Functions of Grid, a key for flexibility in framework

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Introduction

The grid is a well known device in graphic design, mainly in typography. It generally consists of a fixed set of guidelines. Although it plays an important role in design process it always remained underneath the visual discourse of communication. In visual communication, the visual space is not just a medium but itself becomes the agent of communication which engages with the viewer. For any two dimensional display, this space can be in the form of any plane surface— from ancient stone wall to hi-tech digital screen. The communication through this 2D space is the function of the individual visual elements, their interrelationship and the distribution of space. Grid, as a syntactic device, can provide the basic framework at each of these levels and more than that as an expression of a certain mental attitude it can induce the culture to the upcoming visual[1].

As a device, the grid is exploited in the field of typography but rarely appears in the discussion of any non typographic design applications. Etymologically the very concept of grid is still deprived of the proper attention in the research domain. The grid in use is limited, even though not restricted, to create rectangular space distribution which is used to decide the placement of elements and their alignment in vertical and horizontal direction. Grid is employed for the arrangement of different elements but hardly for the shaping of the internal structure of element. It would be worth to deconstruct the concept of grid from typography to overcome its limitations and to make it open for new explorations. Undoubtedly many interesting experiments are done under deconstruction but there are hardly any efforts to theorize it. Let's try to elaborate the typology of grid based on structural functions without any barrier of time and place of creation.

Grid: history and meaning

The grid is a commonly used term in many fields like architecture, mathematics, engineering and design and its meaning varies from guidelines, framework, supporting structure, channel of material flow to network of information flow. The use of grid for visual layouts is not at all new. In visual art, we can find the inscriptions and the evidences of grid from the medieval period or even before. (Hurlburt, 1978) In Europe, the early form of grid was mainly point based which during the renaissance period gained the form of field based Cartesian grid. (Williamson, 1986) Whereas in India, the grid was always a part of tradition and it has been practiced with the faith to the extent of religious doctrine. It had a large variety in form and application[2]. The past few centuries, the meaning of grid has shifted from interface between physical and super-physical worlds to interface between physical world and its perception by the rational cognition. (Williamson, 1986)

The modern grid which is in contemporary use was fully developed in its current form and use by second decade of twentieth century. In the early twentieth century the philosophical trend which denies 'art for art sake' started emerging in the form of constructivism. This concern for usability contributed to the foundation of new design. Around the same time the first design school, Bauhaus school, started in Germany which had a great impact on the modern design. This new design philosophy was inclined towards rationalism and minimalism. Bauhaus, departed from traditional patterns of decoration style, was quite open for experimentation. Soon it got influenced by the Stijl movement with strong dogma of geometry. This established the beauty in simple forms with straight lines and right angles removing all unnecessary curvatures and angularity. Obviously such design identified the rectangular grid with vertical and horizontal guidelines as a very essential device and became popular in the group of

theoreticians in academia. It was Jan Tschichold, trained as a calligrapher through the craft tradition, who was responsible in popularizing the use of grid in typography. Inspired by him many graphic designers like Max Bill, Emil Ruder, and Josef Müller-Brockmann started practicing and advocating the rectangular grid. (Samara, May 2005)

Many experienced designers talked about the use of grid for efficient designing. European designer Massimo Vignelli mentions the definition of grid given in the NASA standards manual as 'a predetermined understructure that the designer can employ to give the publication cohesive style and character.' (Vignelli, 1976) But in design practice, more than the definition it is the consensus which gives the notion of grid on the gross level. It follows the general meaning of framework, guidelines or understructure which is then connected to its application value like effective layout, cohesive style, etc. For our purpose, without being subjective, we will define the grid in graphic design as—
'a framework in the form of geometric pattern which creates the consciousness of the space and guides the designer to create and arrange the visual information in the demarcated space.'

Changing needs for application of Grid
An influential event that has occurred during last few decades is the opening of global market for design. It started the trends in two conflicting directions. One is to design to serve the global user as a culturally neutral group and other is to serve local market with culture influenced user group. In other words, there is a severe need of standardization to serve as much people as possible and at the same time one need to be different to get noticed. This exerts a lot of pressure on decision making while creating any visual. Grid can play very crucial role in standardization provided it has the flexibility to give scope for variations. Recent development in the digital technology has created tremendous virtual space and with it created a lot of challenges to manage it. The two major opportunities created by this new technology are in the field of dynamic media and interactive media. The viewer is allowed to interact through an interface and as a response the layout changes. Interestingly the semantic distribution of

space is no more static. It exerts extra pressure on the grid to change onsite. The use of grid in modern design many times is limited to the static visuals and hardly stretched beyond for the dynamic applications. Mainly, this is because, the Cartesian grid determines the static positions rather than the flow or the contours along the time. With the changing scenario of motion graphics, the functions of the grid should be extended to the level of new dimension. There is a great demand for more fluid, flexible, information heavy, customizable, ever changing but still homogeneous graphic solutions created within least possible time. This is a challenge for today's designer.

