

video games

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2nd Year, CPDM '07



Overview

- Video Games
 - History
 - The Technology
 - Components
 - Morphology
- Impact due to Video Games
- Sustainability in the context of Video Games
- System Simulation
- Results
- Conclusion



Video Games

- A video game is a game that involves interaction with a user interface to generate visual feedback on a video device [1].
- Typically there is a screen (television, monitor, LCD display) through which the game is viewed. Input devices vary depending on the game and hardware, but usually involve a controller, joystick, keyboard or keypad [2].



[1] Raster monitor for video game displays. United States Patents. Retrieved on 2007-10-16.

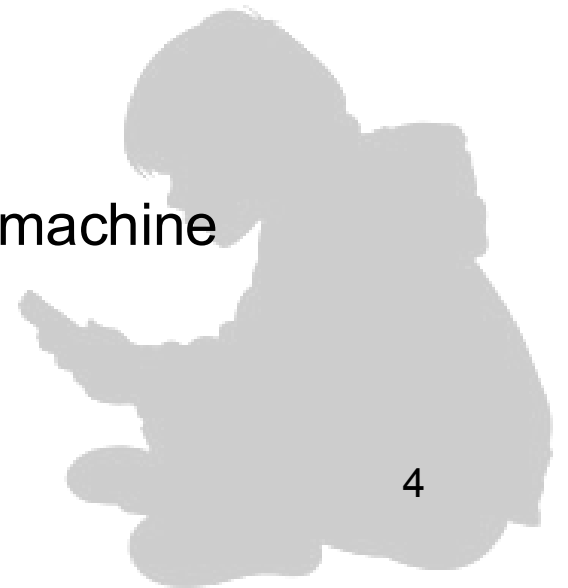
[2] John Kirriemuir, D-Lib Magazine February 2002 Volume 8 Number 2 ISSN 1082-9873

Video Games

- The fastest-growing component of the media sector worldwide, the video game market, is a **\$37.5-billion-a year industry** [5]
- This industry loses **\$3.2 billion** a year on a worldwide basis due to **piracy** [5]
- A 2006 consumer survey showed that **44%** of most frequent game players say they play games **online** [6]
- **Women** account for **38%** of the players [6]
- Nearly **half** of all US homes **own** one game-playing machine (Nielsen Entertainment)

[5] www.sustainableindustries.com/technology/9481767.html

[6] news.bbc.co.uk/1/hi/technology/6662469.stm



Video Games

- The **salaries** paid to US-based video game developers in 2004, were at a starting wage (for programmers) of **US\$60,152** [7]
- After a limited amount of time playing a violent video game, a player can "automatically **prime aggressive thoughts**" (Bushman & Anderson, 2002, p. 1680) [7].
- "The rapid **rise of obesity** is due to decreased physical activity and increased sedentary activities such as watching television and computer and **video games.**" [8]
- British government blames gaming consoles for **wasting** about **\$130 million** worth of energy each year [9]

[7] www.sustainableindustries.com/technology/9481767.html

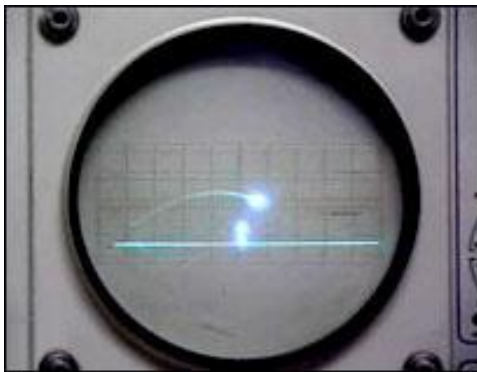
[8] <http://www.ars.usda.gov/is/pr/2006/060314.htm>

[9] www.tomsgames.com/us/fringedrinking/2006/07/



History

- In 1958, William Higinbotham made an interactive game named *Tennis for Two* [3]
- In 1980, Namco released Pac Man [3]
- In 1989, Nintendo released the Game Boy, the first handheld console [3]



Tennis for Two



Pac-Man



Game Boy



History

- Thru the mid 90s, the market was dominated by three consoles, the Sega Saturn (1994), the Sony PlayStation (1994) and the Nintendo 64 (1996) [4].
- 2000 onwards saw extremely high end gaming consoles with Microsoft's Xbox 360, Nintendo DS and Sony PlayStation 3 [4].



