

**Ergonomics for beginners Industrial Design Perspective**

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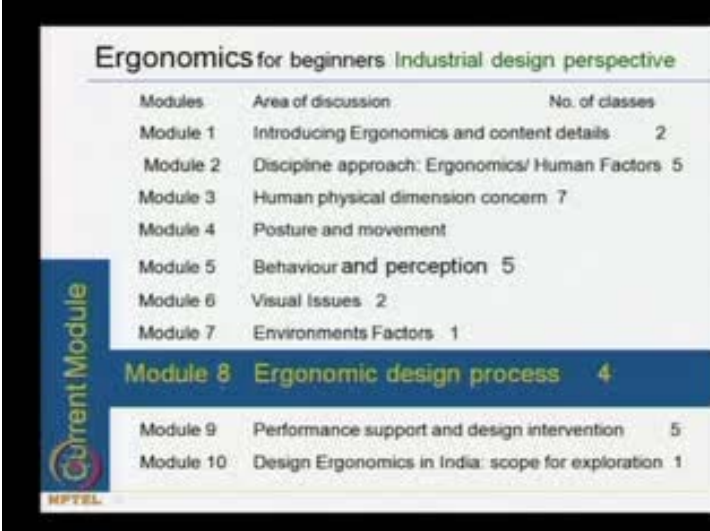
**Module No. # 08**

**Ergonomic design process**

**Lecture No. # 34**

**Some checklist for task easiness**

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Modules	Area of discussion	No. of classes
Module 1	Introducing Ergonomics and content details	2
Module 2	Discipline approach: Ergonomics/ Human Factors	5
Module 3	Human physical dimension concern	7
Module 4	Posture and movement	
Module 5	Behaviour and perception	5
Module 6	Visual Issues	2
Module 7	Environments Factors	1
<b>Module 8</b>	<b>Ergonomic design process</b>	<b>4</b>
Module 9	Performance support and design intervention	5
Module 10	Design Ergonomics in India: scope for exploration	1

Current Module

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<b>Module 8</b>	
<b>Ergonomic design process 4 sessions</b>	
Class 31	Ergonomics design methodology
Class 32	Ergonomics criteria/check while designing
Class 33	Design process involving ergonomics check
Current Session	
Class 34	Some checklists for task easiness

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Welcome to the 34 session of ergonomics for beginners industrial design perspective. The current module is module number 8, ergonomic design process. Out of 4 sessions today is the last session of this module. The current session is class number 34, some checklists for task easiness and design.

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**Today's session**  
Class **34**

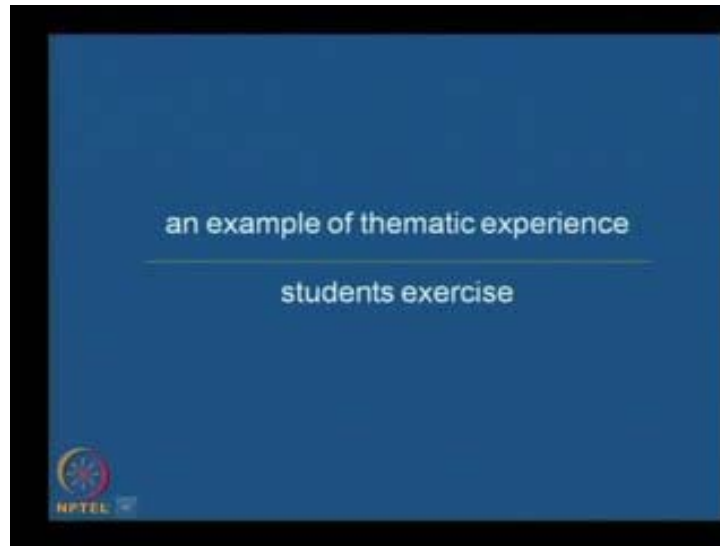
**Some checklists for task easiness**

We shall see few cases of thematic design ideation exercises

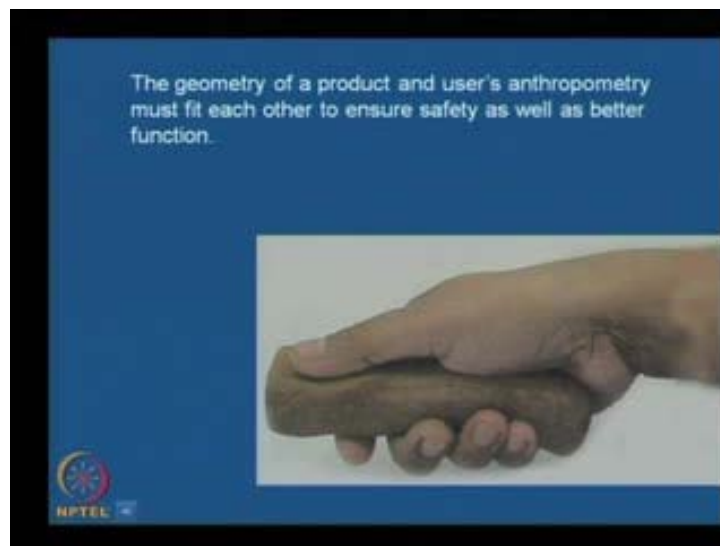
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Today's session is class 34, some checklist for task easiness and we shall see few cases of thematic design ideas(ion) and exercises where this ergonomic checks have already been considered and how it is been used that we would like to discuss.

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Now first see an example of thematic experience - some student's exercises whatever we have done earlier. The point is the geometry of a product and users anthropometry must fit each other to ensure safety as well as better function. We have experienced varieties of handles; now one handle was developed for multipurpose use and it may be used within a sickle for cutting grass and paddy wheat etcetera. It may be used splitting it one portion on the lid and bottom portion on a vessel like pressure cooker; that type of things in combination that one can use and many other aspects.