Advantages of using the grid
Most of the design applications use or may use grid for effective planning of visual information. Grid is an important device useful in decision making while creating visual layouts. The advantages of grid can be seen from different perspectives—space, content, resources, planning and management.

1. Space organization
Controlling the space in any graphic layout is always a main concern. In graphic design the careful control of measured space is required to achieve balance, structure and unity. (Swann, 1989) The grid can assist to think in terms of modules for controlling the space. (Vignelli, 1976) Grid can be used to create a hierarchy of space.

2. Content management
It is much easier to design a layout when there is less matter to display. But when there is lots of content and variety in the type of content it is a challenge for the designer. Grid helps in management of space by semantic content distribution and creates a sense of compact planning, intelligibility and clarity, and suggests orderliness of design. This orderliness leads towards not just better readability but better understanding and retention. (Brockman, 1981)

3. Work distribution: Great collaborative device
Design, being interdisciplinary, most of the time is of a collaborative nature. It's a collaboration of different kind of

content in the same space or collaboration of different people working on the same content. If there are more than one person working independently and their different works need to be merged in to one single design then grid provides the platform to merge these parts together. In case of publication design, say magazine design, there are many people who work together on different levels—copy writers, illustrators, photographers, designers. Then grid provides the structure and guidelines for them to interact and individually contribute towards a common visual space.

4. Cohesive style and character

All brands are very careful about their identity. They spend lots to maintain the identity in terms of quality, services and visual appearance. When many people are working on a project then grid acts as a helping aid in interaction among them which ultimately brings the cohesiveness in the design. As years go by the grid helps to build not only the character but the philosophy of the brand. (Brockman, 1981) Grid helps to maintain the consistency of identity both across a period of time and across the range of products.

5. Resource management- time and money

As seen before, the grid is useful in managing space and content. It is obvious that it saves a lot of designer's time as it reduces the guess work by creating possible nodes for placement in layout. It also reduces the probability of rework. Ultimately this results in improvement of efficiency saving the production cost.

In spite of these advantages, many of students and even professionals consider it as a monotonous mechanical device which constraints their creative freedom. Books which demonstrate the grid and its use mention the fear of designs becoming dull and lifeless unless used imaginatively. Alan Swann, in his book 'How to understand and use GRIDS', while accepting the importance of grid talk about the need for freedom from the rigid grid to achieve dynamic and creative effects. People who don't know how to use the grid 'creatively' or where to break the grid to achieve the dynamism may get trapped into the monotonous repetition. (Swann, 1989) To be

able to use the grid creatively one should know how to mould it according to the need of application and for that matter one should know what the all grid can do on the structural level. Knowledge of variables to formulate the grid will help the designer to create variety of grids with lot of flexibility.

Functions of grid

There can be three ways in which one can classify these functions- Internal, interactive and external. The functions which get highlighted in the design literature are mainly from interactive or external category. They either take into account
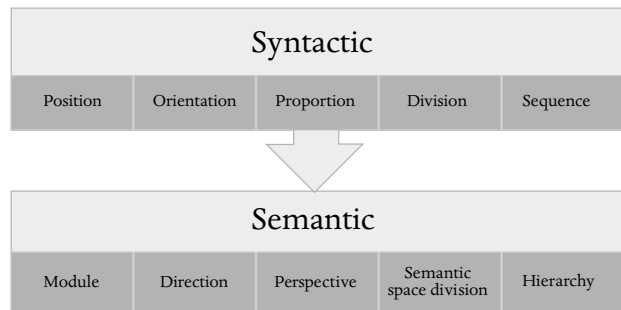

Syntactic				
Position	Orientation	Proportion	Division	Sequence

Semantic				
Module	Direction	Perspective	Semantic space division	Hierarchy

Figure 1: Syntactic and semantic functions of grid

the effects achieved in output or practical advantages of using the grid. We have already covered them in the previous section as advantages.

