

Product Design and Manufacturing
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Lecture – 06
Elements of Visual Design (Part 1 of 3)

welcome to the lecture on Elements of Visual Design.

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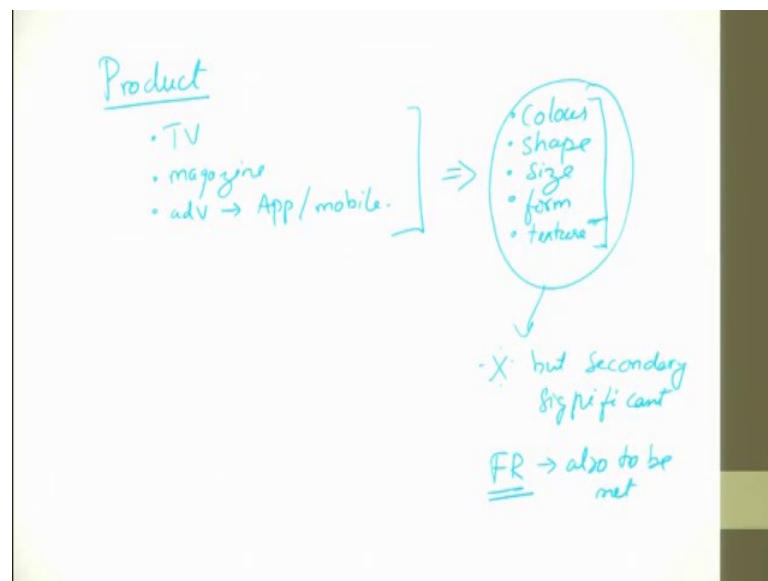


We will try to cover the following content one is aesthetics of design. If you look into the entire design process you have understood customer voice, then you will undergo convert the customer voice into engineering specification, then what you do is from that you will try to make sure all the functional requirements are met.

And then how do you proceed; proceed further if you make several conception prototypes, talk to people and the conceptual prototype along the functional requirement are accepted, then the major emphasis is given to form and form shape, form colour, texture. These are the four things which play very important role. Though they are not primary significant parameters, but they are secondary, but still they dictate the sale, they dictate the pricing of the product also .

How does a product really impress, the shape and form impresses the sale of a product and after this form and shape comes the packaging that also plays a very important role. Aesthetic plays a important role, but aesthetics only does not play an important role. Next is principles of design we will see then what are all the product message then visual design and then we will see elements of visual design. So, these are the things which we will cover today.

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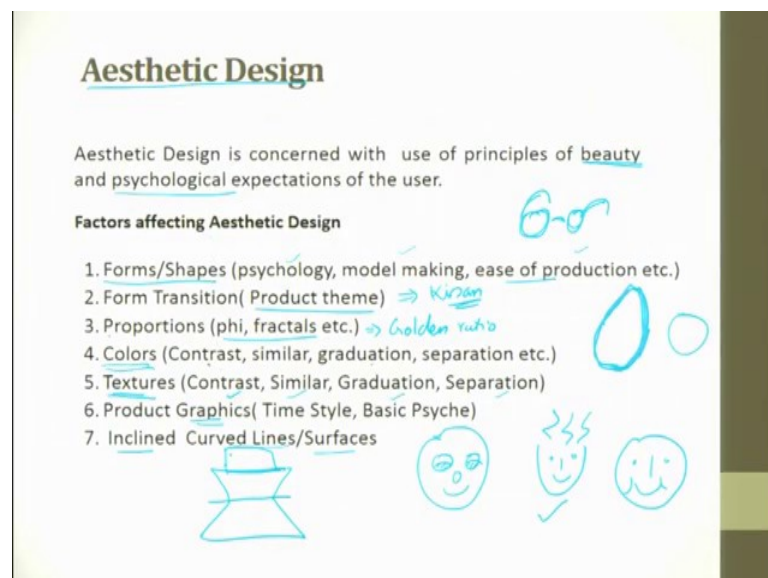
Today when we look at a product, if we do not have a feel for the product by touching the product what we always get impressed is by looking at a television or by looking at a magazine or by looking at some of the advertisements which come through apps, apps or mobile phone whatever it is. So, when we will look at it what are the important things we look at the colour, we look at the shape, we look at the size, and then we also look at the form. So, by looking at this, by looking at all those things we try to have an imagination just by representing the design.

- By giving this a proper colour, proper shape, proper size, proper texture we try to create an impression. When I was recently reading an article, the article says that after coming home from a tirefull days job, if your house can understand your mood and accordingly colour the walls automatically such that it can soothe your thought process and your comfort. Its only the colour, shape, size form and texture play a very important role , but I repeatedly reiterate my statements this is

important they are very important, but they are secondary important, secondary significance.

Because the primary is to meet out the functional requirements, earlier people have a thought processing the designer means its only focusing towards this, but today it is not only this you should have the functional requirements also to be met. Only functional requirement can a product be successful no, the secondary parameters have to be also considered and then we start looking into it, give importance to it and make the product more lucrative.