Xbox 360



Playstation 3



Video Game Technology

Categories of Video Games:

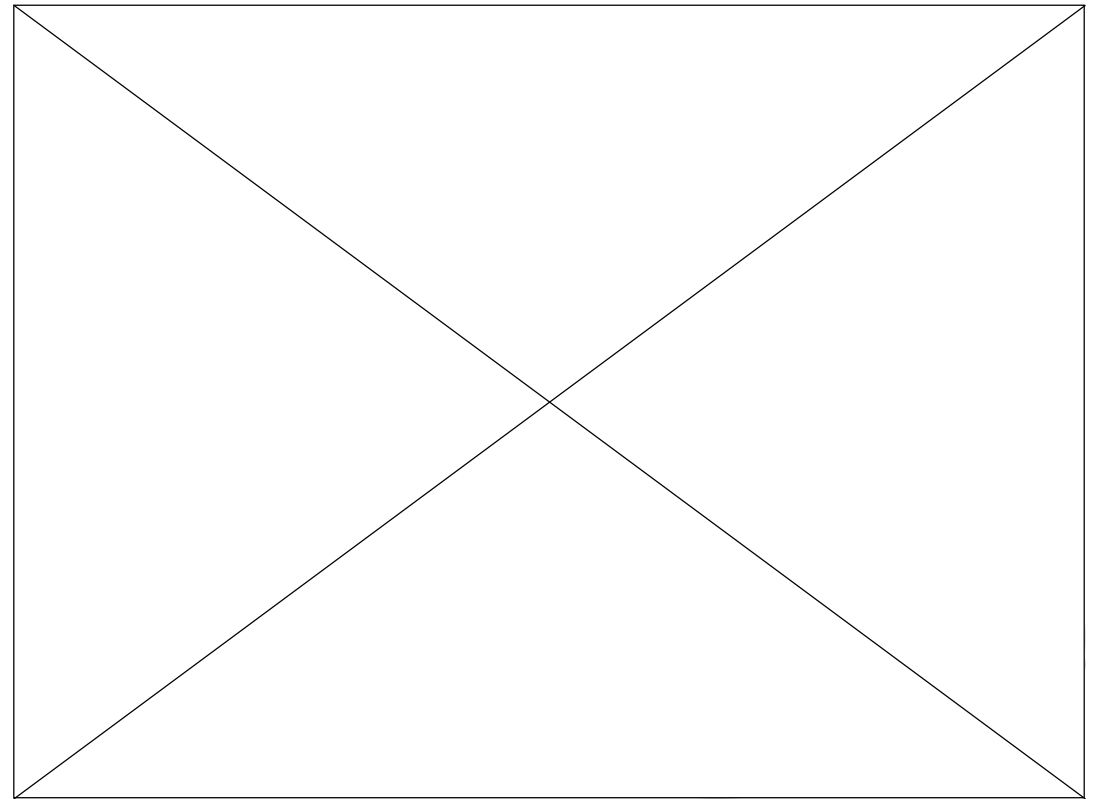
- **Video Game Consoles (e.g. Microsoft Xbox 360)**
- **Handheld Consoles (e.g. Nintendo DS)**
- Computer Video Games
- Games on Cell Phones



Video Game Components

The core components that all video game systems have in common [10]:

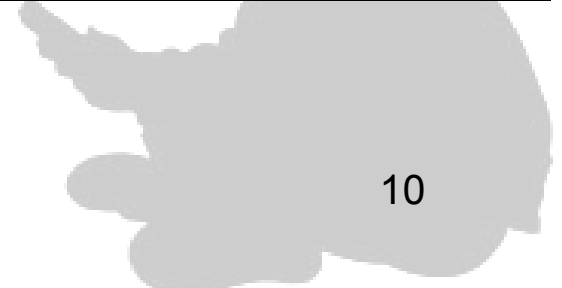
- User control interface
- CPU
- RAM
- Software kernel
- Storage medium for games
- Video output
- Audio output
- Sound Generator
- Power supply



