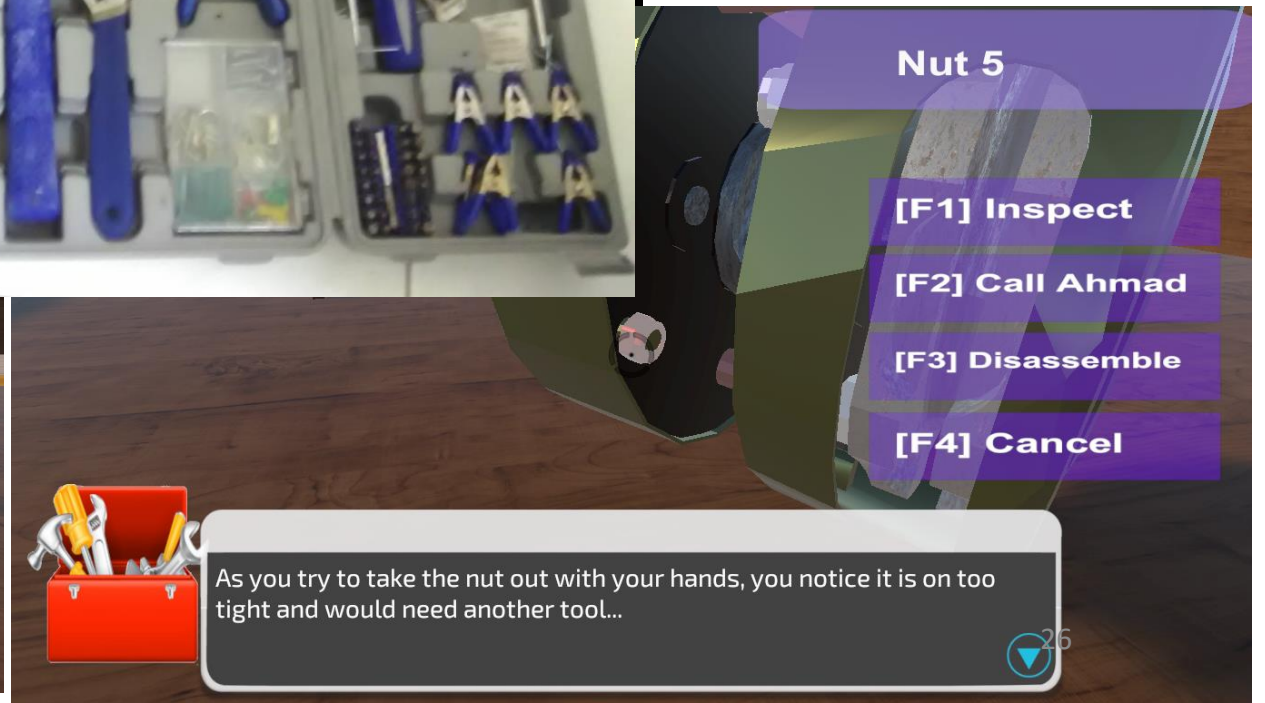
Winter 2023 – translation to other courses and UX testing/data collection

Summer 2023 – Publish in JEE or CAEE

2024-2026 – MechaPunk startup & funding (grants & investments)



		KEYWORDS & MARKS		
Component	**Question**	/2	/1	/2
Chain Hoist (system)	[1] Component Name	Name		
	[2] Function	Lift Loads	Gears	Mechanical Advantage
	[3] Disassembly info.	Socket Wrench	Plier	
Nuts	[1] Component Name	Name		
	[2] Function	Hold supports	Tigtening Torque	
	[3] Disassembly info.	Socket Wrench	Proper size	
Shaft	[1] Component Name	Name		
	[2] Function	Support	Bearings	Rotating
	[3] Disassembly info.	Unbolt nut	Socket Wrench	
Ratchet & Pawl	[1] Component Name	Name		
	[2] Function	Prevent backward motion		One way movement
	[3] Disassembly info.	Plier	Ratchet pins	
	[1] Component Name	Name		
	[2] Function	Brake	Ratchet pawl	Load chain
	[3] Disassembly info.	By hand from second plate		
	[1] Component Name	Name		
	[2] Function	Chain	Covers	Plates
	[3] Disassembly info.	Take off by Hand		