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So, when we talk about the Aesthetic Design; aesthetic design is concerned with use of principles of beauty and psychological expectations of the user. For example, you can always have a handkerchief with red colour, you can have it with orange colour, but people would always like to have with white colour or with the light colour.

Because, its going to give them psychological feeling.

Example: When you look at country flags, certain country flags have red colour in it. So, red colour means they are aggressive. In the same way when I try to put an ad and try to draw a chilli and make it very red dish; that means, to say it is going to be hot and spicy. I do not have to write any words I just put a chilli there and give the colour this

colour tries to create a psychological impression or expectation on the user . Beauty; beauty comes from the shape, size, form .

Factors affecting the aesthetic design is form and shapes . So, for example, I can draw a face in many ways as shown in figure. So, these are different forms all are able to express different person may like different faces. So, look at it recently our government of India has created Swachh Bharat. Swachh Bharat was an initiative was taken by father of our nation Mahatma Gandhi.

- we do not put Gandhi there we just draw try to draw his spectacles and then we say this is Swachh Bharat. So, when we see the symbol we always remember about Gandhi our father of our nation. So, the form has a feel for it sorry, my thing was not very good here. So, the form and shape plays a very important role, it gives you a psychological model making and it is ease for production etc

When you try to do a shape today I was watching a TV ad , there was mixer ad which the body of the mixer was like a person standing and his head there and they have made it. So, nicely it looks a servant maid, something like that as shown in figure, but when you try to manufacture they have to discontend they have to make into three different parts.

So, ease for manufacturing might be little difficult, but for ease of production also depends upon the shape and form. For example, people draw egg, making a three dimensional egg is not so easy, the radius keep changing and the at the tip it goes towards a different shape. So, this is if you start doing it, if you try to draw in two dimensional it is easy, but when you draw in three dimensional it is difficult or making is difficult.

People always try to make an egg and then they make a sphere because sphere is easy to make, the factors affecting aesthetic design form and shape tries to have a psychological effect, ease for model making and ease for production. Then form transition; the product theme must be able to be established. For example, if you are trying to talk about a food product, its good you start expressing a colour of tastiness, a feeling of taste or you try to put your tongue.

- For example, if you go back and look at Kissan sauce advertisement, , look at Kissan the sauce advertisement the logo used there. So, its form translation a

product theme, it is a food product, it gives you taste and all those things are brought in.

- And then propositions; so, propositions are something which is very important, people talk about golden ratio ,we will see what is golden ratio next. So, golden ratio is very important, whatever you do nature follows some proportion.

And if you see magnificent temples which are built they also follow the same proportion of human being, they would have made it proportionally large, proportionally small and if you look at them, they are wonderful. You see someone, who is having a beautiful body structure or if you see a leaf with beautiful body structure. If you see a snail shell which is beautiful, a shell along the seashore is beautiful, if you see nature would have followed this fractal design.

- Today we are trying to mimic and copy the factorial design into all the engineering products nature and nature products and engineering products. There is a difference, nature product does not follow simple geometry, but engineering many a times follow simple geometry why because, it is only to keep the ease for manufacturing. You can have a egg shaped item because, this egg shaped gives lot of protection for a liquid inside, but manufacturing this egg shape is not a straightforward case.

In engineering products, we have only two shapes basically; one is a line, next is a circle. So, you can say a tube, you can say a line and a circle are the basic shapes in 2D, once you know to make a line and an arc not even a circle an arc then all structures can be made because, everything is a combination of these two . So, we will see about golden ratio;

- Golden ratio is very important people also argue beautiful structures, beautiful nature products, new nature scenic scenes are following golden ratio. Then color; color plays a very-very important role, color plays a very important role.

Texture is also very important. If I give a glossy appearance, if I give a matte appearance, if I give a shade variation, if I can follow some Gaussian distribution in the colour variation, it tries to give me lot of impression and it conveys many things through

the design. Contrast designs you can have, you can say people would like to wear contrast shirts.

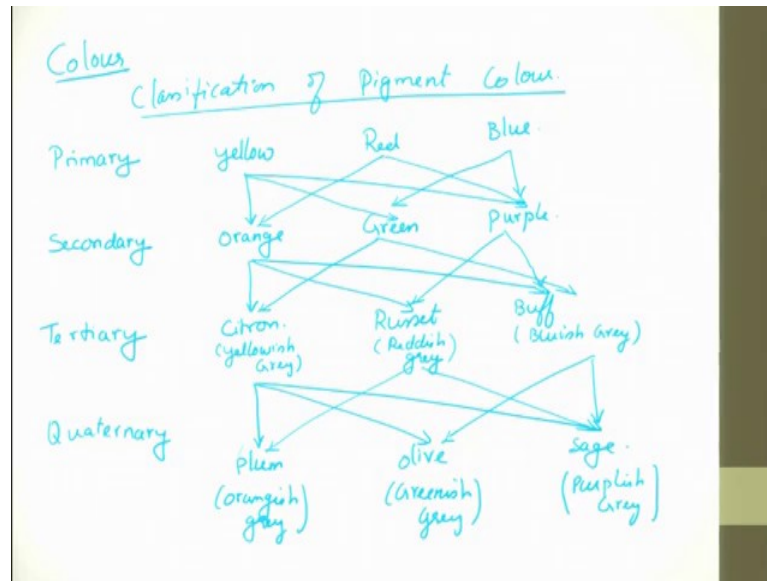
Example: I would like to wear a contrast shirt, I always try to have a chocolate green shirt which I used to wear when I go in parties. So, I know all others will have a smergy colour, but I will try to stand apart, I have a blue colour, a peacock blue colour . So, contrast second thing is when I prepare ppt slides, I always prefer to have contrast. Then you should also have similar, contrast also should be there you should also use similarity. You just keep always using this odd man out concept it does not work many a times.

