

## THE GRAMMATICAL STUDIO

### *Disrupting regularities in digital media design education*

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**Abstract.** Grammar governs the ordered way in which words are modified and combined in human languages to convey complex concepts beyond the simplicities of individual words. By extension (but less susceptible to analysis) grammar governs the way in which visual elements are modified and combined in art and design compositions. In this paper we focus on the outcomes and effects of placing grammar and contingency in the forefront of studio teaching with digital media in architecture and art, and how experience in these two domains can inform each other.

### 1. Grammar

The idea of grammar in art and design draws on analogies between “visual languages” and “natural languages”. For generative grammarians in linguistics, grammar refers to the entire system of structural relationships in a language, viewed as a set of rules for the generation of sentences. Transformational generative grammars emerged with the use of computers for the analysis of natural language, concentrating on formalist approaches. While still conceiving of grammar as “the study of forms and constructions”, recent work in linguistics has brought about a “blurring of the boundaries” between grammar, lexicography and semantics leading to a new theoretical science called grammatology (Kristeva 1989, 31).

These developments in linguistics are echoed in the visual arts. The use of ‘grammar’ and ‘language’ as metaphors in art and design have long histories, especially in architecture, as a part of attempts to make seemingly tacit practice transparent through rhetoric and so-called

rigorous critique. The case is put succinctly by the French architect Viollet le Duc (1866) who uses both grammar and language in *Dictionnaire Raisonne de l'Architecture Francaise*:

*The first condition of design is to know what we have to do; to know what we have to do, is to have an idea; to express this idea we must have principles and form; that is grammar and language (Viollet le Duc 1866).*

The term 'grammar', then, is used as a *metaphor* linking the rules, elements, transformations and compositions which might be perceived in form making in design and art, relating to the rules, elements, transformations and expressions which constitute a grammar in a spoken or written language. In this sense, grammar is a familiar term in art and design, alongside (although less freely used than) terms such as "style", "series", "themes" and "variations". It highlights awareness of form, repetitive patterns, constituent parts, compositional rules, and "families" of designs that share common formal features. The term is so established that it is now probably a "dead metaphor", meaning that in its use it is understood without reference back to ideas of words, sentences and paragraphs of natural language (as, for example, the term "architecture" in "computer architecture" no longer conjures up thoughts of buildings).

Metaphors and models do not have static, one-off meanings, but are potentially capable of revealing multiple meanings, which can be progressively disclosed by the to and fro movement of a hermeneutical circle:

*This takes place within a context interpreted through metaphors or models of the world. Not only do we pick up cues from within the metaphor or models themselves, but also from the situation in which they occur, so that the conceptual environment in which they function plays an important role in the way we interpret and assess them. As the context changes so also does our understanding of the meanings of the models and metaphors we encounter (Coyne and Snodgrass 1991, 15).*

Alongside grammar are associated terms originating in natural language that are also used in art and design: composition, vocabulary, syntax, meaning, and language itself. These terms are also understood within art and design without reference back to natural language. This group of associated terms provide a frame of reference, but need not be read as a complete or formal system. Scruton, who objects to the idea of

architecture as an equivalent to a formal system, observes: “If it were true that architecture were a language (or, perhaps, a series of languages), then we should know how to understand every building” (Scruton 1979, 158).

Similar comments have been made about art and design. They are only true if art (or architecture or design) as language implies identity. Metaphors typically shed light on aspects of an issue (and simultaneously shadow others). The use of metaphors of language, grammar, and associated terms does not imply a belief that the referee of the metaphor is in all respects the same as the referent.

Although the ideal of a universal visual language that uses common notation (or scores) and works the same as a natural language in promoting “understanding” was dreamt of in the Bauhaus, such overarching ambitions have never come close to realisation. As Lansdown writes, “Art works such as musical compositions, poems, paintings, dances and so on do not carry messages in the same clear cut way as everyday prose. Decoding them is usually not easy—nor is it meant to be. Ambiguity and multiple meanings are inherent in such things” (Lansdown 1989, 67).

The metaphor of grammar, then, captures a sense of order in matter and form. The four key components of the concept are:

(1) Vocabulary, which is the collection of elements of an object or art akin to words in a language. We may speak of a sculptor as using a vocabulary of wood blocks and stainless steel rods, or a painter as using a vocabulary of layered parallel brush strokes. The notion of adopting a restricted or selected vocabulary is common in much art, architecture and other design fields.

(2) Rules, which guide the way the vocabulary is combined and modified in the form of products. These rules, though, may not be as definitive and fixed as the term at first sight appears to suggest.

(3) Derivation, which is a process by which a product derives from earlier versions of the same product during its development. Derivation is an outcome of the use of rules, and members of languages are derived through the application of common rules.

