

# Shape Theory in Animation Pedagogy and Practice

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While satirical cartoonists, illustrators and character designers have long embraced design practices that link recognisable shapes including platonic solids to character traits, there is no single theoretic work of animation theory that reflects on this golden rule of animation and character design practice. Commonly known as Shape Theory, this set of conventions in both 2D and 3D character design stems from a set of norms and conventions closely linked to but not limited to children's cartoons. Often taught as part of the academic canon of character design, this set of conventions has informed both industrial, commercial and artistic animation practice since Emile Cohl in the 1900s. Ascribed to an early article by Solomon Ash, Shape Theory now forms part of the canon of Western character design pedagogy. This paper critically reflects on theoretic foundations of Shape language, its applications in animation pedagogy as well as examples of animation practices.

*Shape Theory. Character Design. Animation. Pedagogy.*

## 1. SHAPE THEORY AS EVASIVE THEORETICAL CONCEPT

### 1.1 Gestalt Theory as precursor of Shape Theory

Shape theory dates back 70 years, with its origins often traced back to an article by Solomon Asch from 1946 entitled 'Forming impressions of personality' on the impact of body shapes on character design impact:

*"Body shape has a tremendous impact on the overall impression of the character. If you ever looked at a cartoon character and though they seemed confident but didn't know why, you probably were not aware of the character's shape language!" (Asch 1946, p.258)*

Over the last decades, shape theory has influenced animation practices by example and application, not at least fuelled by pedagogy. Presented as fundamental, however reductive character design practice and animation pedagogical strategy, 'Shape Theory' borrows concepts from psychology, gestalt theory, and aesthetics. The focus on simplicity is indeed a key principle of 'Gestalt'. The German word 'Gestalt' literally translates into 'Shape' or 'Form', with the key difference that it

encapsulates the idea of something representational and recognisable. This recognisability oftentimes relies on simplification and generalisability. In its focus on simplicity, Shape Theory shares with Gestalt one of its pedagogical strengths, and also one of its biggest conceptual weaknesses. Linking simplified visual traits to characteristics of a protagonist and their design, can result in oversimplification, and can be regarded as inherently reductive in its superficiality.

Indeed, the same criticism can be traced back to the beginnings of Gestalt Theory, and was first pointed out by its pioneers: "By using this term for spatial and tone-Gestalten, Mach had been wishing to [aim] their simplicity" (von Ehrenfels 1890 in: Guberman 2015). Both concepts have long shared the signature trait of generalization, which can be linked to the generation of meaning attributed to one of the many laws of Gestalt the principle of 'Praeganz'. This principle was first proposed by one of the pioneerws of Gestalt, Wertheimer (1939) and describes the idea of grouping in order to understand a perceptual reading of a group as a single emergent whole. Generalisation and simplification can be seen as defining principles of Gestalt, and feed into both the potency and the persisting critique of Shape Theory as pedagogical practice.

## 1.2 Shape Theory, Psychology and Archetypes

Just as its precursor 'Gestalt Theory', shape theory rests on a set of perceptual phenomena that builds on cultural norms, empirical, lived-experience and design principles. Importantly, 'Shape Theory' relies on a factor of culturally-coded visual tropes, that have continuously influenced Western character design practices. The origins of Shape Theory can be traced back to the early days of character design, which have been heavily influenced by the history of cartoonists, often in the form of political illustrations and comic strips. The history of sequential political illustrations dates back to the Bayeux tapestries and later William Hogarth (1697 - 1764). And yet character design conventions are based on cultural visual language that has evolved since early political cartoons, which first came to prominence in the 1850s with cartoonists such as John Tenniel in the UK, or Thomas Nast in the United States, who were themselves often inspired by German Realism.

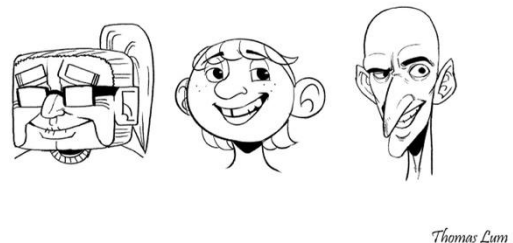
While there is a direct relationship between political illustrations and the evolution of the comic strip, character designs in early animation were heavily inspired by the former. In this sense, there is a degree of linear progression between political illustrations and early character design in animation, which notably manifested in highly problematic racist subtexts attributed J Stuart Blackton's 'Funny Faces' (1906) or later in Fleischer Animation's 'Snow White' (1933). Stereotyping which builds on simplification and generalisation, and bias remains one of the key issues within the pedagogy of 'Shape Theory'.