When you are in a group when the products are in group, you have to follow similarity, then graduation then separation these are the four things which are very important as for as texture is concerned. When you talk about graphics the style in which they write also plays. For example, you can see lot of things in movie industry they spend lot of money in styling and writing the name in such a manner such that it tries attracting people .

- So, many a times when you the style gives you a basic feel of the movie. Earlier days we used to write in black and white the movie name and in a very simple format. Today what has happened, we add colour to it and many a times what people expect today is by looking at the name of the movie by looking at the colour which they have used in writing the name and by looking at the font people try to have an impression about the movie.
- For example, if it is a horror movie or if it is a thriller movie they would try to have a red color or a black color, and when they write it they do not write the fonts smoothly there is a big science behind it, its not just writing alone there is a science behind it. The science is psychology getting integrated into the textual matter and this is written there. So, that you get to feel and apart from that last we see the surfaces, lines which are used in real time.

So, these are the basic engineering things point line, to surface to edge to whatever vertices and then vertices to object. So, this also tries to play a very important role when we try to do aesthetics. So, let us try to talk about first colour.

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the colour are basically the classification of pigments because today we talked about digital world, so, its all pigments and resolutions. They are divided as

- Primary colour,
- Secondary,
- Tertiary
- Quaternary.

here what we have is yellow, red, blue, these are the primary colours.

The secondary colours are orange, green and purple.

how are the secondary colours formed?

The secondary colors are mixed from the primary colors and you try to generate a secondary colour. For example, you can have yellow, can is now mixed in all the three colours . So, then red is mixed with yellow to get an orange, red is mixed with yellow to get a purple then blue is also added to it. In the same way you also have blue getting mixed with yellow to form a green.

So, you look at it how interesting it is you have three basic colours. Now I mixed yellow with red I got an orange, I mixed yellow with blue I got a green, and I mixed red with blue red with blue and yellow I got purple. Now I can have the combinations generated out of the secondary colours. So, what are they?

They are :-

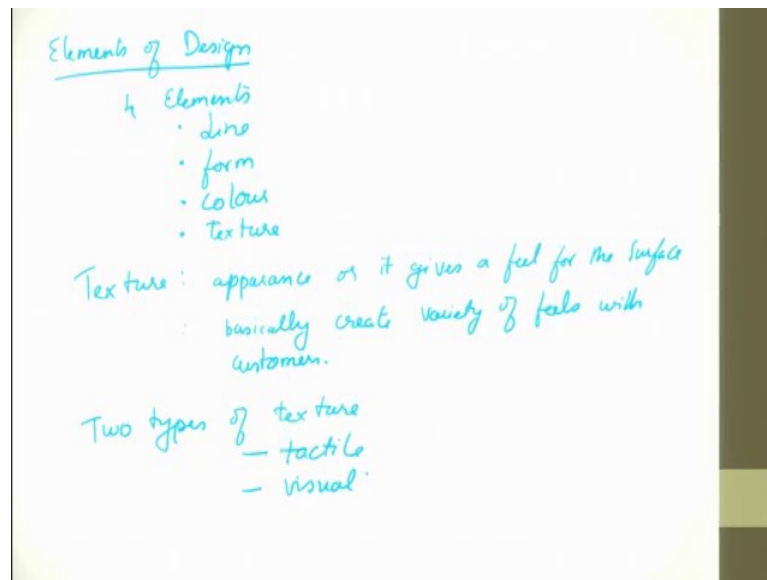
- Russet = yellowish grey
- Buff = reddish grey
- Citron = bluish grey

how is it? So, you can have one here, you can have combination here and then you can have mixed here and then green will try to have its colours from here and then from here green. And then purple will be from here and here. You see now secondary colours are generated this is nothing, but yellowish grey, reddish grey and bluish grey and then quaternary what you can have plum olive and then sage.

This is nothing, but orangish grey, then you can have greenish grey, then you can have purplish grey. So, this is again a combination you can have. So, look at it how interesting it you try to take primary colours, you try to mix colours and then you try to have multiple colours of it. So, this is a typical classification of pigment colours. You can try to generate multiple colours. So, basically you start with only three colours .

