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Review of Core Graphic Design
Principles used in Computer
Games: An evaluation of
Graphical User Interface design

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I. Introduction

The broad influence of graphic design

- Our current technologies for visual communication (through print, digital, environmental and increasingly virtual/interactive means) all fall back on an **established set of basic design principles** to consider when approaching a design, across these platforms [2].

- This graphic design "canon" was developed from the knowledge and experience of millennia [2] and forged into a basic framework by the designers of the International Typographic Style (ITS) in the 1960's.

- As our experience and knowledge of **viewing patterns** (how we respond to and best **absorb communication**) has grown, along with the proficiency of designers as communicators and users of technology, graphic design has emerged into a profession crucial to the modern world.

About our Paper

Our paper explores the relationship between design for Graphical User Interface (GUI) of computer games, and five core design principles commonly used for visual communication.

- **Section II** describes the five core design principles which designers use to conceptualise and then practically execute their designs.

- **Section III** demonstrates the use of core graphic design principles in computer games.

- **Section IV** addresses the analysis of underutilized elements of graphic design in contemporary computer games.

- **Section V** draws an evaluation with respect to the GUI design and lessons learnt from the analysis.

The acknowledgement and conclusions close the article.

II. Core Graphic Design Principles

What are graphic design principles?

The architecture of great graphic design is built upon a **strong foundation** of core principles [2] for layout that most designers begin with, including:

1. Grid

2. Hierarchy (visual and typographic)

3. Scale

4. Balance (Symmetry/Asymmetry)

5. Framing

When given due consideration in design, these **five principles** provide structure to the layout, and allow the designer to also experiment with other elements of form, for instance: colour, line, pattern, texture and layers.

1. The Grid

- A grid could be seen as the "**bones**" of a design layout - a series of columns with margins - to place text and image within; organising content.

- This structural element **works hard throughout the design** to manage alignments vertically and horizontally, giving consistency to content placement for flow and balance, and allowing for greater control over visual and typographic hierarchy.

- From this foundation, the designer may choose to break out of the grid boundaries, to enhance the impact of the work; with Gestalt principles, asymmetry, contrast, and scale contributing to this dynamism.

2. Visual hierarchy

- When we speak of hierarchy as a graphic design term, we are insinuating an **order of importance** in the reading of information.

- Creating a hierarchy of visuals to **clearly convey a message** can be achieved using the following concepts:

    1. **Scale** for focus
    2. **Contrast** for drama
    3. **Colour** for impact and tone
    4. **Repetition** for relating content
    5. **Alignment** for organisation
    6. **Texture** for creating interest
    7. **Space** to direct the eye
    8. **Proximity** to relate elements.

- Paying attention to **viewing patterns** allows us to design for a visual outcome.

- **The 'gaze'** concept draws on psychological studies [2] to determine the way we take in valuable information – how we process what we see, **what we look for** in (for instance) a piece of design work.

- Our viewing patterns tend toward **creating order to conceptualise, rationalise and group what we see**; a factor further explored in Gestalt principles [1].

- **We are looking for things which stand out to guide us visually: differentiation**.
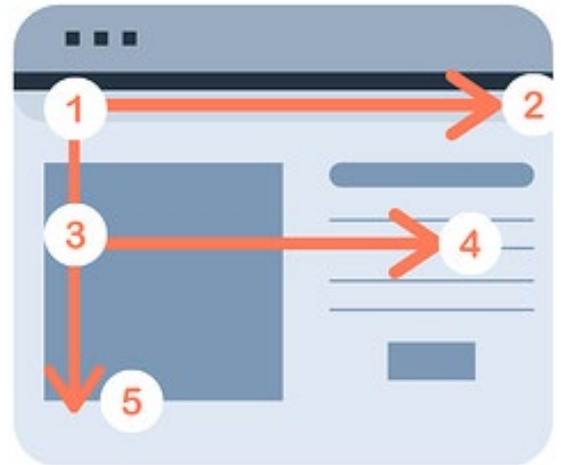
Typographic hierarchy

- The message or information - the communication in design - is often the order of text content, creating **typographic hierarchy** to clearly, as Ellen Lupton (Skillshare, 2021) says, "add difference methodically" and create visual "signals of difference, signals of separation" (Cole-Phillips, 2021).