(4) Languages, which are families or corpuses of products, which can be seen as derived from common sets of rules. The same grammar will

result in designs which belong to the same language. We can think of a design as an example of others in one or many spaces. Membership of a family does not exclude membership of other families. Any design can be a member of several languages (i.e., it lies at the intersection of several spaces of designs).

The benefits of a grammatical analysis of art and design have been argued and sustained, particularly by Knight and Stiny, over the last 25 years (eg Gips and Stiny 1975; Knight 1994). Grammatical approaches to teaching design have also been advocated (eg Wojtowicz, and Fawcett 1986, Oxman, Radford and Oxman 1987). These advantages are compounded when inherently rule-based digital media are used in creating art and design work.

But merely applying repetitive and recursive rules deny the serendipity, the opportunity to react and respond as a design develops. Hence the equal importance of recognising contingency (Bruton 1999), the specific in-place-dependent way in which the use of rules and grammars is modified to meet each new circumstance, a constant revision and renewal of the grammatical rule set. Although the importance of contingency in design has also been argued, the relations between grammar and contingency is less documented – indeed, those who focus on grammar as algorithm and interpret the generation of designs by grammars as uncompromisingly predetermined, regard the idea of a contingent grammar as an oxymoron.

We reject this algorithmic focus. We regard the grammatical studio as a place where artists and designers work with an acute awareness of grammar and an acute awareness and responsiveness to contingent circumstance. The awareness of grammar extends to the implicit and explicit grammatical rules within the media as well as the implicit and explicit framing of rules for form making. Following Schön's (1982) concept of reflective practice, such a studio places in the forefront the origins, derivations, backtracks and reframing of studio production rather than the outcomes. It encompasses the social semiotics and meanings associated with grammatical formal languages (Kress and van Leeuwen, 1996) as well as the grammars themselves. The records and narratives of the journey are as important as the end points. Intervention and disruption are key elements of revolutionary thought and consequently, of creativity. As old formulas are interrogated, alternative actions may be discovered.

## 2. What is a grammatical studio?

A grammatical studio seeks to bring to the forefront awareness of grammar in studio work. This does not mean that all other framings of creative work are ignored or downplayed; merely that grammar is always overt and addressed. The studio does not necessarily use digital media, but may well do so both because those are the media of choice for many contemporary artist/designers and because there is a natural synergy between a grammar-like view of art and design and a grammatical view of the basis of digital media. Digital media inherently enable and promote a grammatical view of art and design.

This awareness of grammar, then, extends to the grammar-like operations imbedded in computer software. Consider Adobe Photoshop™. At a practical level Photoshop essentially operates on a vocabulary of pixels – there is no means of defining the vocabulary of lines, shapes, objects and groups that drawing software typically assumes. The transformation rules which are applied in Adobe Photoshop operate on this vocabulary, for example when an image is scaled or transformed, or images are superimposed, or colour ranges selected and modified, or an image is transformed from colour to grayscale. More obviously, grammatical rules govern the way in which an image is transformed from a ‘photograph-like’ render to a ‘charcoal-sketch’ type render. As each transformation occurs a new version of the image is derived from the previous version. Photoshop images as a group can be regarded as members of the language implicitly defined by the possible rules and transformations, although if no other grammatical rules are operating in the creative process this will be a very broad language.

Comparable grammatical rules govern the operation of 2D drawing and 3D modelling software, web site creation software, sound software, and animation software. Indeed, since computer software is inherently algorithmic and hence rule-based, all software can be seen as imbedding grammatical transformational rules. Often the way that these rules apply can be modified using settings under menu items labelled ‘preferences’ or ‘modes’. The fact that ‘Powerpoint’ presentations, or ‘Flash’ web sites, or ‘FormZ’ models all tend to have a certain similarity in form indicates consistencies in the languages that they permit.

Overlaid on these software rules is the compositional grammar of the artist/designer. Much has been written about shape grammars and the benefits of using shape grammars as a model in creative work. We promote here a more general sense of grammar, highlighting the key

concepts listed above but not necessarily requiring the explicit definition of rules.

The grammatical studio, framed in this way, positions the learning of how to use computer programs as a part of the understanding of the grammar. Artist/designers brings their knowledge to the screen but may be frustrated by their lack of technical ability. To create a personal vision with a pencil is usually a tacit operation because people draw with a pencil from an early age. For many people, to achieve the form making manipulation skills required to create a personal vision with a computer is still a tricky learning curve. Just as the Japanese Master potter may take many years to create a treasured masterpiece, so too digital artists need time to develop an awareness and understanding of the nature of the materials they are working with. To create significant statements in digital media requires both tacit knowledge of both life and technology. In the grammatical studio, this tacit knowledge of the rules of technology is brought out to the non-tacit, overt, realm of reflective practice (Schön, 1982) and skills and confidence is developed.