Here we will discuss the internal functions of the grid. The internal function is the function satisfied by the grid within the two dimensional visual space[3]. These functions work on three levels — form making, inter relationship among various forms and the distribution of the total space. In broader sense, the grid assists to create visual elements, divide the space in smaller units, give position to put the visual elements, align the elements and helps to arrange and order them as required. If we further break it down to the formal level, then five such formal functions can be observed. These are Position, Orientation, Proportion, Division and Sequence. These functions are purely syntactic in nature and work on the root level of space management in graphic layout. These are the

variables of grid formation. Further in combination of two or more they grant some secondary functions which handle the complexity of layout design. The grid can even be semantically loaded and then further classified as shown in figure 1. The examples illustrated below will help to understand these syntactic and semantic functions.

1. Position: The grid gives the point reference to put the visual elements in the two dimensional field. This grid is in form of points or intersecting lines which mark the positions either in rows or in scattered form. It nails the elements in the graphic layout to the surface. Sometimes it is just the centre
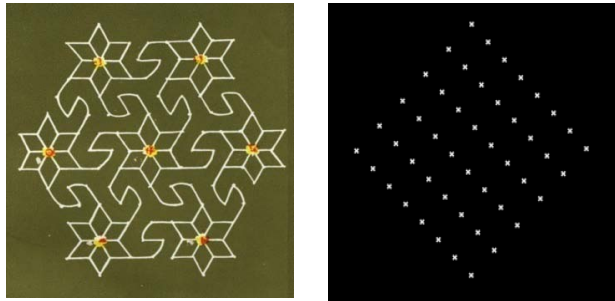
Figure 2: Syntactic functions of grid — Position

of the image which gives the starting point to draw. (Singh, 2000) Fig 2 illustrates one of the rangoli patterns found in central India. It is a common practice to mark the points at specific interval to create these patterns.

2. Orientation: It is a line based function and aligns the visual objects or part of the object along a particular direction. Orientations at different angles can create different expressions. For example alignment with vertical lines can indicate growth; with horizontal lines may lead to longing and angular lines contribute to energy[4]. Use of oblique grid in 1972 Olympic symbols by Otl Aicher (fig.3) induced the dynamic characteristics in the graphics.

3. Proportion: This function has a dual behavior. In linear form it defines the relative positions within the form and in planar form it acquires the enclosure of the content. As shown in fig.4 the grid helps to create the form of Buddha
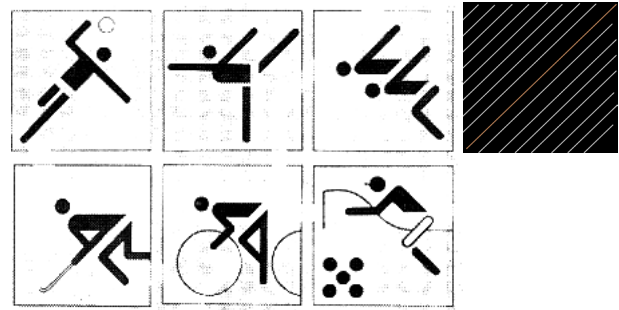

Figure 3: Syntactic functions of grid — Orientation

with specific proportions accepted in the school of Tanka paintings. In the typographic column grid it takes the form of enclosure for the text to fit in.

4. Division: It divides the space and separates the two entities from each other. The space division is achieved by physical boundary line, attribute variation or just a negative space. In the example illustrated here the animals in the bottom row are separated from each other by background attributes as if the space is divided due to the difference in the place. In upper two rows, the architectural features had mapped over the grid which creates the division of single place in separate units.
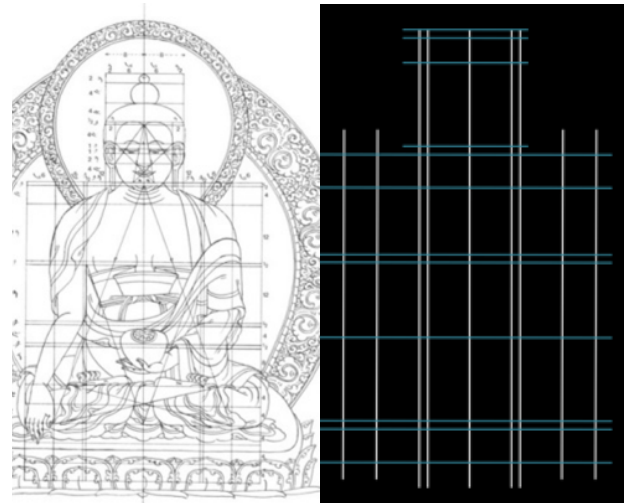

Figure 4: Syntactic functions of grid—Proportion

Functions of Grid

5. Sequence: It helps to arrange the content in a linear order. When space is divided in small pockets it naturally generates the logical sequence in linear or radial direction. If the sizes are uneven, the sequence that is formed can be explained using the Gestalt principles. Figure 6 shows the natural sequence created by the division of space.