- In layout, defining and differentiating content such as **heading, sub-heading, body text and caption** can be achieved by **adjusting the character of the text**, using combinations of:
  1. **Size and scale** (drama/dynamism)
  2. **Weight** (e.g. bold, medium, light, italic)
  3. **Colour** (emotion, tone)
  4. **Spacing** (flow and pause between text)
  5. **Case** (e.g. all capitals, all lowercase)
  7. **Character** (typeface selection).

3. The dynamics of Scale

- Similar sized graphics in a design can lead to flatness and monotony. Adding variation through scale creates **movement and flow**.

- Ultimately, scale gives **dimension** to design.

- Designers use contrast in scale to draw the eye, for **impact** and added drama. We generally see scale in two formats:
  - **Objective scale**: how large something is
  (in reality, or the scaled down actuality of the real thing)
  - **Subjective scale**: how big we think something is
  (our impression; in relation to other things).

- Scale of text or image on the screen can **assist with hierarchy.** Appropriate scale for text sets a **comfortable reading size**, and makes a headline or important game element stand out.

4. Balance (symmetry/asymmetry)

- The goal of both symmetrical and asymmetrical design decisions are to **engender a sense of harmony and balance** to visual communication, a stability of form.

- Whilst symmetry harnesses the power of harmony and simplicity, asymmetry challenges the eye with form which may appear random, however placement of elements is deliberate, to add interest and movement.

- Symmetry through simplicity of form gives us **strong, clear messaging**.

- Asymmetry through a harmonious balance guides us through the communication, p**romoting interaction**.

5. The importance of Framing

- Framing "creates the conditions for understanding an image or object" according to Lupton & Phillips (2015, pp.116).

- Content within a frame becomes our focus, the frame or border itself a tool of **visual acuity**.

- Almost all graphic design is contained in a **frame of reference**, be it a device screen, a book jacket, magazine spread or package.

- The placement or orientation of design elements on a page become dictated by the grid, with text, image and illustration layered across these lines, but all have an end-point – the edge of the page, or an internal shape.

III. Use of Graphic Design Principles in Games

About computer game GUI

- The GUI is the arrangement of visual components which **communicate between the user and various aspects of the game code**.
- This includes elements of in-game interactivity, information displays, narrative, and settings.

	In the game space?	
	No	Yes
In the game story? No	Non-Diegetic	Spatial
In the game story? Yes	Meta	Diegetic

Fig. 1 Table of GUI types and uses [7].

- The GUI can be seen as **diegetic** (appearing in the game space - as part of the narrative) or **non-diegetic** (outside the game space and narrative – in the player's world).

Graphic design principles for GUI

- Our initial research indicates there is a **little written analysis and review** into how graphic design principles are applied or work in the area of computer game Graphical User Interface (GUI).

- As the GUI in a game is the **connection point or bridge between game and user**, developing a UI which is aesthetically pleasing, functional and easy to operate is crucial to **user engagement**.

- It follows that a **consistent and expert application** of graphic design principles to the digital interface design would provide enhanced visual structure and much-needed hierarchy to a (potentially) very complicated communication system.

- To this end we selected a number of popular and well-designed computer games, across different genre/platforms, to investigate whether the five core design principles are in fact present in the GUI.

A. Grid

Non-diegetic

Fig.2 Example of grid elements in non-diegetic UI ("Destiny2", Bungie Games) [8].

Diegetic

Fig. 3 Example of grid elements in diegetic UI ("Tom Clancy's The Division 2", Ubisoft) [9].

- Appropriate design of UI grid systems will give the user a sense of space and proximity.

- This non-diegetic grid remains flat and neat, as clarity is the goal, with consistent alignments.

- In this grid the information and icons are in column blocks, with alignment and structure.

- The player views the UI as 'built in' to the world (as a projection), which affects the perspective.

B. Hierarchy

Fig. 4 Typographic hierarchy ("Destiny2", Bungie Games) [10].

- Typographic hierarchy is here represented by scale, style and weight.