Evaluation

- 30 Mechanical / Aerospace Engineering students who had taken Engineering Design;
- TWO tests (shown below):

TEST 1

- Real Chain Hoist
- Form A

TEST 2

- Virtual Chain Hoist
- Form B

Serious Games in Engineering: The Current State, Trends, and Future

Conference
2021 ASEE Virtual Annual Conference Content Access

Location
Virtual Conference

Publication Date
July 26, 2021

Start Date
July 26, 2021

End Date
July 19, 2022

Conference Session
Innovative Pedagogies Afforded Through Technology and Remote Learning

Tagged Division
Educational Research and Methods

Page Count
24

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https://peer.asee.org/37709

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Paper Authors

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Tahzinul Islam *York University* biography

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Abstract

Games have garnered recent attention within the engineering education realm, owing to advancements in computing technology and lowered barriers to entry for game development, with Game Engines such as Unreal Engine and Unity3D being free in a non-commercial, educational capacity. The present paper seeks to investigate 28 relevant studies which have reported games for teaching engineering courses within the past decade. These studies were obtained after extensive Scopus search queries and filtered manually according to 8 research questions. Key questions we seek to investigate are what genre of games are being employed, disciplines most often targeted for gamification, assessment tools used to gather data on student learning within gamified settings, learning outcomes and attitudes towards game modules for students' engineering courses and as well as data analysis/collection methods.

Citation

Kittur, J., & Islam, T. (2021, July), *Serious Games in Engineering: The Current State, Trends, and Future* Paper presented at 2021 ASEE Virtual Annual Conference Content Access, Virtual Conference. https://peer.asee.org/37709