Both psychology and character design theory points to the close link between archetypes, and visual representations (Tillman 2011) and its uncomfortable relationship with stereotyping (ibid). The concept of archetypes was studied and made prominent by the Swiss psychologist Carl Jung. Jung understood archetypes as patterns that repeat themselves in the collective consciousness (Jung 1885), a concept that influenced storytelling in its introduction of recognisable archetypes, typical of their narrative behaviour. Shape theory assumes an inherent link between such archetypes and their visual representation. Such phenotypes i.e. their visual counterparts or observable characteristics can themselves be traced back to our collective cultural heritage.

As a visual trope and narrative tool, oversimplification or in the terminology of animation practices, 'exaggeration' (Johnston & Thomas 1981) can help to convey key characteristics in storytelling, in particular to a young audience. Some of the most successful examples in character design history lean heavily on such phenotyping through shape

theory for instance the iconic, recognisable round shapes of Disney's Mickey Mouse, the square shape of SpongeBob SquarePants, or the stylisation of Nintendo's Super Mario as round and likeable - versus his archnemesis Wario, who is presented through pointy, triangular shapes. Be it as a suggestive storytelling device, as a means to an end in a design world that is often characterised by the functional design principle - 'Form Follows Function', or as an ostensible signifier that conveys readability, Shape Theory permeates industrial practice from Pixar's Up (2009) to Disney's Inside Out (2015) and Inside Out 2 (2024), and has found its way into Animation curricula across the West. Yet Shape Theory cannot be discussed and taught without a lens of criticality, to ensure that the limitations of the concept are just as evident as its pedagogic potential.

## 1.3 Aesthetic, formalistic and psychological co-factors



Thomas Lum

Figure 1: Tom Lum - Expressions, Graduate Project 2023

At its core, Shape Theory can be reduced to the attribution of three principal two-dimensional shapes - the triangle, the square and the circle (see Figure 1). The immediate appeal of the concept relies on its connection with an embodied level, which can be accredited to their geometrical, physical and optical attributes: a square is defined by its four sides, on one of which it typically rests. Within this representation, a square is oftentimes perceived as both static, passive and immobile, but also as balanced and grounded. In 1886, the aesthetic philosopher Heinrich Wölfflin differentiated between the visual impression of different squares stating that

*"empathetic, embodied responses to gravity, making tall, thin rectangles unstable but elegant; squares heavy and bulky; and wide, flat rectangles relaxed and dissipated."* (in: McManus 2013 p.1).

Carl in Pixar's Up (2009) is depicted with square glasses from a young age, a representation of what

he will become, whereas in contrast, Ellie is always represented in circular shapes. Indeed, while geometrically, and architecturally stable, the square is a rare form in nature and frequently symbolises the man-made, the constructed, the domestic, stability.

In a similar vein, in the West a circle is frequently associated with bounciness, playfulness, friendliness, the nurturing, the female; but also symbolises the transcendental, in its allusion to the planetary as well as ideas of unity for instance in liturgic, communitarian or religious symbolic contexts; The downward facing triangle is frequently associated with the unbalanced, the unstable and sometimes with threat: Research suggests that the perception of the “downward-pointing ‘V’, which is similar to the geometric configuration of the face in angry expressions, is perceived as threatening” (Larson, C. L., Aronoff, J., & Stearns, J. J. 2007, p.1). Whereas the upward facing triangle can be perceived as more stable and robust. In his classic oeuvre ‘Art and Visual Perception: A Psychology of the Creative Eye’, aesthetic and perceptual psychologist Rudolph Arnheim noted that

*“Vision is highly selective, not only in a sense of concentrating on what attracts attention, but also in its way of dealing with any one object” (Arnheim 1960, p. 28).*

The concept of universal face expressions (Ekman 1972), as put forward by Paul Ekman is in itself contentious, as demonstrated by research into facial expression recognition (Wang 2010).

The interpretation of a shape, a face, an object is fundamentally subjective, and culturally coded. While the dominance of these shapes across cultures has been assumed by Rosch (1973) and other Gestalt theorists, their meaning and contextual significance is of course culturally coded. The Himba of Northern Namibia for instance are known not to possess words for either of these shapes (Roberson et al 2002). While the above tacit knowledge that converges into what we now understand as ‘Shape Theory’ is frequently understood as basic, fundamental to cultural readings of character designs, this set of norms, conventions and principles appears often artificially constructed, culturally-coded, simplistic and evasive. So why is this shape theory so pervasive in animation pedagogy, and remains so popular among students? While the concepts are simple to grasp, they consist in an effective communication device, a visual trope that is easily communicated across ages. In particular, young children find shape theory a helpful vehicle to understand a story. Furthermore, shape theory helps to provide visual contrast in storytelling, as it introduces a mimetic element -

showing rather than telling. Shape theory is intuitive to use and decipher, and yet there is a real danger in equating shape and form with meaning, in perpetuating stereotypes, oversimplifying characters that could be complex in their personality traits rather than reductive to their outer form and appearance. It is for these reasons that a critical stance in teaching of shape theory remains so very important.