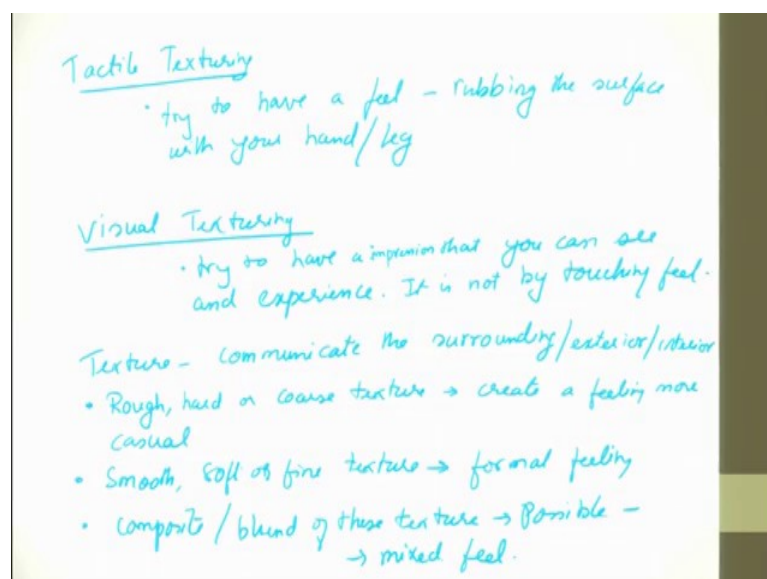
From there you start adding colours and now it is interesting, when you look at your monitor you will try to play with the grayscale level and the pixel resolution, pixel colors and in each pixel you will try to have three or four levels or two levels or three levels of different colours. It tries to give you combinations through this you try to generate. So, this will try to talk about colour. So, now let us see about textures.

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So, we will try to see elements of design, in elements of design we will try to see textures there are 4 elements; one is line I told you already, form and colour we discussed colour and texture. Now, we will try to focus only on texture, what is a texture? Texture is basically given to express the appearance or it gives a feel for the surface. By just looking at the surface many a times we try to have an illusion saying that the surface is smooth, the surface is rough all those things. texture plays a very important role. they can basically create variety of feelings with customers. There are two types of textures; one is called as **tactile**, the other one is called as **visual**.

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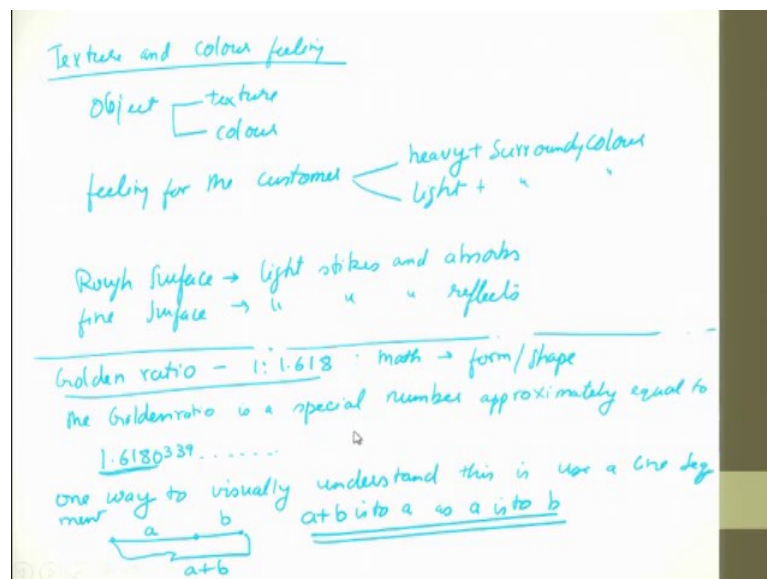
- What is a tactile texturing? You can try to have a feel by rubbing the surface, the surface with your hand/leg, it gives you a feel that is tactile feel
- Visual texturing , visual texturing that tries to have a feel that you can see and experience . You try to have a feel in the sense feeling just by seeing and here it is not by touching feel or your impression.

Basically textures, what do they do? They communicate, they generally communicate the surroundings ; surroundings means it can be exterior or it can also be interior. For example, inside a room, inside a box, inside AC theatre, inside a virtual work all these things textures just give a feel.

So, it tries to give you a communication like rough, hard or coarse texture create a feeling, more souring or more it can create feeling or casual rough, hard or coarse textures. when we try to put a smooth, soft, just opposite to it or fine textures ,it tries to create a formal feeling - neat, clean all those things rough surface. So, this creates a form feeling.

If you can have a blend of this to a composite or blend of these textures, but it gives you a mixed feel, it gives you a completely mixed feel .