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Now we have asked a group of student to see the varieties of handles in respect to the knives where your knives blades. So that they were asked to go to the market and see varieties of knives available, what function it does, whether the shape and size of those knives suits to the intended function. Like that, in this case when we see that this is an area we need to cut and so while cutting, it touches the floor then this finger should not get rubbed so it should be little above or not. So all these issues we asked them to study and after studying whatever they found with that we asked them to experiment on a specific handle made with clay and the blades they made with polystyrene sheets similar to the original knives available in the market and then they make some experiment to learn what will be the handle then the blade position, angle etcetera.

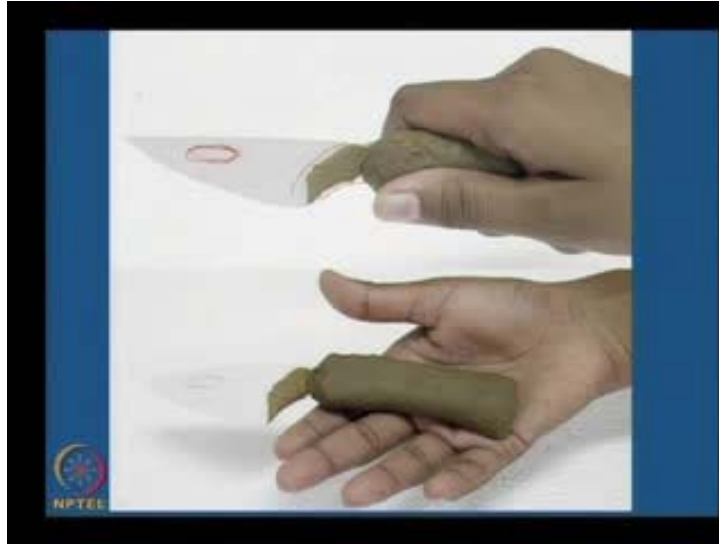
So these are the combination of different exercises which are shown here and some students of I T Kanpur have undergone this exercise.

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How we have done approached, depending on this how we hold it, how much we can hold it and etcetera and thematic dimensions we gave some 20 centimeter length around 4 centimeter diameter both the sides of square is a block of semisolid clay. we gave it to the students and asked them to hold it with specific blades fit in and then to do the task. what type of impressions they feel to have and according to their requirement they make their own handle with taking out all these unused clay. So, they give the shape and like that. So after, all the students have gone through this then taking the different variations of this handle make a single handle like this and ask them if any problem they can give impression otherwise give their remarks on it. So this was the total experience. In this laboratory these types of things were being going on with the students.

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Now what is the outcome? This type of blade handle was made like this and this much portion was covered. So while operating this blade it requires a bent sliding movement like this. So these fingers should not touch the blade hence, these type of extended handle cover are provided.

Now one more thing we have seen that is how to keep these blades. These knives normally placed either horizontally like this or kept stand like this way or sometimes a hole is given here where one can hang it but for safety point of view while taking out of the place if it falls from your hand then it may damage the product or your body parts.

So, a trial was given if a specific hole also made on this blade so that if we hang like this even if it falls it will fall with blunt force. So, less accident chances are there so for this a specific area was also shown. So the students have developed where this will be the appropriate. So this is one type of handle.

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Then another type of handle is that where the blade is like this. So this version handle was made in this manner considering the holding like this.

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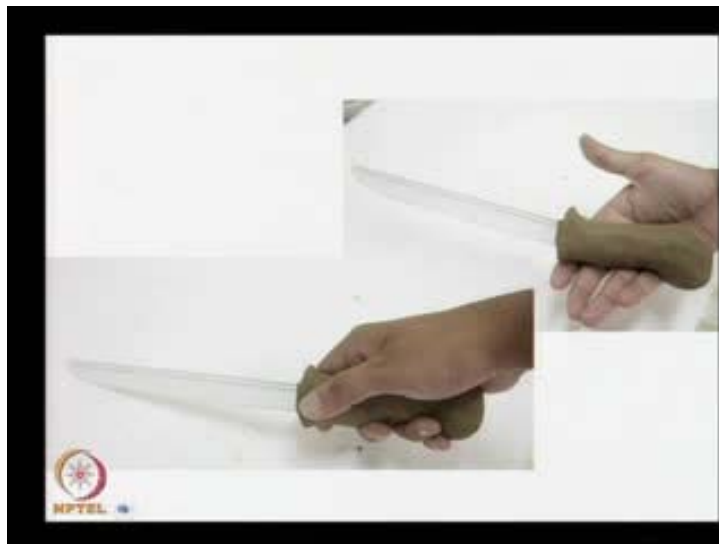
Another was that where this blade is required to do like this. So what happens when we are having this floor here is this may squeeze top. So, the handle will be up means it can hold like this way. In this case what happens is only the top portion is seen so it is fine cut. So, these type of handles much preferred by those students who groups.

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For this, little larger with pressure means on some platform they have to cut it and beat it like this way. In that case it was giving where the handle is like this so holding maybe from this side or maybe from this side both sides can be holding. If this type of blade is there then what would be the handle sizes depending on their specific function.

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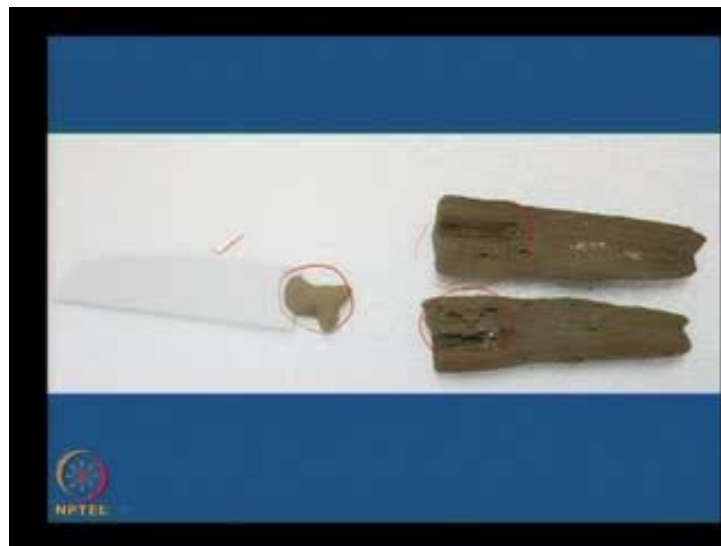


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Butchers knife, where we require beat only. So to get the maximum length, contact on the surface and hand has to be up. So, with that some pressure will be there. So to use, get the pressure all over the hand and this portion will not get any problem.