## 2. SHAPE THEORY AS FUNDAMENTAL PEDAGOGICAL PRACTICE

### 2.1 Shape Theory in 3 Dimensions

As his final major animation research project ‘Expressions’ by Thomas Lum was designed as a character study and exercise in shape theory, consisting of:

*“projecting characters animating within the confines of the three commonly used shape theory geometries. The circular character will be animated in 2D and projected onto a sphere 3D shape, the square and triangle characters will also be animated in 2D and projected onto their 3D shape counterparts.” (Lum 2023)*

The student, a skilled 2D and 3D illustrator, chose to translate his character designs from a two-dimensional plane into the 3-dimensional space. While conceding the limitations of shape design, and the fact that implementations are - in the student’s own words ‘often done very badly’, Tom Lum exchanged the confinements of the 2D plane for the limitations of a 3-dimensional shape, implanting fixed forms into the spatial environment of his graduate exhibition.

Ever since Bauhaus, both architecture and design embraced the translation of simple shapes into three-dimensional space, not merely as minimalist visual statement, but as storytelling device, to convey messages to and as signifier for underlying values. Following research into the Kiki / Bouba effect (Fryer et al 2014), the student employed techniques pioneered by artist Tony Oursler, who playfully embraced parallax, distortion and perspective in projecting faces onto objects. Using a sphere, a cube and a pyramid polyhedron, three animated faces were projected onto these opposing surfaces, resulting in a triptych composition, full of conversational tension - an endless of discursive ambivalence between the character designs and their representational shapes.

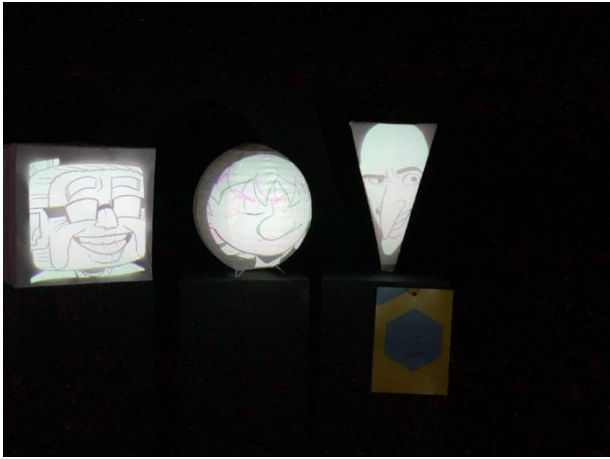


Figure 2: Tom Lum - Expressions, Graduate Show 2023

The project was ambitious in expanding from fixed screen animation into projection onto 3D shapes in the real world. He discovered opportunities and challenges of projecting 2D onto 3D shapes whilst preserving the essence of the 2D shapes. Nominated for the prestigious University of Greenwich, School of Design - Head of School Award, the work succeeded in highlighting the restrictions of Shape Theory, both as a design concept and application. Reflecting on his learning on animation theory and practice including the fascination and frustration with Shape Theory. The resulting artwork (see Figure 2) playfully critiqued superficial, dogmatic and reductive tendencies of the concept.

## 2.2 Subverting Stereotypes

As second example, illustrating the effect of shape theory on students' creative practice is a project by Level 6 student Sara Papp. Her 2D animation is heavily influenced by Disney's *Inside Out* (2015) and Garret Rhea's animation and children's book 'The Story of Circle and Square' (2016). Sara's narrative is set in a world where everyone is conforming to a single shape, and one day, our protagonist, Zia, is looking in the mirror, realises that she is different:

"Zia had been unhappy with her shape for as long as she could remember. Every day she looked in the mirror and saw someone she did not like. She wanted to be thinner, to have longer legs, to have a smaller waist. But all her wishes had never changed her shape. Zia finally reached a break point and decided enough was enough. She was going to learn to accept her own shape, no matter what anyone else said. Zia started by taking a long look at herself in the mirror. She looked at all her curves and contours, and she started to find things she liked. She liked her wide hips, and her full lips, and the way her eyes sparkled."