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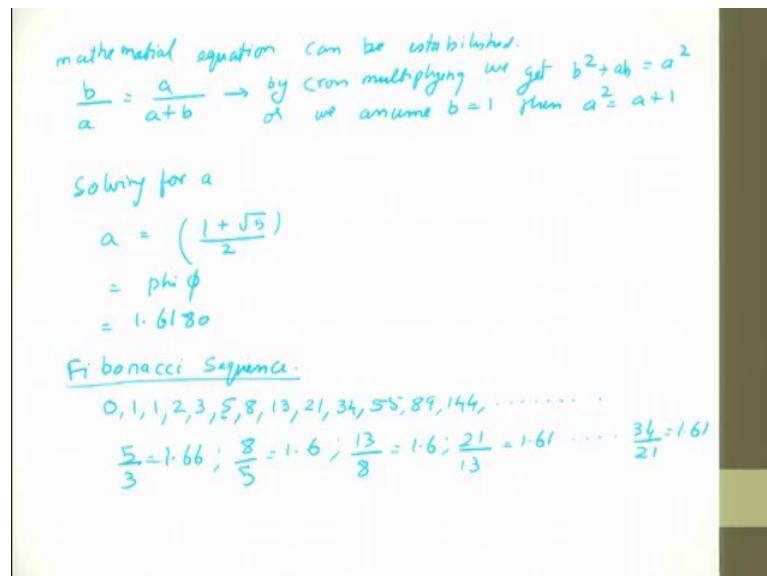
Now, I will try to cover both texture and colour feeling, we will try to discuss them. So, for example, if you have an object. So, this object texture and colour tries to give feeling

for the customer like heavy, light object. This in turn, in combination with the surrounding colour will try to have more impact on the object. So, the light and the surrounding colour if you have. So, that tries to make, to give you feel whether the object is small, large and all those things can be thought of. So, when you have rough surface what happens is the light when it strikes light.

Strikes and absorbs, when you have a fine surface light strikes and reflects. So, you get a glossy look. So, or if you look at this if you just make the texture fine, so, then it tries to take what is the appearance around the room and then start giving you a very good surface finish. So, we have discussed about texture, colour feelings. Now we will try to discuss about the golden ratio; golden ratio is 1 is to 1.618, golden ratio is a simple math which is followed whenever you try to give a form or a shape to the object or whatever product you develop.

So, the golden ratio is a special number which is approximately equal to 1.6180339 and it goes on. So, we try to take only 1.618. So, one way to visually understand this is used a line segment. So, what we do is we take 'a' we take 'b' and this is nothing, but a plus b. So, a plus b is to a as a is to b. So, this is very important which we follow in golden ratio.

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So, the mathematical equation can be established, 'b' by a equal to a plus b, by cross multiplying I will say, we get what is that b square plus ab is equal to a square or we assume b equal to 1, then a square is equal to a plus 1. I take a value of b equal to 1, so

then it becomes a square equal to a plus 1 . So, solving this, solving for a we get a equal to 1 plus square root of 5 by 2 which is nothing, but 5 which is 1.6180.

$$\frac{b}{a} = \frac{a}{a+b}$$

$$b^2 + ab = a^2$$

$$b = 1$$

$$a^2 = a + 1$$

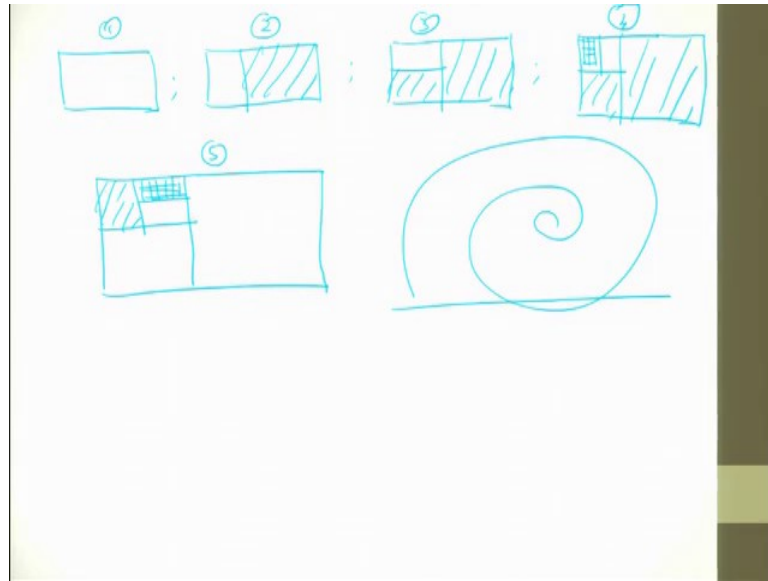
$$a = \left(\frac{1 + \sqrt{5}}{2} \right)$$

$$= 1.6180$$

So, this is what is called as Fibonacci's theory or sequence Fibonacci sequence. So, in that you take two numbers and when you try to add these two numbers you from the next number, so 0, 1, 0 plus 1 is 1. So next is 1 plus 1, so this becomes 2, then it is 2 plus 1 it becomes 3, then 3 plus 2 it becomes 5. Then if you try to take a ratio you will always get that 1.6 let me say go ahead so 3 this is 8, then 8 plus 3 is 13, then 13 plus 8 is 21, 21 plus this 34 and then 34 plus this is 55, then 89, then it is 144 and it keeps going on and on .