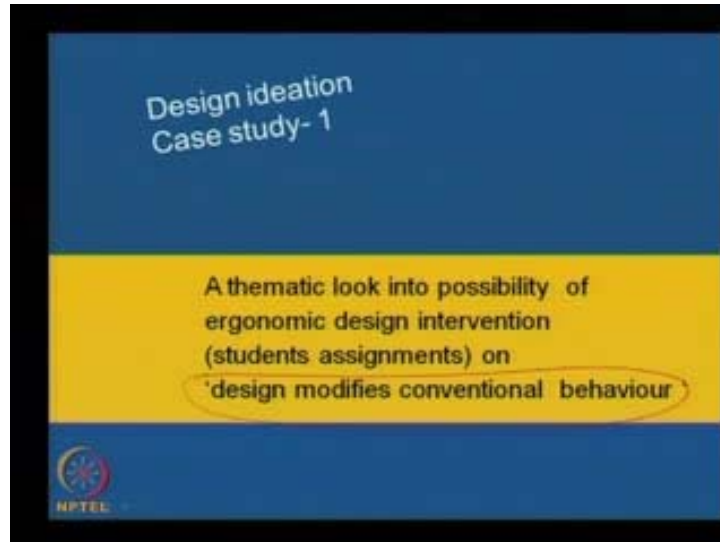
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Another issue was thought we can have a special handle where a keyhole type of arrangement may be there and the blades will have special key type of attachment here. So that various knives blades can be used with single .So a special package maybe developed where such an handle and many type of blades can be placed in that container.

So that as and whenever required with a single handle different type of blades may be used. So that approach one can consider it.

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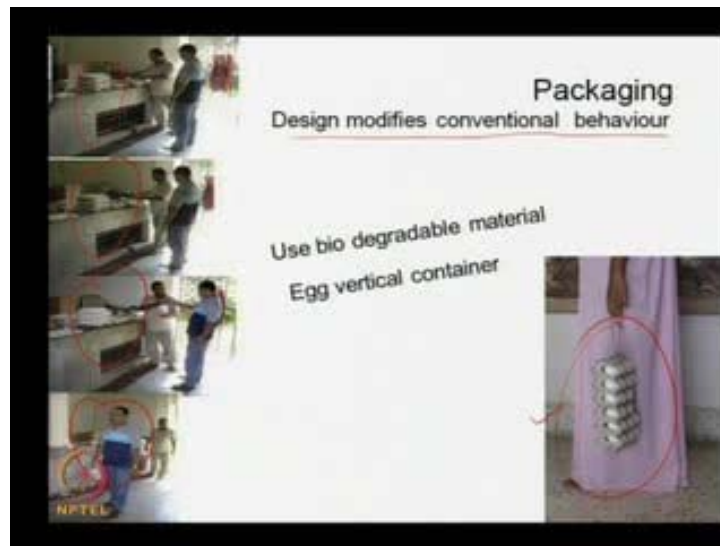
Now we will see one design ideation a case study. Here, we will be presenting today two case studies. First case study is that a thematic look into possibility of ergonomic design intervention that a student assignments presenting here. On design modifies conventional behavior this was the theme and with this theme how a design can be developed or thought of.

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Consideration is like; this product can be used for various purposes - similarity the product and container. Like this the ladies finger with a palm leaf container matches whereas with a plastic container this type of green vegetable may not go along but it is not always possible to have it. Then what would be the design thought in it? Another thing is that in an organic appearance a processed product is given here. So what it says that it is very close to all these things so here the closeness is being used.

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So with this, an experiment that a packaging designs we thought of based on the idea or the theme design modifies conventional behavior. Now see, the egg carrier the idea was to use biodegradable material only and egg container. How normally eggs are sold and we buy and we carry and we store it. Here it is seen that the egg vendor person go there buy and then come. Normally, like this way also people carry eggs. So with this an idea came why not to have here all the horizontal placements. There are horizontal placements everywhere, in that eggs are placed in a horizontal place. why not using this idea that you have a vertical container, a design thought has come. The first idea was cumulative then how it can be developed. Observation was made on the users behavior of how people buys eggs. People buy eggs in two pieces together or six pieces together one dozen or a full crate of 30. After observing many people we found that if we can have a packaging unit of six eggs it would be better it and will be affordable to buy also.

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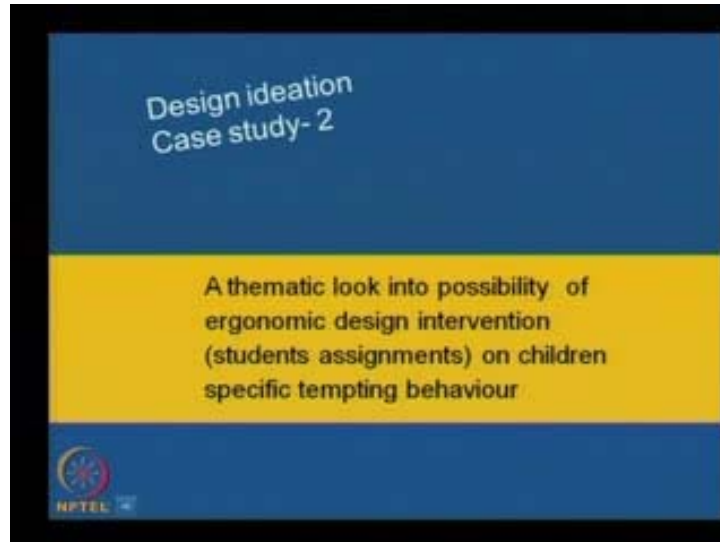
So with this idea, thought came that why not to use bamboo as a container product like bamboo splits. **Bamboo splits are used in this counter product means bamboo splits are like this.** If this is a bamboo split it in this type of figures like this. Tie it here then tie it here and use the bamboo rings in this position. This is the bamboo rings and the bamboo split so what happened is keep one egg here then slide down a bamboo ring then keep two eggs then slide down a ring then keep two eggs slide down a ring and then one here and close it. So it may be hanged like this in a shelf.