Ed
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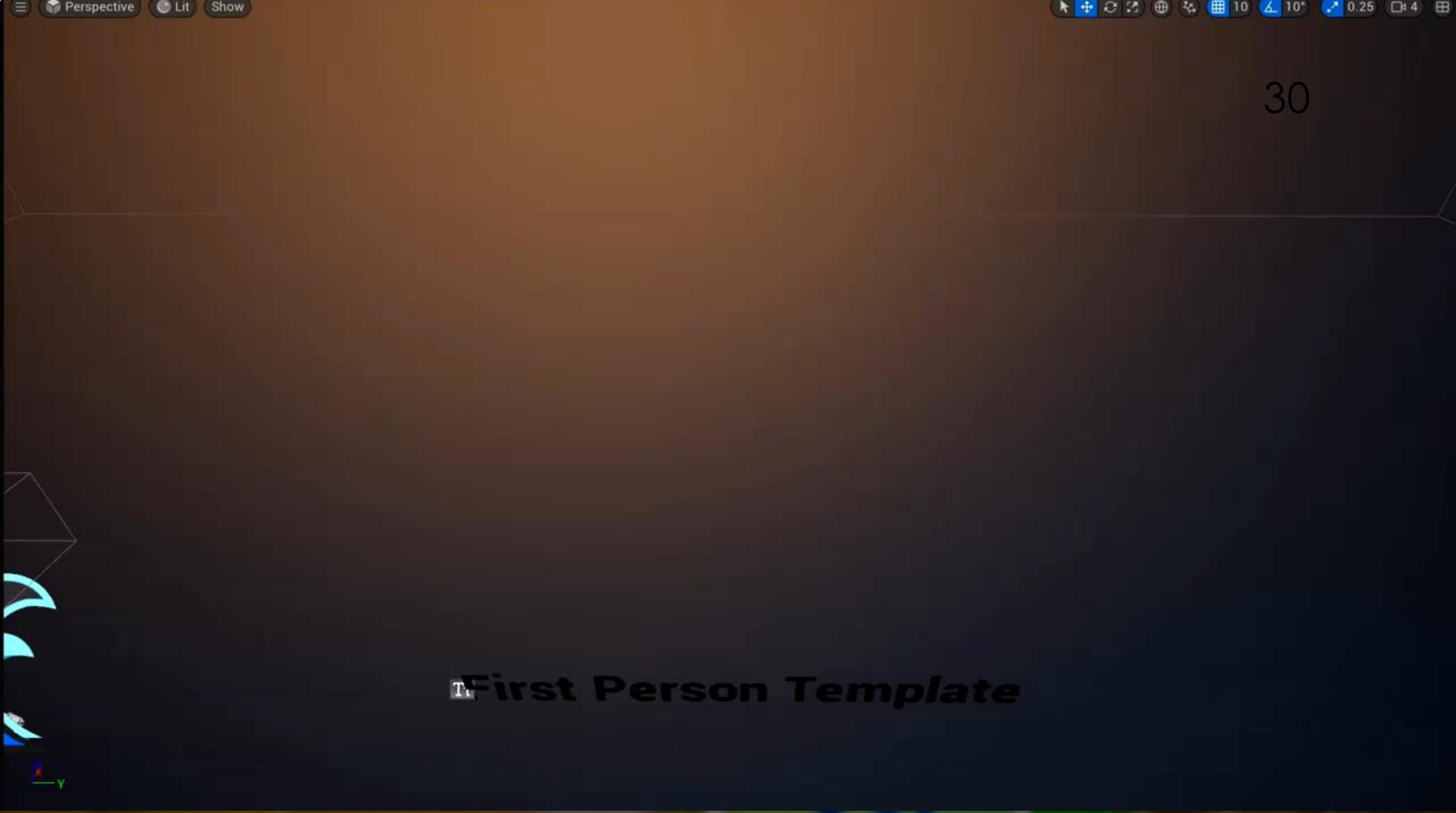
Perspective
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4
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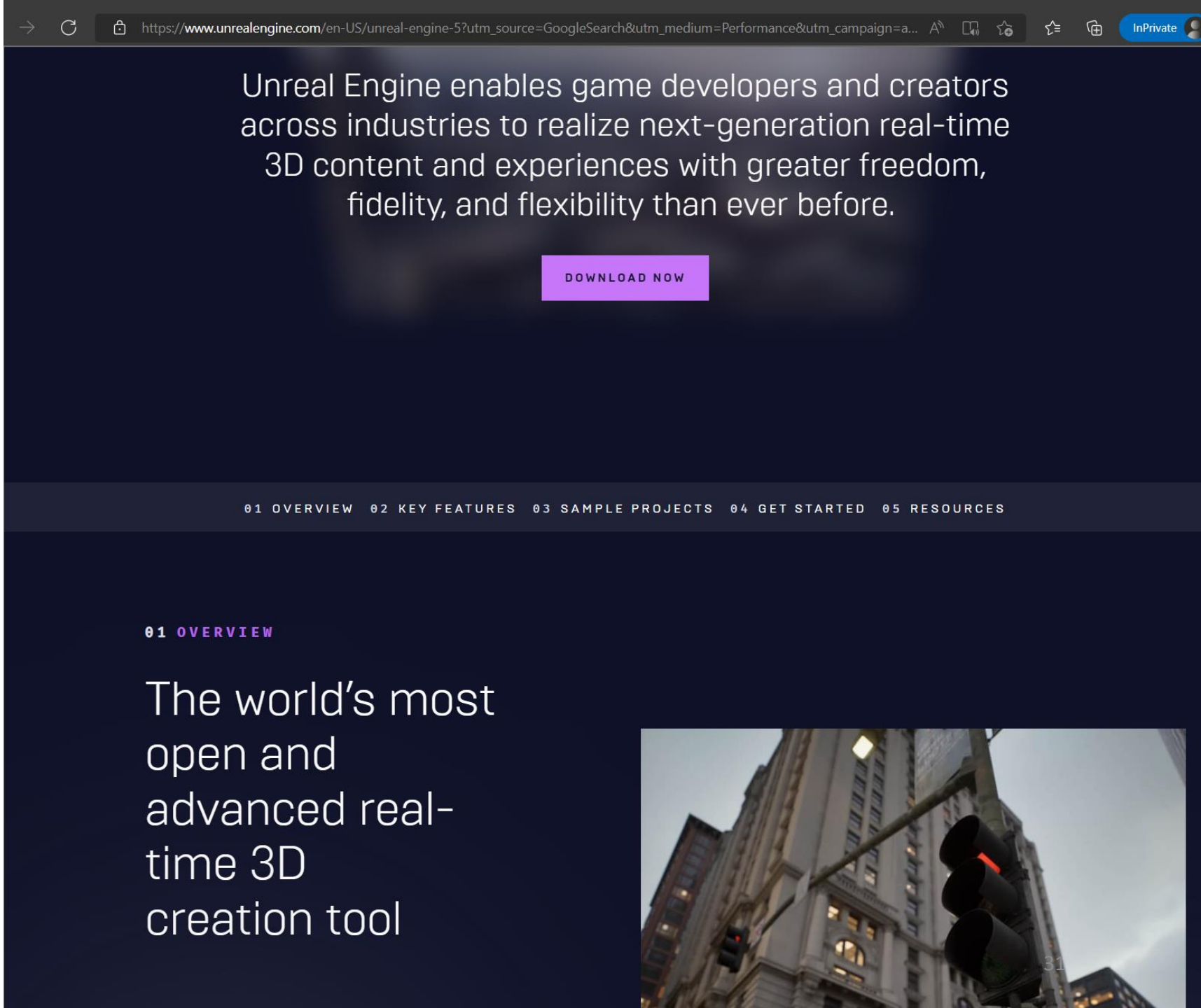
First Person Template