Semantic functions:
The visual information displayed by the artist/ designer is ultimately the representation of the world around or the abstract concepts perceived by her. The syntax of representation is sometimes loaded with the meaning of the content. And the grid then does not remain merely at formal level but carries some meaning with it. Here are few semantic functions served by grid.

1. Semantic module function: This combines few semantic elements with some of the syntactic functions to create a meaningful modular unit which then can be repeated over the space with variation in position and orientation. All paintings

Figure 5: Syntactic functions of grid— Division

by Escher using the tessellation technique are based on the multiplication of a form based on a uniform geometric grid. In the graphics shown in fig.7, the modular unit is mapped on the geometrical grid and repeated over the space.
2. Vector function: It dictates the direction of the visual flow or even the flow of information. It is a combination of Position function and Orientation function. It creates the illusion of motion through the static visuals. In the Mughal painting (refer figure 8) the two elephants crossing the
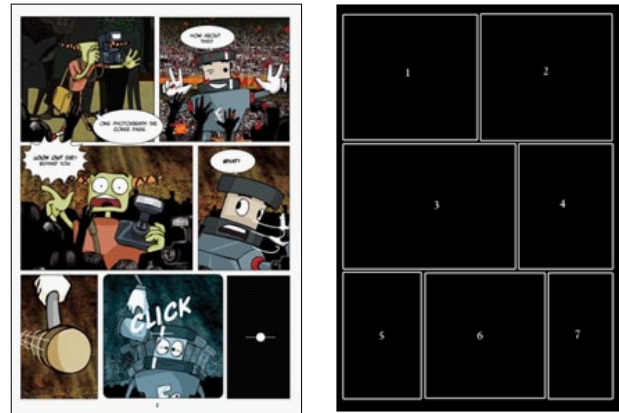

Figure 6: Syntactic functions of grid—Sequence

floating bridge give the feeling of actual dynamic motion in the diagonal direction. This effect is achieved through the alignment and orientation of different visual elements with the oblique grid.

3. Perspective function: The perspective grid (fig. 9) creates the geometric inter-relationship between the spaces which gives the feeling of depth. For non geometric shapes it acts like a guiding enclosure and for geometric shapes such as the architectural elements, it appears more prominently.

4. Semantic space division: The space here is divided not just for the purpose of convenience in spatial arrangement but also serves the demand of the semantics of the content. Figure 11 is the representation of market road with various
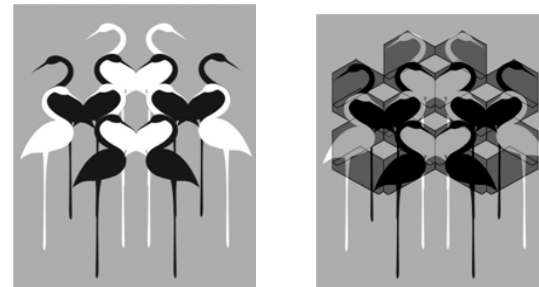

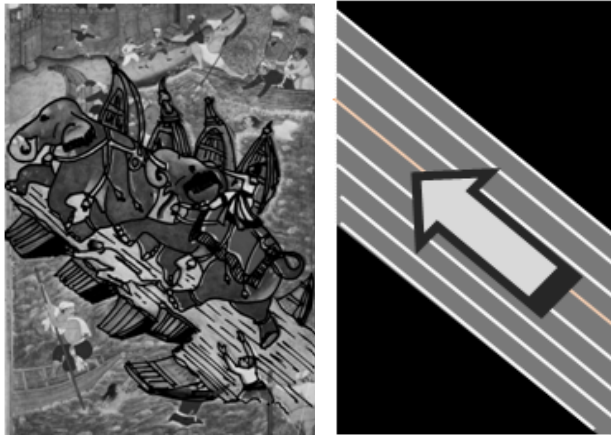*Figure 7: Semantic module functions of grid—Semantic Module*

Figure 8: Semantic functions of grid—Direction

shops on either side of it in a queue. The space here is divided as per the semantic division of place.