In this case what happened is as this ring layer is higher than the egg shell even if you roll it the eggs will not damage. If we want to take one egg from here opening this and then place the ring back here. So this will remain intact in this package. If I want to take out another egg still that ring I can push it back here so all others will remain intact. So, by this way what we try to achieve is that bamboo made egg holder unit of six eggs, a thought with intended use and reuse value after using it again we can refill with eggs.

Mind change is necessary for new design development and acceptance if it serves better. So, the bamboo is plenty available material in villages and etcetera. This type of a provision of development we can think of and while carrying, this may be the carrying mode. So, the space instead of occupying a horizontal stacks like this; in many other small shops it may be hanged from top sides; when you require you can give one packet,

you can sell it and you can carry it. The breakage also will be less so this is one thought that one can proceed for a new design development.

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Now another design ideation case study two I am presenting now. This is a thematic look into possibility of ergonomic design intervention that is student's assignment on children specific tempting behavior. A specific area where we can allow children to do something that normally parents try to stop them with a special design approach. So that they can learn some specific behavior. Now let us see how

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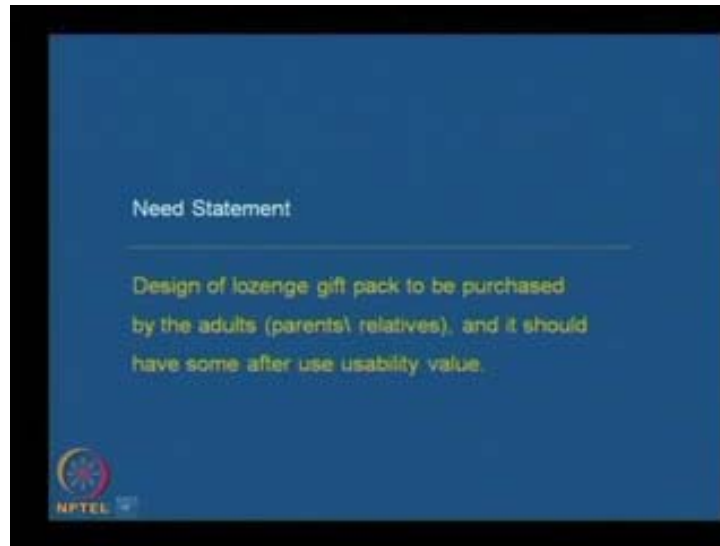
This is an advertisement; here some food items are displayed and some problems and etcetera are shown and this is an advertisement of toothpaste. It says that fight ten teeth and gum problems means you may eat all these things but there is a problem of teeth if you use this one then teeth will be ((okay)). So, with this an idea came why not to develop a design so that children can fulfill those behaviors.

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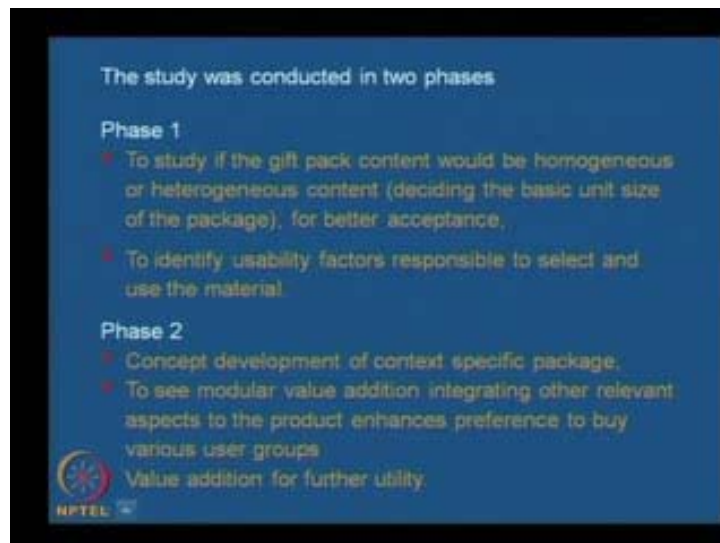
How joy of using even restricted products can address a design development issue that came in mind. So, a study on developing a context specific design concept was taken with the lozenges as an object of desire.

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The need statement for this design development is design of lozenge gift pack to be purchased by the adults, parents or relatives and it should have some after use usability value. Normally those who use these end product lozenges do not buy. We adults gift them as a package form or something like that. Children buy small units but as a package gift we adult buy and give them. So a design should be there that it should fulfill this as a gift package. Now we will show here how we have addressed it.

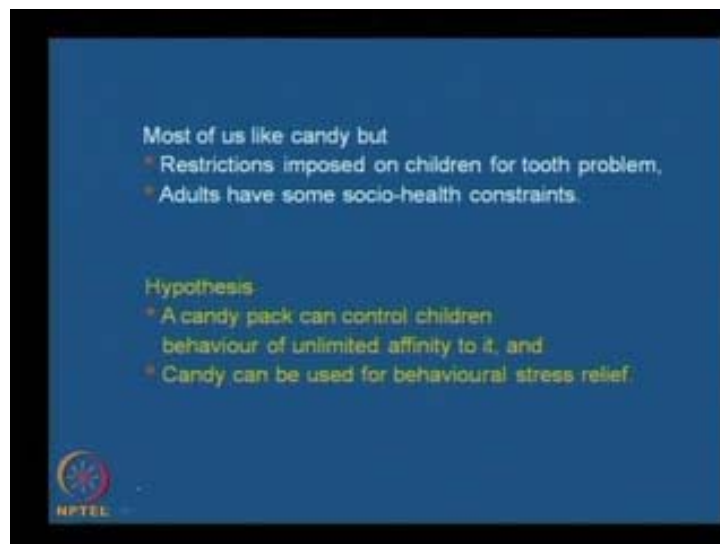
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The study was conducted in two phases. The phase one is that to study if the gift pack content would have homogenous or heterogeneous content deciding the basic unit size of the package for better acceptance. Heterogeneous means same type of chocolates lozenges; if are there in that packet then homogeneous if different types of lozenges are there then it will be heterogeneous kind of thing. **what would be preferable**. To identify usability factors responsible to select and use the material.