The tool we are using:

Unreal Engine 5



Discussion points

What this concept review game does

- At a high level, we are using MMO-RPG as a mode of information delivery
- Knowledge trees reinforce cognitive abilities, Tech trees for psychomotor, and Story trees for affective
- Why not textbooks for instilling this skill tree?
  - Lecture, conventional textbook, assignments, quizzes, groupwork, problem set, etc.

The 'defense' and 'oral examination' mindset and overall implications in outcome-based learning

The framework so far (work in progress)

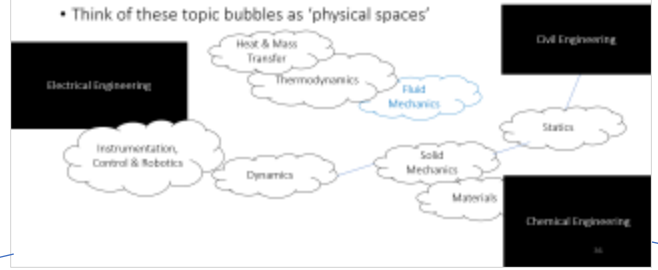
3 Zones (3 monthly review sessions)

6 open modules / 6 weeks / 6 topics

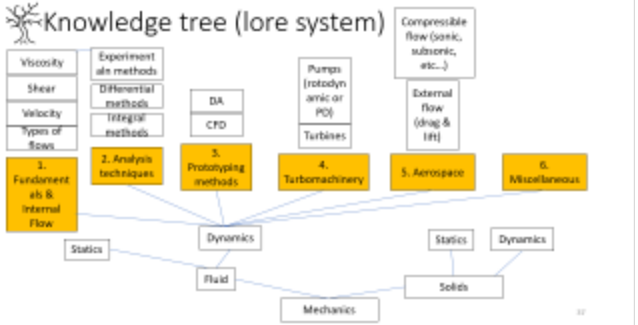
- 6 oral exam questions per module
  - 2-3 clues* per question (easy, medium, hard difficulty).
  - * Lots of room for improvement in this level of detail (future testing)