5. Hierarchy function: The grid also helps to create the hierarchy among the various elements. It is combination of position, proportion and sequence functions. Arrangement of different elements and their relative dimensions are many times determined by logical reasoning and not just by visual necessities. Sometimes, the order and relative scales are determined by hierarchy of meaning involved. (Coomaraswamy, 1934) Figure 11, a Jain painting made on cloth, shows the space division according to the hierarchy of the forms depicted.
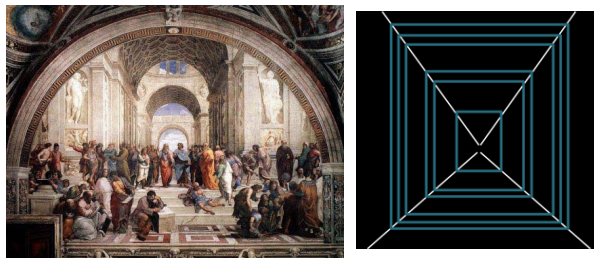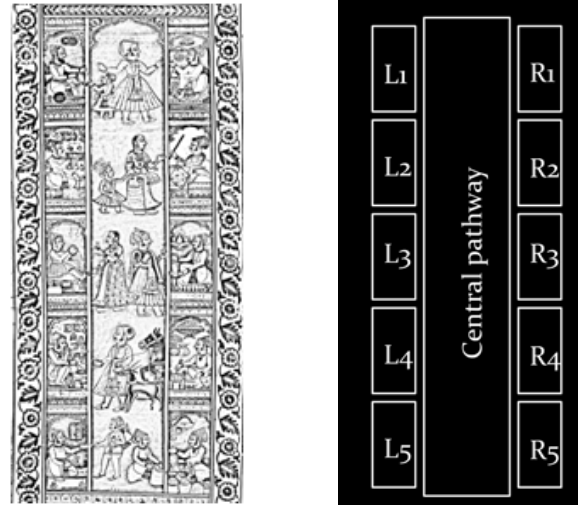

Figure 10: Semantic functions of grid—Space division

Flexibility through the grid

After the discussion of the various functions of the grid, we can say that the form of grid need not be constrained to the Cartesian grid. The forms of grid which are common are Cartesian grid, Manuscript grid, Modular grid, Hierarchical grid and there are forms like Radial grid[5], Oblique grid which are not much in use. There can be variety of forms the grid can take. Different functions demand different forms of grid. According to the application needs, the grid can take various forms from Point grid to Modular grid. It is possible to use more than one form of grid within a space, even overlapping
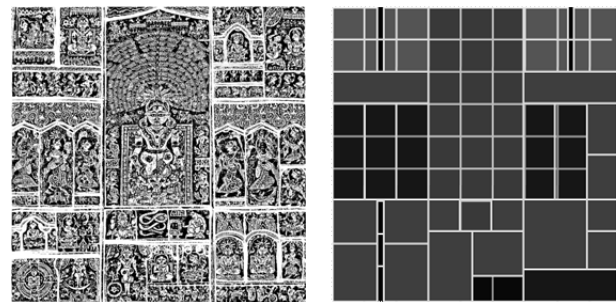

Figure 9: Semantic functions of grid—Perspective

Figure 11: Semantic functions of grid— Hierarchy

Functions of Grid

each other, to produce interesting possibilities of framework with higher level of flexibility.

In conclusion, the diversity in the layout lies not in a monopoly of some one of these several functions of grid but in a different hierarchical order of functions. The flexibility can be achieved by altering this hierarchy of order of functions. One needs to apply the grid creatively to avoid the rigid and monotonous look. This may be the first step towards unfolding the process for creative use of grids. The functions which are defined here can be treated as variables to create variety of grids. One needs to explore systematically and analytically.

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Notes
1. The cultural influences can be observed on not only the form of grid but also in the way it is applied. There are many forms of grid and many more ways of following the grid. In a way, the visual created using a grid reflects the culture of the designer.
2. In her book, 'The square and the Circle of the Indian Arts' (1983, Roli International), Kapila Vatsyayan has discussed variety of applications of grid in Indian tradition.
3. The approach here is purely formalist and the context of each art work is not discussed for the matter of simplicity. Although the context adds different layers of meanings to the image, it can not be neglected.
4. In the text of Vastu Sutra Upanisad (verse 24, 25, 26) it is suggested—how the mood of form is governed by the lines which it follows.
5. Alice Boner in her book, Principles of composition in Hindu sculpture (1962) discussed the radial grid and how it is implimented in Indian sculptures.

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