Phase two - concept development of context specific packages. To see modular value addition integrating other relevant aspects to the product enhances performance to buy various user groups and value addition for further utility. So these were the steps we have taken.

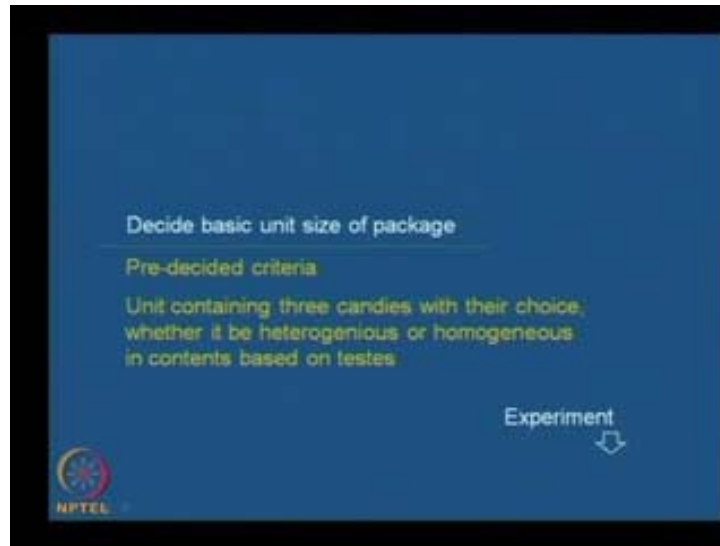
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What it should have? Most of us like candy but restrictions imposed on children for tooth problem and for adults some social health constraints but still we like candies. So hypothesis was that of this development, a candy pack can control children behavior of unlimited affinity to it is as candy eating and the candy can be used for behavioral stress relief. These two hypotheses we are trying to look in this experiment.



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Decide basic unit size of package: pre decided criteria; unit containing three candies with their choice whether it would be heterogeneous or homogenous in contents based on tastes. How we have made this pre decided idea? Yes if this is a package, inside the package small packets should be there of 3 units. If 3 chocolate, 3 candy will form the basic unit and then the package. How we can do this? normally mothers say their child not to eat or if they prefer, then one can say this as an assumption that while going to school you can take one, at recess time in school you can take another one and while coming back to school you can have one or the another one. So with this assumption we felt that let have 3 candies smaller units that children can take to the school. The experiment now

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**Subjects** 4 females and 6 males of M Des students of IIT Kanpur while they were attending a lecture class of the present speaker.

**Material** 10 candies each of 9 varieties of locally available candies, costing 50 paisa each were the tests material.

Volunteers for study, attending a one hr. lecture

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Subjects: 4 females and 4 male subjects of master of design students of I I T Kanpur; while they were attending a lecture class of a present speaker was here. On a workshop this lecture was given at I I T Kanpur and the students were the subjects with them. So, material: 10 candies each of 9 varieties of locally available candies were taken costing 50 paisa each were the test material. In this class, while delivering the lecture those students performed the subject group; the volunteers for study attending a 1 hour lecture, a time duration.

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**Method** Out of total 90 pieces of candies, mixed randomly and placed on a flat space to allow free selection.

Candies used for experiment

Step 1: At the beginning of lecture, every body was asked to pick one piece from the lot of 90 candies, not to open and eat them.  
10 minutes lecture continued.

Step 2: Repeat same exercise, pick up one more piece, not to open and eat them.  
10 minutes lecture continued.

Step 3: Repeat again the same exercise form the rest of candies. They were asked to note down the features/ speciality of their choices, and they were allowed to eat their selected candies.  
Lecture continued to end the hour.

Step 4: At the end of one hour they were asked to select one more from the remaining candies, and were asked to speak out their choices and were asked the reasons behind this specific choice.

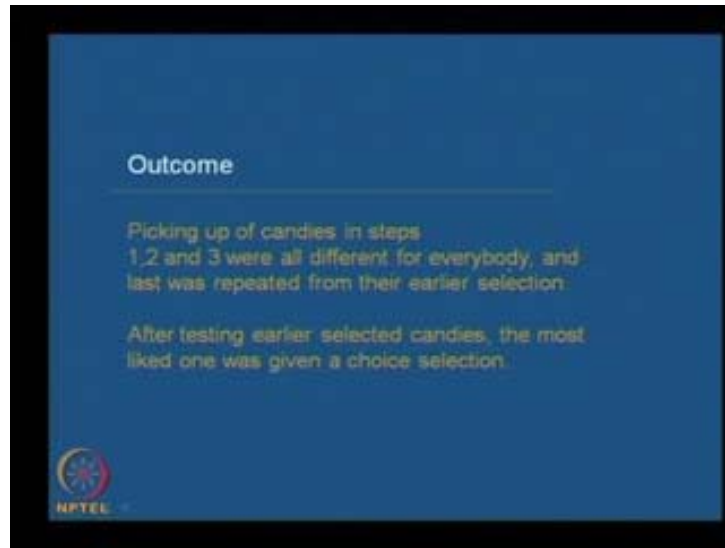
The method: out of total 90 pieces means 1 2 3 4 5 6 7 8 9 varieties 10 each we have taken, so total 90 pieces. Thus, out of total ninety pieces of candies mixed randomly and placed on a flat space to allow pre selection by these students group. So, step 1: at the beginning of lecture everybody was asked to pick 1 piece of lozenges of candies from the lot of 90 candies but not to open and eat them; at that time 10 minutes lecture continued then a pause.

Step 2: repeat same exercise means, they were asked to pick up one more pieces not to open and eat them; again ten minutes lecture continued stop.