So, now, let us see the ratio what is the ratio? From here 5. So, it is were 5 by 3 is 1.66, then if it is 8 by 5 it is 1.6, 13 by 8 is 1.6, then it is 21 by 13 it is 1.61 and so on. So, you take 34 by 21 that is again 1.61 . So, this ratio is called as Fibonacci sequence and this falls under the golden ratio.

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So, if you try to form a figure it is like this, you have 1 square, then I divide this into. So, this is the next thing and next what I do this is first I divided into that ratio, then I try to take at this as a next step, then I go to the fourth one, I can put mark like this, so this will be . So, if you see what I have done as I have taken the ratio and I kept on maintaining it, the next step will be, I will try to finish this here. So, first I divided 2 by 3, So, you can see that, so every step you are trying to bring in the ratio and try to make things, so the last one I can put it like this. So, this was first, so this was the whole square from here you kept on going it and finally, what you say it, now this will be divided.

So, if you try to start drawing a radius, then you can see something like this will be involved and which you look at it this will be a typical snail shape snail shell shaped. So, this is the golden ratio which we talked about. So, these are the things which we tried covering now. So, for example, product we saw about proportions, pi and factorial this is what we discussed till now. So, I have explained all this things in this slide, so let us keep moving.

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What are the principles of design? When we talk about the principles of design, first comes

- Functionality
- Conceptual-in conceptual comes modularity. Today we are able to customize products because of this modularity. So, depending upon the requirements, people keep changing to meet out the customer demand.

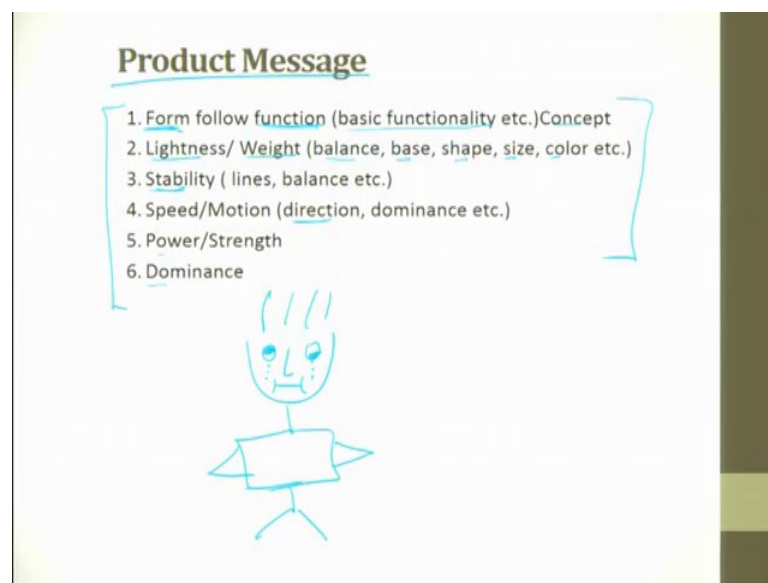
For example, if I have a shoe or if I have a building or if I have a kitchen, so I will build a shell as a kitchen and then what do I do, I have several racks made and these racks can be placed or it can be removed depending upon the requirement. So, wherever I need I keep adding and all these racks are cuboidal in shape. So, that I place it as and when required and the biggest advantages in kitchen and we always have maintenance issue. If I want to throw one rack out and replace it with other new rack it is done.

And in a bicycle if you see there are several parts, if the peddle fails the modularity concepts is followed, only the paddle is replaced rest all the cycle will be the old cycle. So, conceptual we should have logo, modular design and themes, then we should have balance in the colour, we will see about it later whether symmetry, asymmetry radial we should have this. Balancing of the object or the figure, then it is the directions, emphasis, contrast, so this we discussed about the factorial design.

Then it is Juxtaposition ,unity, variation, patterns, discolored all those things are the next principle to be followed. Rhythmic; rhythmic talks about contrast, similarity, graduation and separation, so this all discuss about the colour, ratio and proportions which go back there and then finally, it is going to be the lines curves, lines and surfaces.

These are the principles which we have to follow when we talk about developing a design in terms of representation. What are the product messages? The product messages are form, follow, function.

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So, the form plays a important function first you fulfill all the functional requirement and then you try to do the form for it, the basic functionality etc and concept has to be maintained. The lightness and the weight, you will see that lightness and the weight that is nothing, but when we look at the figure we look at balance and base, shape, size, color.

So, the lightness and the weight weightage which is given for the figure in the front end or in the back end is very important. The stability is also very important; that means, to say the line balancing with respect to the background color of the used color. Speed and motion tries to talk about the direction, power and strength and dominance, these are all messages which is given.