The framing of grammatical awareness within reflective practice is demonstrated in a greater emphasis on process rather than product in the grammatical studio than in the conventional studio. A concern with the vocabulary, rules, transformations and derivations, which occur during the creation of a design or artwork, leads naturally to an interest in “how things came to be” as well as “what things are”.



*Figure 1. Ben Gryst, 2002. Disruption*

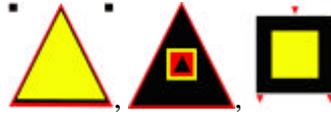


Figure 2. Neal Powell, 2002. Alphabet letters: A, B, C



Figure 3. Neal Powell, 2002. The word “synergy” expressed in the grammatical form language.



Figure 4. Neal Powell, 2002. *Cottleston Pie*, an animated 3D poem



Figure 5. Neal Powell, 2002. An animated 3D poem in the language

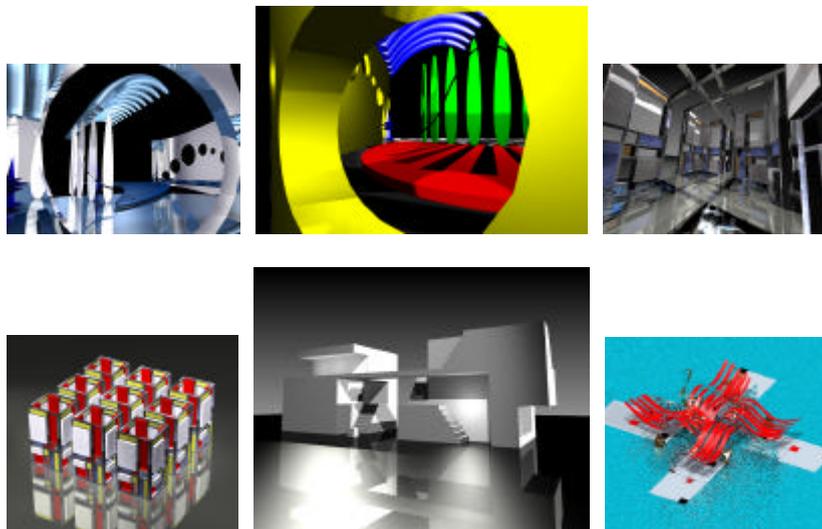


Figure 6. Andres Lopez-Torres 2002; Nikki Walsh (bottom right) 1999. Using five element grammars

### 3. Disrupting regularities

For many, art requires an intervention in old formulas for visualization and communication. Disrupting the conservative paths taken by former revolutionaries is a popular approach that yields results. In design education, we have seen new ideas emerge as fashionable philosophies swap from the automatically mechanical to unconscious romantic arenas. Traditionally our design education is based on the 17C Kensington education system. The system of the fine arts changed little since Baumgarten and Benjamin West set things in train for the Royal College of Art, London, that is, until the advent of the digital media revolution. Suddenly we have seen a new foundation for knowledge and activity on the visual arts that has disrupted the traditional approach to the fine art and design studio. Online screen based design education has added to the mix a new sensibility and modus operandi. These changes lead to alternative states of visualization and understanding of our environment. In the 21C studio we have artists who are using new tools in new ways to create new feelings and ideas about life and their environment. The new digital tools offer detailed documentation of the progress of ideas, a transparency of conceptual development, as never seen before. This enables design education to become clearer and more articulate in its aims and strategies as well as expand the range of outcomes. Some clear examples of changes are that sculpture may include rapid prototyping, and digital painting has become an accepted part of the cultural mainstream. Software engineering is rapidly becoming an influential playground for pioneering design. For example, at MIT John Maeda develops an approach to computer graphics using what he terms, “design by numbers”. He generously makes available his proprietary software online. Consequently, dynamic possibilities are maximised using a simple interface to explain the Java behaviours and code for anyone to use (to see an example: <http://proceedings.media.mit.edu/learning/examples/structure05.html>). Maeda extends the early dynamic digital work done with programs like *DiscoverForm* and *Tartan Worlds* by making available a programming system rather than simply a software product. This approach disrupts the norm by offering endless differentiation. The grammatical studio embraces this kind of disruption so that art and design may provide an open-ended environment for learning.

### 4. Outcomes

In the following sections we shall briefly outline the outcomes that should be sought from a grammatical studio.