C. Scale

Fig. 5 Example of scale ("Forza Horizon 5", Playground Games) [11].
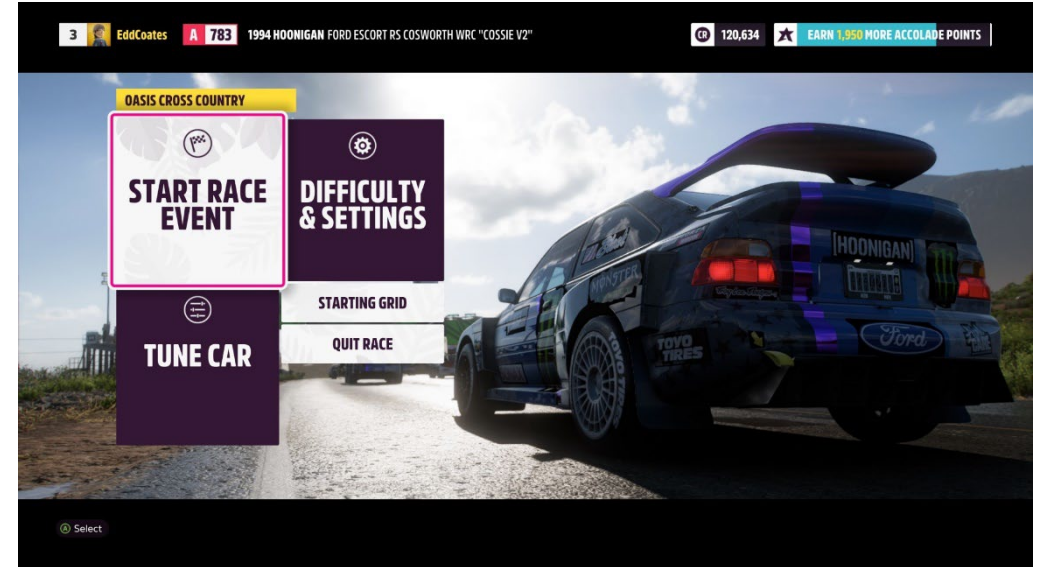

Fig. 6 Example of scale ("Forza Horizon 5", Playground Games) [12].

- In Fig.5 the '1000' text stands out as the dominant lead-in graphic, through its comparatively large scale on the screen.

- In Fig.6 the use of a large car image becomes the directive element, the eye looped back across the screen to the 'Start Race Event' box by its size and positioning.

D. Symmetry/Asymmetry

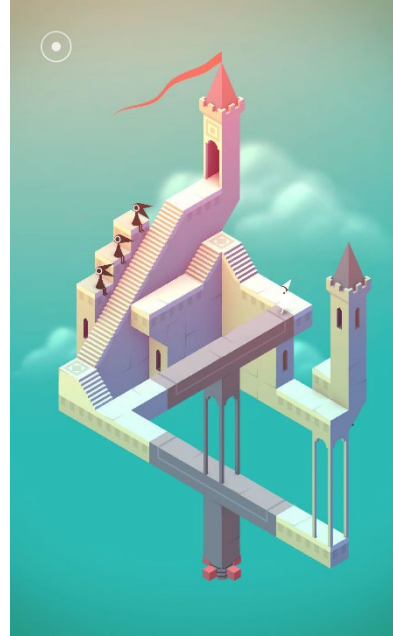Fig. 7 Symmetrical balance ("Monument Valley", Ustwo) [13]

Fig. 8 Example of symmetrical balance of visual ("Monument Valley", Ustwo) [14]

Fig. 10 Symmetrical balance ("Firewatch", Campo Santo) [17].

- The symmetry applied to each screen of isometric puzzler, "Monument Valley" (Ustwo Games) achieves a visual sense of harmony.

- Similarly balanced but in a different genre, adventure game "Firewatch" (Campo Santo. Fig. 9 & 10), demonstrates a minimalist non-diegetic UI HUD.