[10] <http://electronics.howstuffworks.com/video-game3.htm>

Technology Morphology

Dimensions	Options														
Types	Video Game Console			Hand Held Console			Mobile Gaming			Personal Computer					
							Mobile phone	Smart phone	PDA						
Parts	Body			Controller			Peripherals			Power Supply					
	Different Shapes			Yes	No		Yes	No							
Body	CPU			RAM			Storage medium			Graphics card					
	Speed	Bits		Speed			Disc Drives		Hard Drive		Yes	No			
	Variable	Different Capacities					Yes	No	Yes	No					
Controller	Stick		Plastic base	Rubber sheath		Shape		Circuit Board		Buttons					
	Yes	No		Yes	No	Various Shapes		Different Sizes		A & B		START	SELECT	SHOULDER	
									Yes		No	Yes	No	Yes	No
Peripherals	Video output		Audio output		Sound card		Video card		Network card		Keyboard		Mouse		
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
Power Supply	Li - ion			AA			AC Mains								
Shape	Rectangular			Hourglass			Clamshell			Cubical					
Material	Case			Buttons											
	Plastic			Metal base			Silicon Rubber			Plastic					
Dimensions	Different lengths, widths and thicknesses														
Colour Patterns	Indigo	Arctic	Glacier	Fuchsia	Platinum	Black	Gray	White							
Display	Video Standards			Type			Alignment		Screen Position						
	NTSC	PAL	SECAM	CRT	LCD	TFT	Plasma	Touchscreen	Horizontal	Vertical	Middle	Top			
Added Features	USB / Flash Memory Slots		Wireless		Bluetooth		Stylus		Force Feedback						
	Yes	No	Yes	No	Yes	No	Yes	No	Microprocessor	Electric motors	Gear train	Position sensors	ROM		
												Yes	No		
Main Purpose	Entertainment			Introduction to IT			Neural and Motor Skill Enhancements			Educational					
Variant	Single Player			Multiplayer											
	Yes			No			Yes			No					



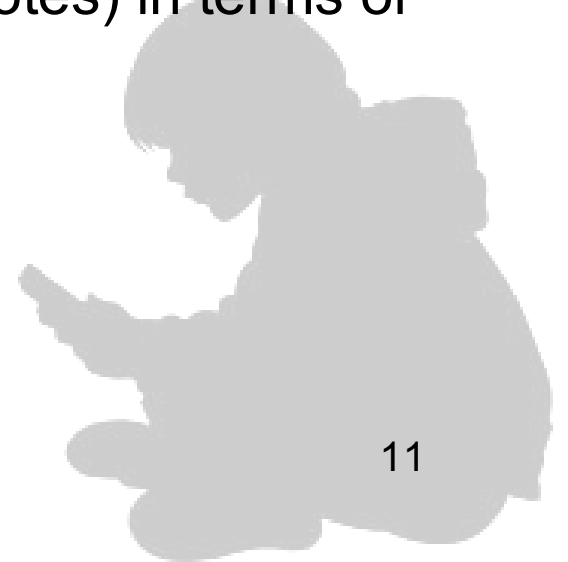
Impact due to Video Games

Uses:

- Players are introduced to **information technology** [11].
- Some games provide practice in **problem solving** and logic [11].
- Games can provide practice in use of fine **motor** and **spatial skills** [11].
- For Americans, video games ranked second (30% votes) in terms of offering **value entertainment** [11]
- It **boosts** the **economy** and **technology** [12]

[11] http://www.mediafamily.org/facts/facts_effect.shtml

[12] www.theesa.com/files/VideoGames-Final.pdf



Impact due to Video Games

Misuses:

- Over-dependence on video games could lead to **social isolation**[13].
- This industry loses **\$3.2 billion** a year on a worldwide basis due to **piracy** [14]
- The latest generation of computer games consoles consume up to an astonishing **180W of electricity** - the equivalent of leaving three 60W bulbs burning [15].
- Creating a 24kg PC with a monitor requires at least **240kg of fossil fuels** to provide the energy [16].