Step 3: repeat again the same exercise from the rest of the candies means, they were asked to take one more of their own choice. They were asked to note down the features specifically, the specialty of their choices; whether they have selected the same type of lozenges or different types of things and why they have taken that. They were at that time allowed to eat their selected candies means, first they were asked all the lozenges were mixed in a bowl and placed in a flat surface. At the beginning of the lecture they were asked to take 1 1 of their own choice. All that ten students have taken and after 10 minutes they are asked again to take 1, after 10 minutes again they asked to take 1 and they were asked to note down of the things of why they selected that and then they were are allowed to eat that. After that lecture continued to the end of the hour, 1 hour was over.

Step 4: at the end of 1 hour means, end of that whole lecture they were asked to select one more from the remaining candies and were asked to speak out to their choices what they have chosen and were asked to reason behind this specific choice.


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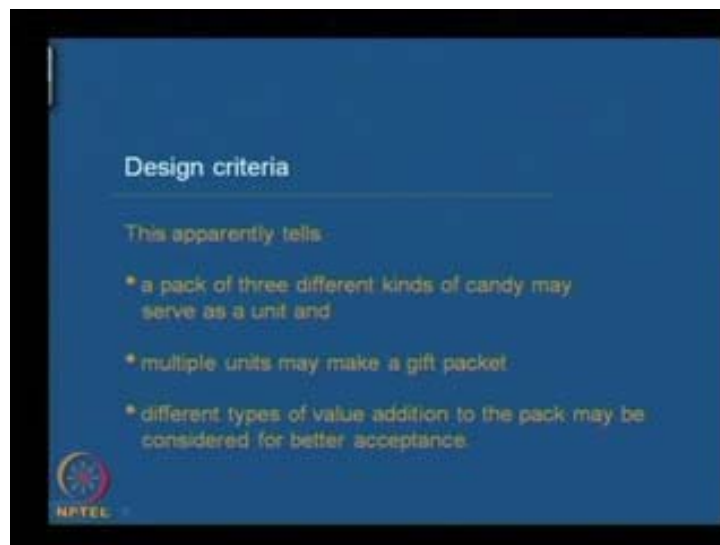
**Outcome**

Picking up of candies in steps  
1, 2 and 3 were all different for everybody, and  
last was repeated from their earlier selection.

After testing earlier selected candies, the most  
liked one was given a choice selection.




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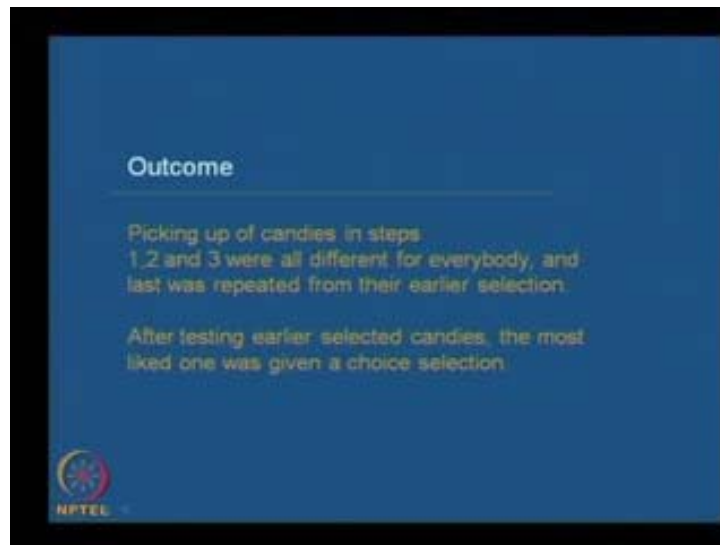
**Design criteria**

This apparently tells

- \* a pack of three different kinds of candy may  
serve as a unit and
- \* multiple units may make a gift packet.
- \* different types of value addition to the pack may be  
considered for better acceptance.



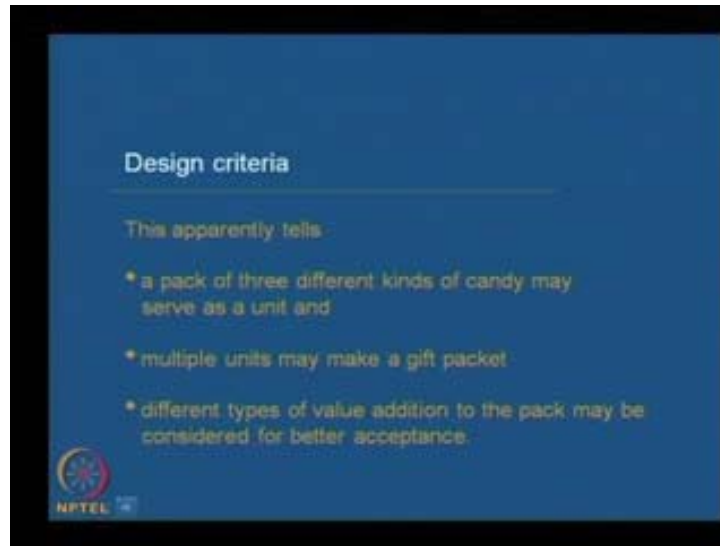
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It is found that the outcome: picking up of candies in steps; first step, second step is at the beginning of the lecture; after 10 minutes and then again after 10 minutes were all different for everybody means, out of these lozenges these lozenges all of them have taken different candies.

Multiple units may make a gift pack and last was repeated from their earlier selection and the fourth **time** when they are asked to take one more means, after eating first they have taken one, second they have taken one, third time they have one then they ate that. After that when they selected, out of 10 students 8 selected same from their own choice. Earlier, they have taken and only 2 students have taken separate one, a different one.