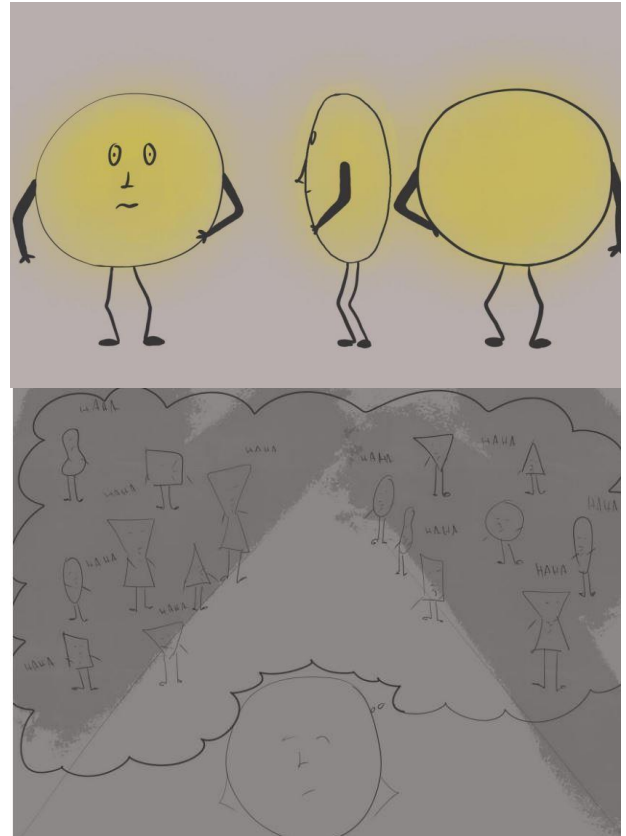


Figure 3 and 4: Sara Papp: Zia - Character Design & Storyboard frame

In the case of Sara's Final Major Project, shape theory serves as a point of departure, for a discussion of stigma, conformism, and societal expectations. In this case, the notion of a shape remains a surface structure, a symbol, a signifier, rather than signified meaning (see Figures 3 and 4). The critique here concerns not so much the theoretical construct, but the societal norms that preconditioned it. In Sara Papp's narrative, characters respond to their own body shapes, coming to terms with an 'expectation of norms' in what can be seen as a form of body dysmorphic disorder:

"Zia's biggest fear is her own body image and round shape. The biggest desire Zia has is to change her own body shape but deep down she is learning to love herself. She feels guilty about not accepting the way she looks."

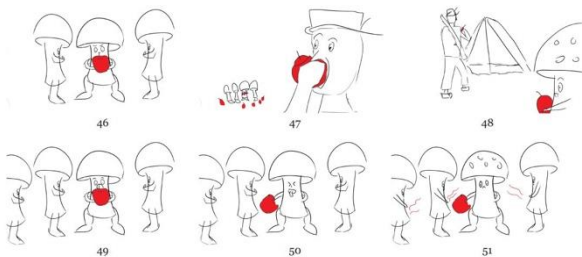
In a society where superficiality, and surface norms reign supreme, shapes stand for something absolute, a perfect ideal, that sometimes jars with perception of self, expectations and representation. In her critique, the student takes a fundamentally human-centred stance, with the profound message not only can we never judge a book by its cover, but appearances can also be deceiving. As individuals

we are not always in control of our 'shape', appearances can be deceptive.

The final case study, by final year student Dev Saxena, centres around a story in two parts: Whereas in one story, the protagonists are depicted as round, innocent looking mushrooms, they are revealed to be mass murderers (see *Figure 5* and *Figure 6*). In the second story the monstrous villainous looking protagonist, turns out to be philanthropic, caring and kind despite their outer appearance. Applying shape theory, and principles of animation such as exaggeration and appeal, this project is designed to 'smash the expectations', to subvert the ideas of shape theory that 'what you see is what you get'; Here, the student is playing against stereotypes, actively confronting ideas of oversimplification, and generalisation, thereby fuelling narrative moments of suspense and surprise.



*Figure 5: Dev Saxena - Character Design*



*Figure 6: Dev Saxena - Storyboard frames*

## 2.3 Conclusion

In all these examples, shape theory is applied as a fundamental animation and character design device, but its use and application are underpinned by a critical lens that elevates the message. Experientially we have found that a thoughtful approach to Shape Theory gives students practice at countering a well-known but over simplistic theory and thereby develops their critical thinking and confidence.

Shape theory is a useful pedagogical tool because it builds on ideas students have already been introduced to explicitly in animation or design curricula, or implicitly via films and illustrations. Additionally, Shape Theory links to and makes relevant to animation historic design pedagogy such as the Bauhaus movement and theories such as the Gestalt. Students approach Shape Theory with more confidence, as a known entity, and this makes it a fruitful area to help contextualise a wide variety of students' research, as seen above.

Contemporary popular animation walks a fine line between clear visual coding, and representational messaging as in *Inside Out* (2015) and *Inside Out 2* (2024) and a more nuanced stance adopted in recent films *Nimona* (2023) or *Elemental* (2022) in which not all is at it appears to be. Pedagogical animation practice will need to ensure that teaching about shape theory continues to critically reflect on questions of representation, so as to call out stereotyping and encourage the development of complex and multidimensional models of character design.

We propose to follow up this study by sharing this paper with future students to encourage more work that critically evaluates theories through practice. As part of this process, we will be screening student work mentioned in this paper, as well as student work being developed across the degree, in public facing venues, with the implication that further development will come from these endeavours.

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