- For example in the figure, I put this and I say that the person who had this one is happy and here I have expressed his emotions and this is only a line scales, if I

would a blended with the background color, this would have been much more and interesting. So, I just play with one more look at it is there. So, first it was happy; first it was happy, he is now calm and happy. So, now, if I just change only the figure only the form and then I do.

the contrast used at the background and the form, shape, color gives a very good message about the product. So, this is very important, this is what we talk about in the product message. So, the form we are talking about, lightness and weight in terms of color that does not have written as balance, base, shape and color.

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Visual Design

- A new method of technical knowledge develops rapidly by following a scientific discovery.
- Visual Design is an applied art, whereby the principles of visual communication are used for effective design of product.
- Basic element of visual design are form, content, arrangement, light, and color
- The emotions that drive visual communication are seduction - conviction - inspiration.
- Visual Techniques Scale, Cropping, Juxtaposition, Abstraction/ magnification, Orientation, typography

Handwritten notes in blue ink:

R R g g
R K K

So, visual design is a new method of technical knowledge developed rapidly by following the scientific discovery, it is not like people have their own, it comes off like that. Anything and everything if you look back and see there is a science which follows and the science will back the theory and so that is how the stability or acceptance is more common.

Visual design is an applied art, it is an art, whereby the principles of visual communication are used for effective design of a product. It is not that randomly you draw something and its get accepted, you follow the visual communication principles. The basic elements which have already discussed is form, content, arrangement, light and colour.

Form is the shape, content, what are all present in the particular seen or in a particular shot is the content and arrangement whether something has to put in the front end or something else to do the back end, what all has to be arranged in such a way such that it can look very interesting. Color and the light, all these things, the direction of light which is thrown on the object, its shadow which is created that gives you an impression about when you see your photo or that when you see a product, it's the impression you get.

The emotions that drives visual communication are the emotions which is seduction, conviction and inspiration. Certain things what happens is you start remembering.

- why are the comics book more accepted? they are more accepted than your textual books whatever this kids study. Today government of India has made it a point that the textbooks have to be more pictorial.

More pictorial tries to explain the concepts more easily and then on top of it they have also try to make this pictorial more impressive. If you look at the kg, kindergarten school children books, the color of the book will be very-very impressive, individual photos will impressive. So, it creates inspiration; it creates inspiration for reading the book.

See if you see if you look at a movie which is 2 hours or 2 and half hours a movie and then you look at an add, the add is only for 90 seconds or may be 60 seconds. The add will have impressive colors, will have impressive song, it is only going to create an impression about the product to the customer and they get inspired and they are out there to buy it, so inspiration is something very important.

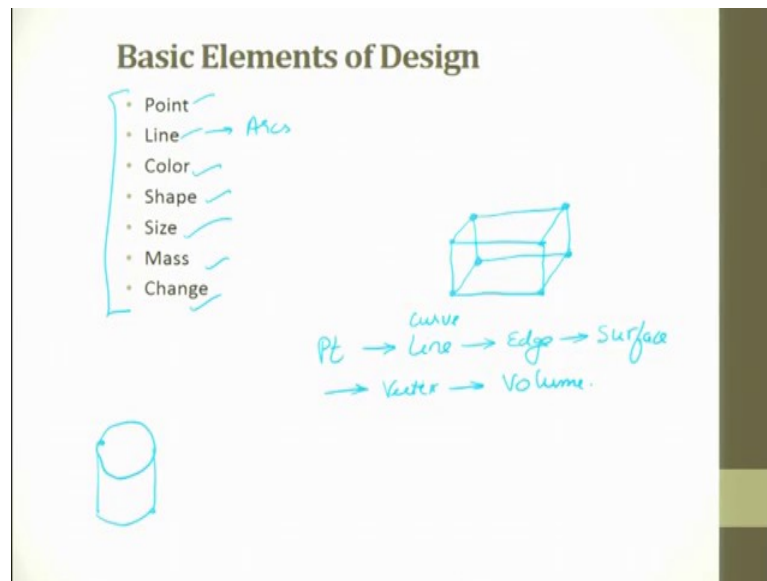
Moment you have lot of color pictures in a given book. So, then the students are able to correlate the picture color, the picture and the content to it very easily compared to fully textual ones. That is why you see cartoons are very impressive, the advertisements are very attractive, it is the impression the emotion what they cover plays a very important role.

The visual techniques such as scales, cropping, juxtapositioning, abstraction, magnification, orientation and typography, all these things we saw. Typography is nothing, but making the font for the same thing, some people write R and G in many ways and styles. so it is typography.

Typography, which people do and by looking at it putting at the proper background you can convey messages.

The visual techniques scalings, croppings, abstraction, magnification, orientation all these things are visual techniques which are used. So, ultimately what we should understand is, the principles of visual communication is used for effective designing of your product.

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when we talk about design it is more about point. So, let us go very simple a point, if I want to draw a line, point a line. So, then I wanted to make a surface, so a line is now closed, this is a surface. Now, I want to create it as a 3D image.