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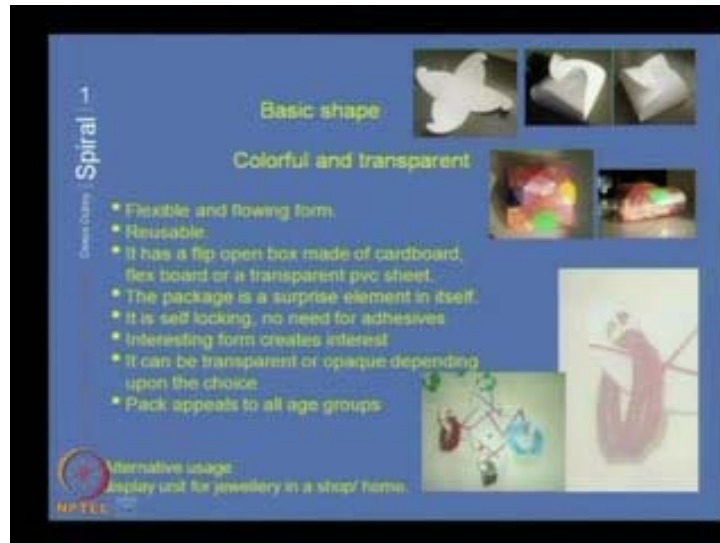
So, the design criteria came from this. This apparently tells: a pack of 3 different kinds of candy may serve as an unit and multiple units may make a gift pack; 3 of same may be a small one and then different types of things may be in a packet or the same type of things may be in a packet. So, different types of value addition to the pack may be considered for better acceptance. These were the design criteria outcome from this thing.

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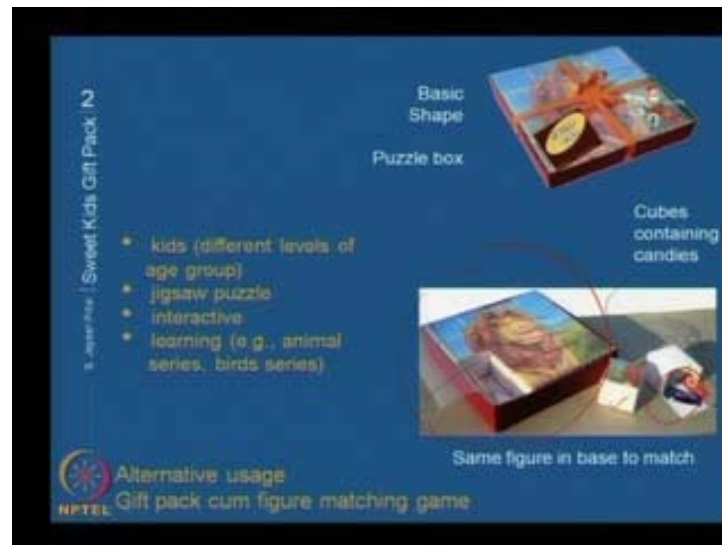
Now, students have come up with many ideas. Under this, here we are presenting 6 ideas. 6 concepts developed by the students 1 2 3 4 5 and 6; so, small unit was of 3 lozenges together.

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Now, we will see one after another. The first example was a spiral, a paper cut model used of the 3 lozenges together. The basic shape was like this and then it may be colorful or a transparent cover may be used. So, the small 3 lozenges may have a small unit and small units may have in a bigger unit. The specific measure comes from it. The flexible and flowing form not much constant; reusable means after once used second time you also can reuse it for certain period certain time; It has a flip open box made of cardboard flex board or a transparent pvc sheet like this; It is self-locking feature and no need for adhesives; Interesting form creates interest so, students or children can make their own forms after seeing this and using this one they may go further and may develop a knack for this; It can be transparent or opaque depending upon the choice this cover; Pack appeals to all age group. It is a nice package thing so, alternative after using this candy matter, display unit for jewelry in a shop or home like this way. It can be displayed with as a display unit.

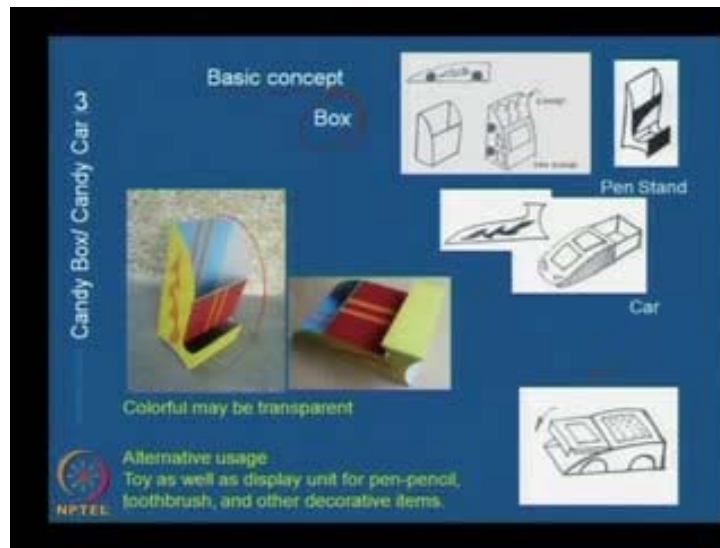
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The second idea, sweet kids gift pack. It is said that the kids different levels of age group; jigsaw puzzle; interactive; learning as for example animal stories, bird stories etcetera may be used. The basic thing is that a gift packet will be like this, where a small cubes having 3 lozenges will be like this way forming these cubes. So, one side of this thing may have a specific figure and a bottom also the same figure will be there. So while going to school the child can take one piece to the school; while going they can have one, at a recess time one, coming back time one. But they should not lose this; if they lose then it will be disturbed, the whole figure formally disturbed; they can come and they can keep it here to make the form here. So, at least for each lozenge box they can use for six times to have six different figures. After that, they may paste some new figures and they can have or they can play and make some play item games whatever they like. So with this, the children will not tend to lose these units because they know if they lose, then the whole product will be disturbed. So, by this we can say that design induces the behavior though children forgetfulness, etcetera may be tackled with this behavior. Alternative usage: gift pack cum figure matching game can be used like this way.