Mind Map of Mechanical Engineering (exercise) -> delegate to virtual spaces

- Think of these topic bubbles as 'physical spaces'



Knowledge tree (lore system)



Tech tree

Story tree

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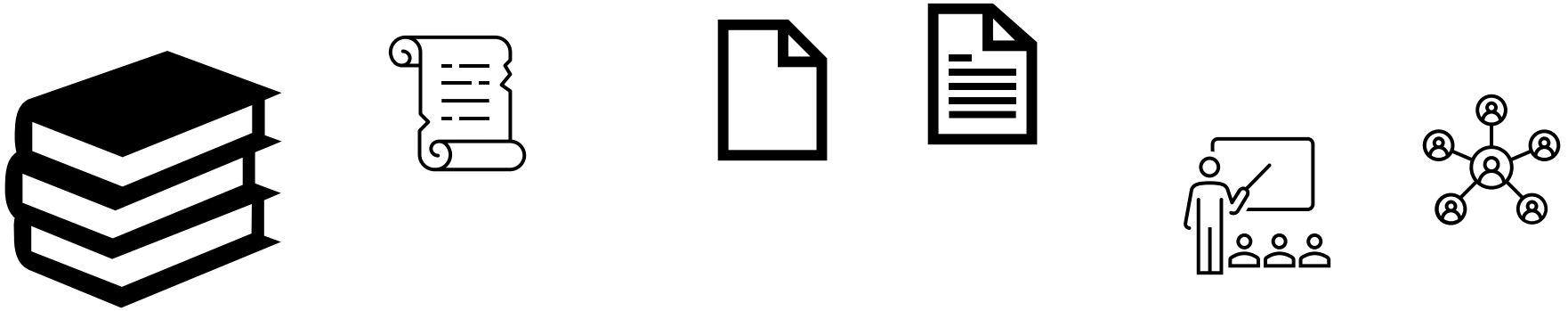