[13] http://www.mediafamily.org/facts/facts_effect.shtml [14] web.mit.edu/cms/games/opening.html

[15] www.energysavingtrust.org.uk/energy_saving_products/a_guide_to_choosing_consumer_electronics

[16] www.computerandvideogames.com/article.php?id=163387

System Simulation

- Simulation used: Kane's Simulation Method – Cross Impact Analysis
- Formulae:

$$x_i(t + \Delta t) = x_i(\tau)^{p_i}$$

$$p_i(t) = \frac{1 + \frac{\Delta t}{2} \sum_{j=1}^N (|\alpha_{ij}| - \alpha_{ij}) x_j}{1 + \frac{\Delta t}{2} \sum_{j=1}^N (|\alpha_{ij}| + \alpha_{ij}) x_j}$$

X_i - Variable

t – time (years)



System Simulation

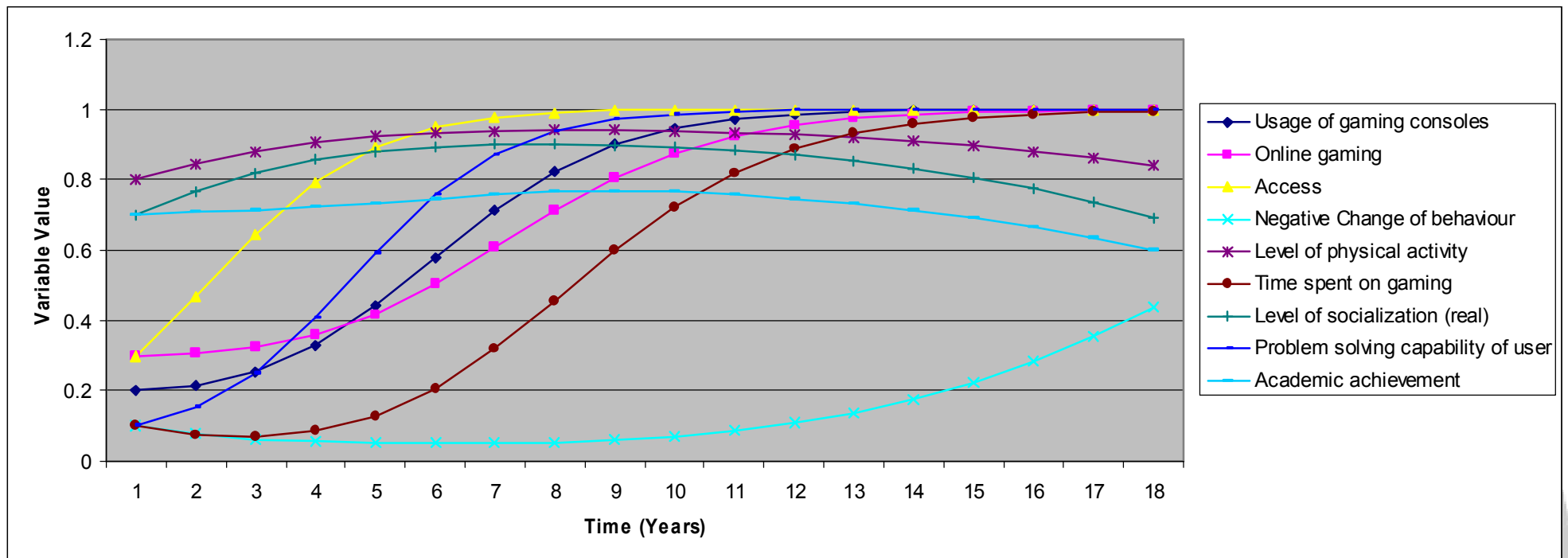
Society Variables	
System Variables	
Usage of gaming consoles	
Online gaming	
No. of Males	
No. of Females	
Ownership	
Access	
Parental control on playing	
Negative Change of behaviour	
Level of physical activity	
Stress levels while gaming	
Time spent on gaming	
Level of socialization (real)	
No. of people playing online	
Offering high entertainment value	
Playing action games	
Playing other games	
Hand - eye coordination	
Problem solving capability of user	
Academic achievement	
Games made for positive effects	
Sales of games	
Expenditure on games	
Losses due to piracy	
Growth of gaming industries	
Impact on development budgets	
Salaries of employees	
Reality experience of games	
Consumption of fossil fuels	
Chemicals and water in mfg	
Electricity Consumption on gaming	
Generation of electronic waste	