E. Framing

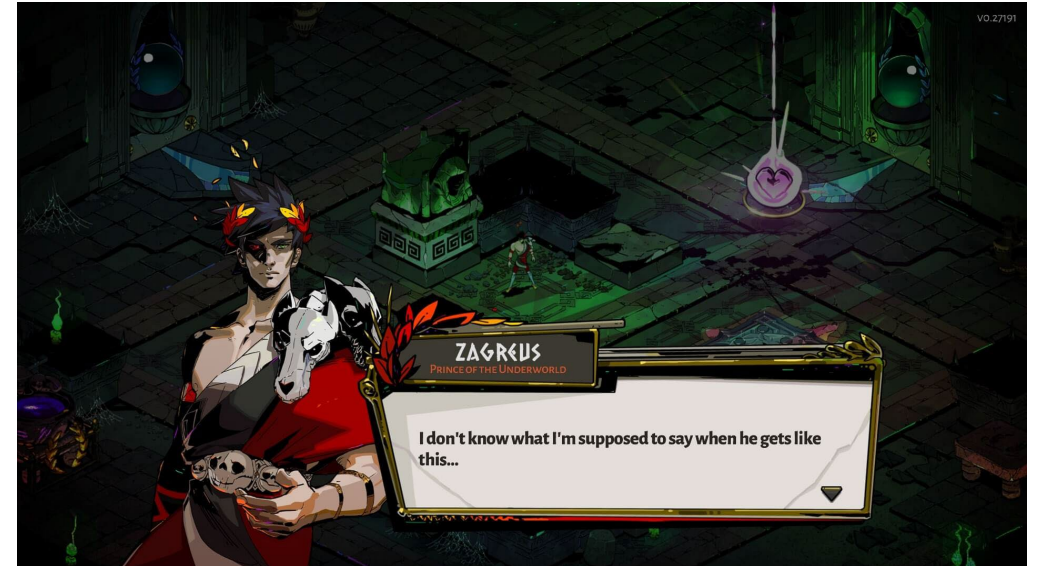Fig. 11 Example of framing ("Hades", Supergiant Games) [18].

Fig. 12 Example of framing ("Hades", Supergiant Games) [19].

- Frames appear as a regular element throughout the gameplay to hold information and communications and direct the eye.

- Frames as graphic devices separate UI clearly from the action.

IV. The analysis of underutilized elements of graphic design in computer games

Underutilised principles/elements

There are certain elements of graphic design which are either harder to incorporate onscreen or potentially overlooked.

Fig. 14 Asymetry and contrast ("Persona" P-Studio, Atlus) [21].

- Asymmetry & Dynamic Contrast: exampled here by "Persona" (P-Studio, Atlas), is a rare style of game UI design.

- Typographic Knowledge: appropriate fonts and type usage can enhance the game experience, poorly executed text can inhibit player understanding/immersion.

- Simplicity and Clarity: keeping the screen clear to play.

V. Evaluation of GUI in games

Evaluation of design principles in GUI

- Our paper details each core graphic design principle to examine to what extent the examples show evidence of it's use within the UI screen selected.

- The consensus was that the games we examined all used the core graphic design principles (Section II), despite varying genre and platform.

- We further noted that despite these principles being applied from a communication perspective, that analysis of successful use is still subjective in nature – games with very aesthetic and fundamentally elegant UI may fail to address ergonomic or experience concerns from a technical perspective.

Summary:

- The core principles of graphic design have remained more or less the same from the modernist era. Development of a system for graphic design began in earnest through the International Typographic Style, and now we engage those principles, and other design elements, to tackle a 'post-postmodern', digital world.

- Design principles provide a great foundational architecture for visual communicators to construct GUI designs. Considering the basic principles of grid, hierarchy, scale, balance and framing are important to build designs which are user-friendly and best-practice visual solutions.

- By developing a greater understanding of human viewing patterns and behaviour, we can make our GUI designs look, function and communicate better, and with this knowledge utilise the major elements of design as tools of our messaging.

Conclusion:

- The analysis presented in this paper was conducted on small sample of an array of popular games, across multiple genres and platforms, with the focus on to what extent five core graphic design principles were present in the GUI.

- Our contention is that most if not all five graphic design principles are applied in some form to GUI design, from analysis of these examples, and few principles appeared to be underutilised.

- This initial review gives us insight into the application of design principles from a broad perspective and indicates that graphic design principles, applied appropriately and with consistency and forethought, can increase positive user experiences with game UI and assist in the clear communication of information critical to gameplay.

- Future studies could measure user experience in gameplay; investigating the efficacy of UI element placement, to give insight into the affect console and screen type or size may have on layout, interaction, and thus immersion.

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