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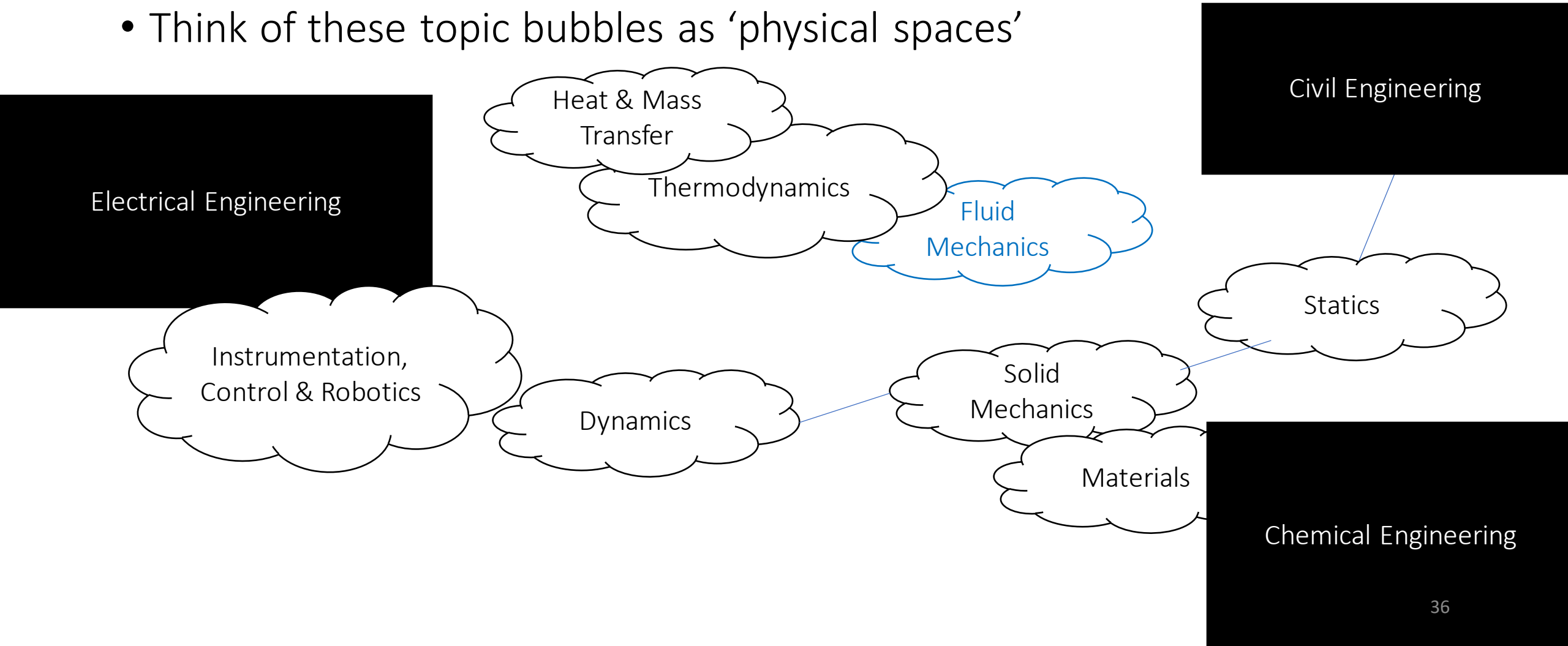
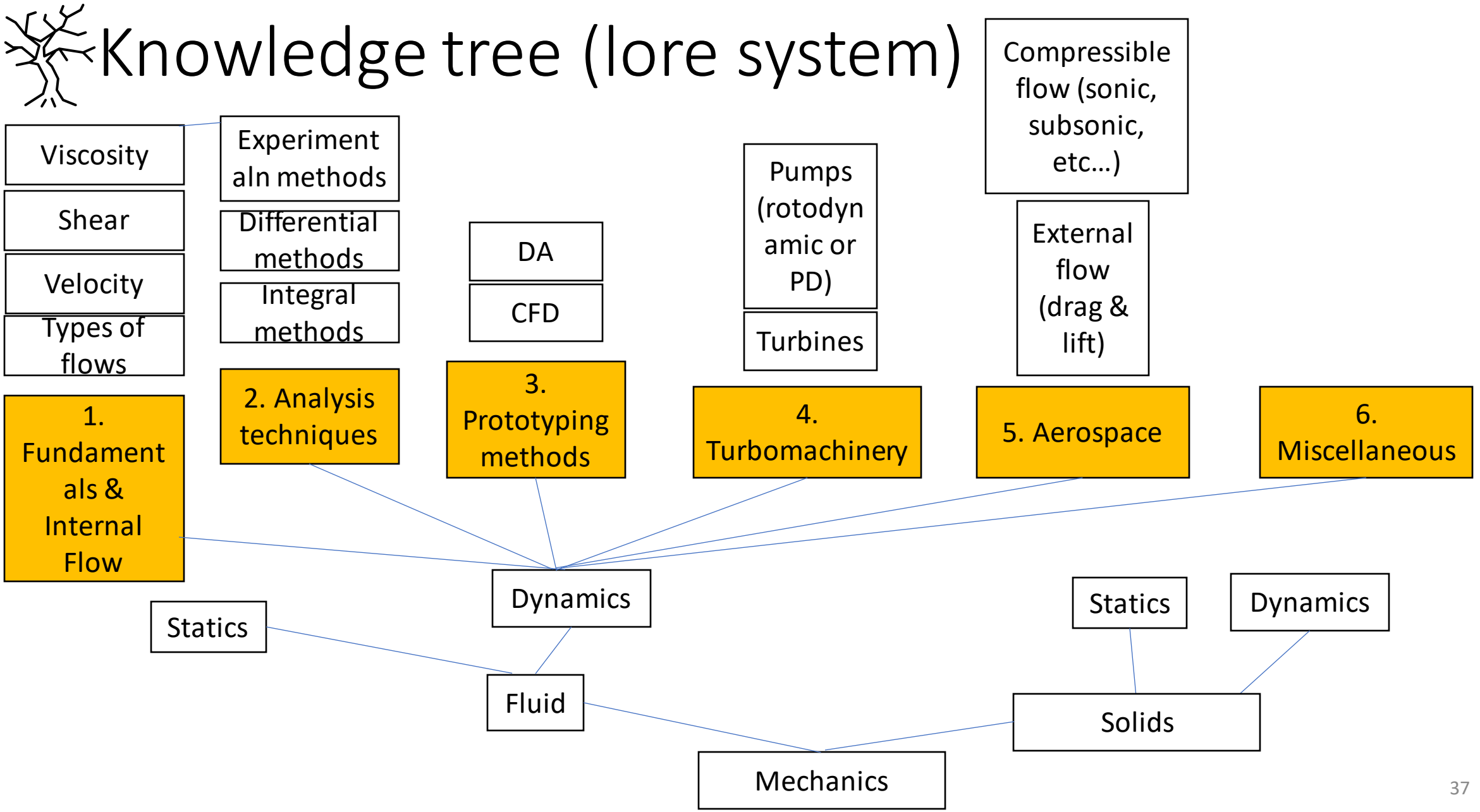