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Economy Variables	
System Variables	
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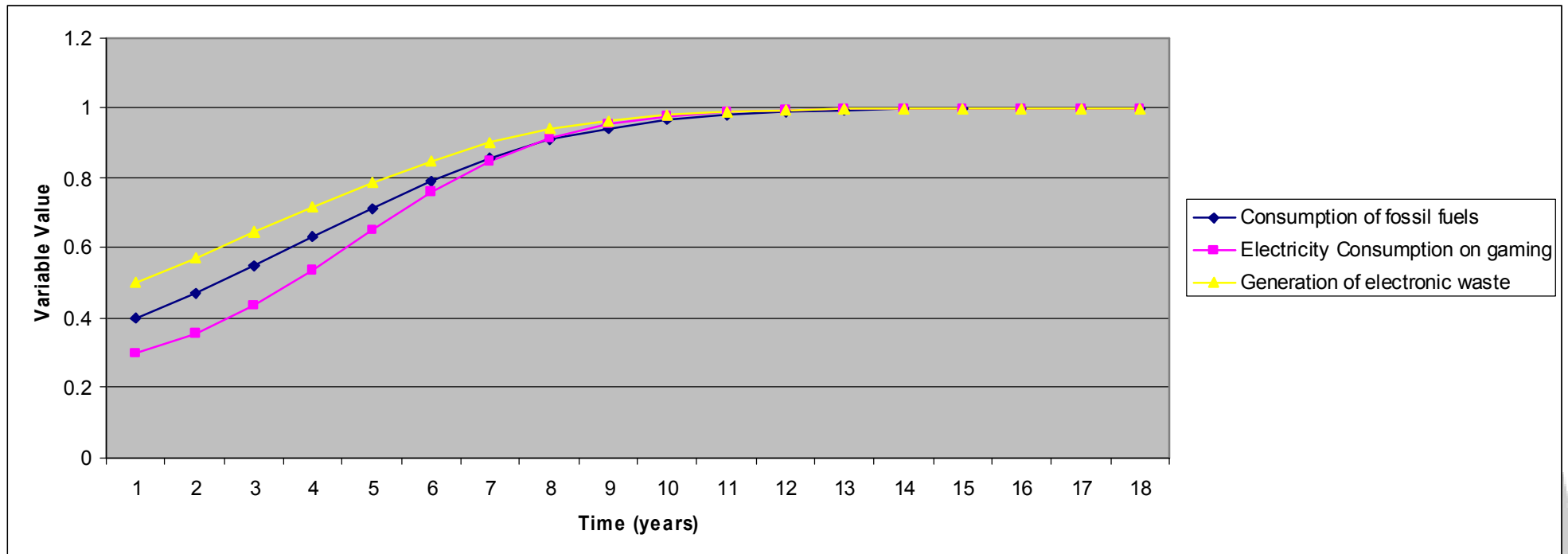
Results of Simulation

- Impact on Society:



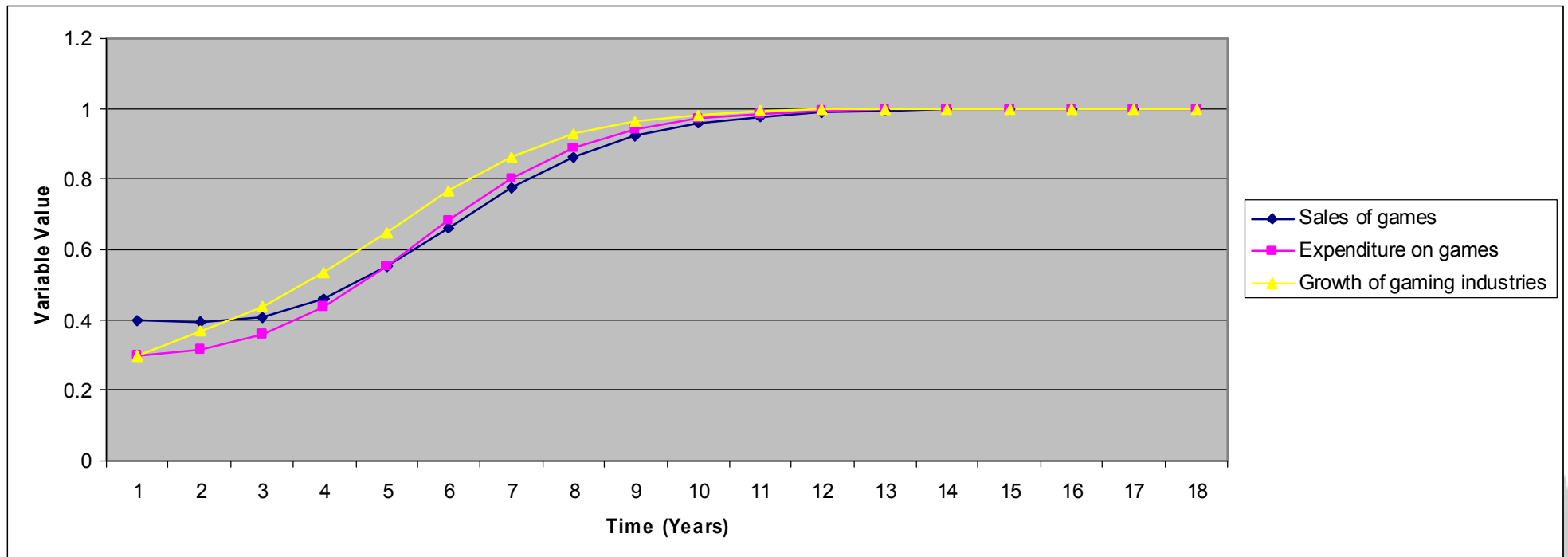
Results of Simulation

- Impact on Environment:



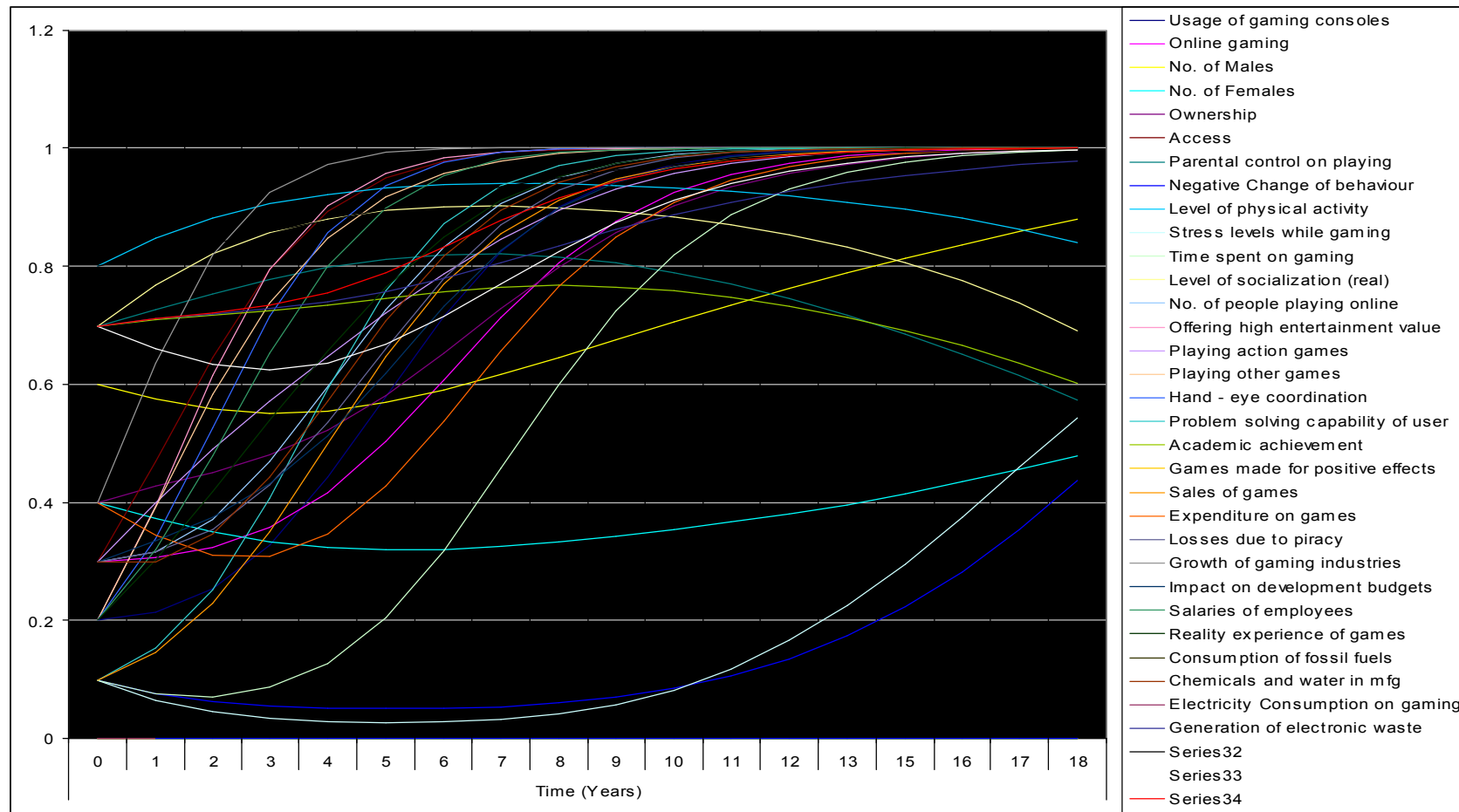
Results of Simulation

- Impact on Economy:



Results of Simulation

- Combined Representation



Results

From the graph:

- There is a **rise** in the **time spent** in the usage of gaming consoles and online gaming
- This results in a gradual **decrease** in **outdoor life**, namely physical activity and nurturing social associations
- Though certain games can **negatively alter human behaviour**, they also **enhance** certain **skills** (motor skills, alertness etc.)
- The **gaming industry** sharply **grows** as sales on video games increase
- Manufacture and use of video games **consumes** a **high** amount of₁₉ **natural resources** and generates e-waste



Sustainability in the context of Video Games

For the society to be sustainable:

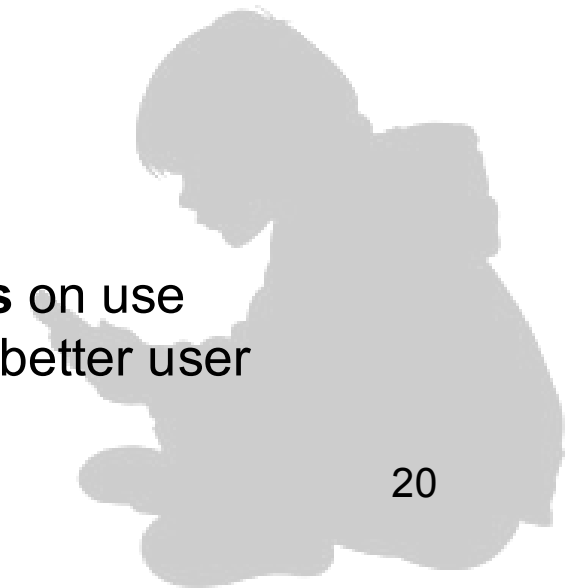
- Video games should **foster social associations** among users
- The time spent on gaming should aid in **problem solving** and enhance academic output
- They can be designed to encourage **physical activity** and reduce mental stress while gaming

For the environment to be sustainable:

- Use of **environment friendly materials** to prevent e-waste
- **Controlled utilisation** of non-renewable resources
- Use of **energy saving** components

For the economy to be sustainable:

- Games should be created for promoting **positive impacts** on use
- **Maintain growth** of industries by introducing games with better user experience



Conclusion

- Even though the **video gaming community** will **rise**, the **impact** of video games on individuals will be **negative**
- The **gaming industry** will **leapfrog** in growth
- In spite of the fact that recyclable materials are used, there will be a significant rise in the **consumption** of **fossil fuels** and **energy** in the manufacture and use of video games, which in turn will lead to **generation** of a high amount of **e-waste**





Game over !!!