Look at it, so what did I start? I started with a point, this point let me do a line and this line let me to an edge, when I convert it, I made surface, a surface I made it into vertices, vertex and from vertex I made a volume .

So, now I can replace this into a line into a curve, a point a curve . So, I can convert this line into a curve, curve forms an edge or surface. So, the basic elements for drawing is going to be point, line and arcs or curves. Then will have color, then will have shape, size, mass and change. So, these are the basic elements of design, how effectively use it and what you convey matters.

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Point

- This is the most basic of elements, manifested in the material world with just slightly more gusto than a mathematical point.
- Atomic Component of visual Work
- Dimensioning perspective
- A region for the FOCUS for eyes of the viewer
- More no of points creates a shape

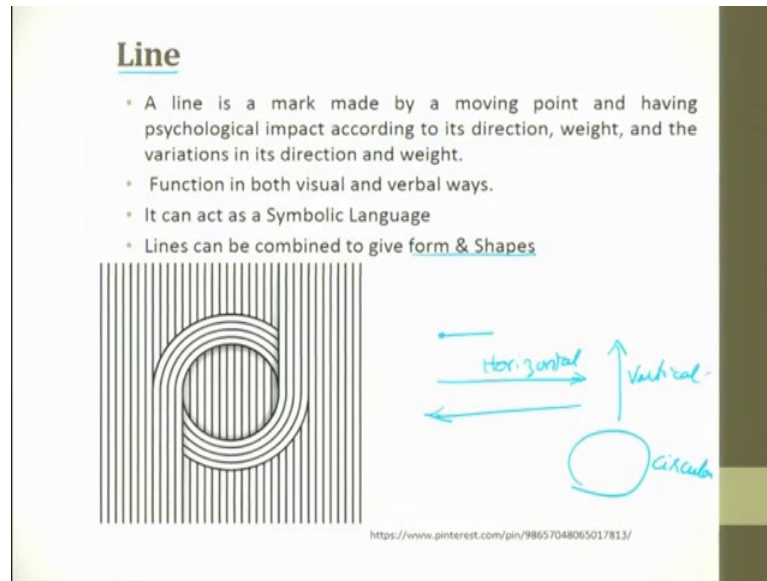


<https://share.algorithmic.com/libraries/379>

This is an image, which is completely made out of points. For example, you try to take a photograph and then converting this photograph data into a pixel data, then almost you will have same type of image. This is only points, this is the most basic of elements, manifested in the materials world with just slightly more gusto than the mathematical point. Atomic components of the visual work is the points, it is dimensioning also it is perspective.

A region for the focus from eye to the viewer it is taken, more number of points creates a shape. suppose I have a and a line. So, now, this is one pixel, two pixel, three pixel, four pixel, so you will have more pixels you try to get, higher the resolution you have more clear the figures. So, this is all about the points.

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Next is lines; a line is a mark made by a moving point and having psychological impact, according to the directions spiral. So, what are the directions? Directions can be this way; directions can be this way, directions can be vertical ,horizontal, circular .

By moving a point in any of those three, in any of those directions and having a psychological impact according to its direction, the weight; weight means your thickness of the line color, whatever we use and the variation in the direction and its weightages. The function in both visual and verbal ways it tries to convey both, it acts as a symbolic language, drawing is a symbolic language, lines can be combined to give form and shape which I constructed and I showed you. For example, from a line to edge; edge to surface; surface to a volume. So, that gives you a form and shape to it.

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Colour

- **Colour:** General terms for the quality of color, Hue, intensity and value observed.
- **Hue:** Name of the color like red, green and blue etc.
- **Chroma:** Intensity, strength, or saturation of color, distinguishing the chromatic colors from black and white.
- **Saturation:** degree of vividness of a hue from its concentration; used synonymously with Chroma.
- **Value:** range from light to dark, including white, grays, and black; colors can be evaluated on this scale. 0-BLACK 10-WHITE.
Generally, high values are considered to be light, and low values dark

read & understand

So, when we talk about colours we discussed about primary colours, secondary colours, tertiary colour. Generally terms for the quality of the color, hue, intensity and the value of absorb. So, these are the important terminologies which we generally used for colors.

- The general terms for the quality of the color is hue, what is hue? Name of the color like red, green, blue etc. are hue . Then intensity the chroma, intensity, strength or saturation of the color, distinguishing the chromatic color from black and white is chroma . Next is saturation; saturation is the degree of vividness of a hue from its concentration used with chroma is saturation. The color is saturated, so you can see and when you saturated color you get a feeling out of it.
- Then the last one is value; the value is the range from light to dark including white, grey black; colors can be evaluated on it scale 0 to 10. So, value is the range what you give and the impression what you take. Generally, higher values are considered to be light and lower values are considered to be dark.

These are important terminologies, I would request you to please read and understand. Hue, chroma, saturation value. So, by this you can try to create an impression about the product to the customers.