Knowledge tree (lore system)



Tech tree


ESC
KITE SHIELD.
Azoth 475
Coin 2,544,659.53
Weaponsmithing 58
Armoring 58
MELEE WEAPONS.
Straight Sword
War Hammers
Hatchet
SHIELDS
Kite Shield
Round Shield
GATHERING TOOLS
Pickaxe
TIER I
TIER II
TIER III
TIER IV
TIER V
24.0
NOT AVAILABLE
NOT AVAILABLE
STEEL KITE SHIELD
STARMETAL KITE SHIELD
55 / 12
16 / 12
0 / 5
21 / 5
25 / 3
23 / 3
ORICHALCUM KITE SHIELD
A Kite Shield made of Orichalcum.
Orichalcum Ingot
102 / 24 (12+12)
Add Primary Resource
Increases Gem Socket Chance
Ironwood Planks
19 / 5
Infused Leather
16 / 3
Azoth
475 / 100
Add Azoth
Increases Perk Chance
Steel Shield Charm
1 / 1
Add Special Resource
Determines Perk
Craftsmanship
Item Stats
POTENTIAL GEAR SCORE
500-550
500
600
Increased chance for a Gem Socket
0-3 Perks
Slightly Increased chance of getting maximum number of Perks
Increased chance of getting the Steel Shield Charm perk
1
0
1
Forge Station
Tier 5
Weaponsmithing Skill
Lv. 55
CRAFT
Cutlass Keys TAX: 7.48
60

Story tree


Fei >
I'm the curator on this island. I preserve valuable knowledge of fluid dynamics on these walls. How can I help?
Who recovered these valuable pieces of knowledge?
[CLUE 1] What can you tell me about the types o...
[CLUE 2] How do we even study fluid dynamics?
Who are you?
What did you do back on Old Earth?
How does it feel to live like cave people?
Bye.
[1] Save
[2] Load
[Q]uest journal
[I]nventory
0/10
Story
0/5
Tech
0/6
Knowledge

Conclusion

- How to design MMO-RPGs to deliver university-level STEM information
- Broadly investigating information delivery in such virtual learning spaces
- Current $15,000 CAD project underway for pilot testing with plans to scale to other courses, engineering disciplines and STEM disciplines