#### 4.1 FOR LEARNING:

Students are more productive once they recognise their strengths and respond to the regularities they discover in their bodies of work through the transparent records provided by a grammatical studio. They are more confident than in traditional studios because they can see how their work was achieved and hence how similar work can be achieved again, and how changes to the use of rules and vocabulary might alter the work.

Public presentation of student work is more feasible than previously encountered in traditional approaches to studio education. An overt concern with grammar can lead to more formally polished and refined work, not necessarily in the sense of a slick digital imagery but in any consistent language.

Students recognise their visual goals and focus more quickly on the development of successful visual communication by developing alternative understandings of regular patterns and by recognising moments of inspiration and insight in irregularities. Irregularities – where the rules of a grammar are transgressed and the grammar itself seems to shift – can reflect moments of inspiration and reframing. A student's awareness of grammar also heightens awareness of these important moments.

As variations emerge so, too, meaning is revealed, especially in retrospect. Meaning in art and sometimes design is ultimately left for the critic to decide. Artists usually works for themselves while the designer must try to please a client. Within these seemingly conflicting circumstances the meanings of imagery or an arrangement of form, are decided. Variations on a theme offer opportunities to clarify and focus on meaning, to build on strength and to promote valuable personal dialogue and action.

Using digital media develops alternative directions in form making due to encounters with the often-steep learning curve inherent in ongoing technical mastery and upgrading skill acquisition. As skills develop in digital media, fresh outcomes are envisaged. An image can be output in many ways to print, web, broadcast film/ TV, and mobile device. As students develop their skills, new alternatives become available, the 2D image may become 3D, then moving image. Mastery of design fundamentals is essential, but so too, is a strong foundation in the digital manipulation of objects for a variety of production outcomes.

#### 4.2 FOR PEDAGOGY:

A high standard of public display and an exhibition program can be developed as part of a course. This extends outcome expectations and requirements for course maintenance and development in terms of resources and intellectual development. Learning professional presentation skills is part

of the repertoire of an accomplished artist/designer. Grammatical awareness in the display and review arena may form the basis of creative approaches that stimulate alternative readings of digital works.

Multiple output formats become standard delivery requirements for student presentation in web, disc, print and software/system. This leads to a better-prepared digital graduate artist/designer capable of survival in a rapidly changing digital culture. In addition to familiarity with traditional media digital artist/designers require a flexibility of design management that encompasses a wide range of materials for presentation. Changing Industry output demands are a vital part of the learning environment that requires regular upgrade of pedagogical approaches.

National and international boundaries are broken as the discourse on grammars enables shared understanding and scholarship. The transparency of a grammatical approach offers reflection and redirection beyond the standard "well worn" studio solutions, maximising the possibilities of creative and original approaches to form making in art and design.

There is a degree of convergence of art and science, through new language users that emphasise a redefinition of traditional notions of art and design as "data", "digital information" or "virtual form making". Trends toward an amalgam of programming and visual art skills indicate new double degree courses will require longer study programs to supply fully qualified digital form makers.

#### 4.3 FOR STUDIO PRACTICE:

The artist is able to transcend the "empty canvas syndrome" by recognizing and creating vocabularies of personal significance. Often the vocabulary of an artist is determined in relation to tacit rules of a deep and meaningful reflective engagement with the self. However, using a grammatical mindset offers access to achievable goals that avoid or seek constructive means of achieving what may appear to be the frustrating impossibilities of some aesthetic agendas.

Ideas can be connected into a matrix of cultural discourse. The use of networks of conceptual frameworks to position a set of images is a valuable outcome of a grammatical approach, especially in regard to semiotic relationships to form making. Using grammatical analysis as a tool for categorization assists the discovery of alternative modes of thinking and cultural understanding. Interdisciplinary threads are brought into play through international discourse on the development of form and its contextual relation to meaning.

The inevitable impact of contingency spawns interventions in studio practice preventing regularity from becoming stultifying. Irregularity may be

identified and stimulate alternative directions of thought through a concentration on the bigger picture. Instead of a perpetuating a repetition of old dogma, the grammatical studio assists artist/designers in more readily finding significant messages of value to self and society.

## 5. Conclusion

Harrison wrote that “anyone learning how to paint, write music, poetry or the skills of architecture” will “inevitably find that the learning of recipes, principles, rules of thumb and more exact rules for achieving varieties of effects and results” will be just as prevalent as in any ‘less exalted’ trade or profession” (Harrison 1978 p60). Harrison was writing before digital media was prevalent – his words are even more true in this age. In the grammatical studio these ‘recipes, principles and rules’ are recognised, made apparent, even celebrated. Through this recognition possibility for experiment, change and even radical disruption and reframing emerge. The recognition, and the competence and confidence that come with it, makes possible a creativity and quality that eludes the traditional touch-and-feel, personal expression, dominated studio.

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