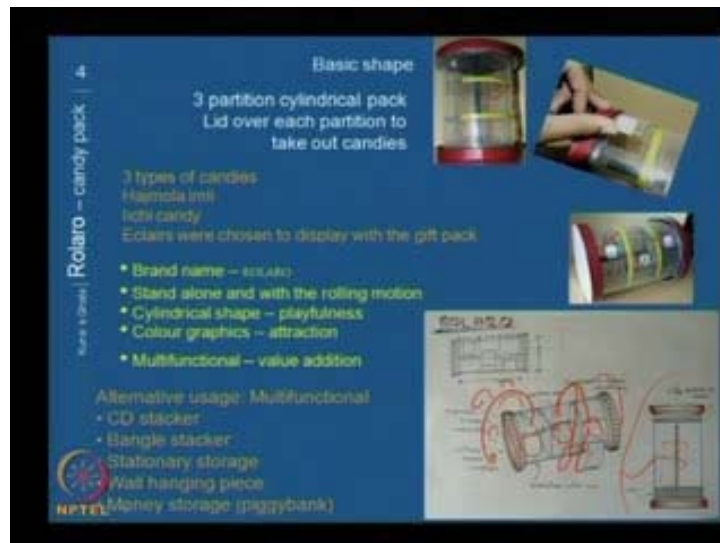
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Another item was that the candy box candy car: the boxes will be like this in such a manner that it can be used as a box as paper pencil keeping box or can be used as a car type of thing. Here colorful may or may be transparent. The basic concept was the box.

Alternative usage: toy as well as display unit for pen and pencil keeping toothbrush keeping and other decorative items can be used.

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Number fourth is that rolaro candy pack is the name given to this package. The basic shape is a drum type of thing where the 3 partition cylinder pack lid from the both sides

are there. So here what is happen from the 3 chambers, openings are at different levels so, 1 chamber each may have a same type of candies and you can open it and you can take it. Here, we are not thinking of specific unit of 3 small units like that. As per their need they can take it and then when it becomes less it can be refilled. After this use what happened is, the 3 types of candies - Hajmola, imli, litchi candy, etcetera whatever it may be or Eclairs were chosen to display with this gift package while showing to the students. Then brand name was given rolaro because it can roll stand alone and with the rolling motion; cylindrical space – playfulness; color graphics attachment can be given on it and multifunctional - value addition. So, after this candy matter is over; when they become bore with this, then it can be used for some other aspects.

Like, alternative usage that multifunctional: Like C D stacker - if you open this cover it may have a C D stacker one after one, you can open these covers then it may have a C D rack like this c d stack; Bangle rack - we can keep bangles also here like this way; stationery storage - stationery items can be kept; wall hanging piece like this can keep as wall hanging and we can have some creepers of different sizes and we can keep some small vessels here. So, the wall hanging with creepers; money storage piggybank can be used as a money storage means, different type of coins may be kept in different chambers. So, that type of things with this type of product is made for candy package but it gives some other benefits also that new behavior one can make it.

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Final 8.5 | WheelLeR Lozenge gift pack | 01

### Basic shape

Lozenge stacked in the compartments WheelLeR

### Dimensioning

Total height – 15cm  
Height of pole – 13cm  
Thickness of discs – 10mm  
Total number of rods 1  
Diameter of discs – 20cm

### Features

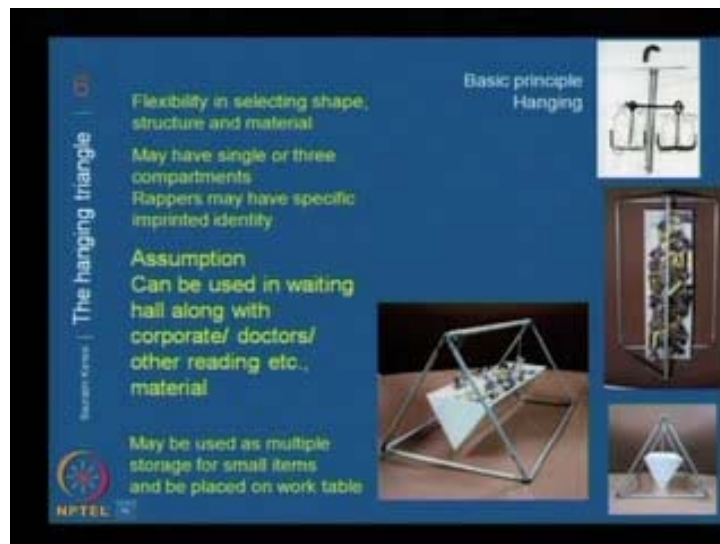
- Heterogeneous content, three chambers
- Made of wood give it a natural look
- Colorful stickers to give it vibrancy
- Value added addition of it being used for storage, and also as a stool on the flip side
- User experience with revolving unit on the top
- Can be used as a low level seating by old people

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Number fifth, another item was that let have this type of basic shape is a stool type of thing where the 3 holes are there and it contains a specific package of lozenges you can take. It can be used as a sitting place or may be some storage to keep something on it. So the lozenges stacked in the compartment is called wheeler that is dimensioning the total height is 15 centimeter, one person can sit as a squatting stool; height of pole 13 centimeter is main pole; thickness of discs are 10 millimeter; total number of rod is 1 means, center rod and then other 3 packets; diameter of the disc is around 20 centimeter.

So, features were that heterogeneous content, 3 chambers; made of wood give it a natural look or we may have some different graphics colorful stickers to give it vibrancy so, they can choose their color and then stickers; value added addition of it being used for storage, and also as a stool on the flip side; user experience with revolving unit on the top is a revolving unit that one can use with a movement like this while playing and etcetera. It can be used as a low level seating by old people also. These are the some aspects which were considered apart from the main candy package. So these were the different for a specific purpose

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Now the fourth item - It gives a totally different aspect and the corporate users can also be made with this. How? The theme is that hanging triangle; the issues are that in a doctors chamber when patients go and wait in a waiting area, patients are waiting in queue and accompanying person is reading some magazines and etcetera whatever kept

there. Sometimes children also accompany the patients; what they will do? Problem is there; and other key aspect is in a corporate reception waiting area, people are not very cordial to talk each other because everybody interest and mood is different but they have to wait in that reception area. How to wait without doing anything like that?

So in this context, a thought is that, if we can have a candy pack like this where mix of chocolates candies will be there and the wrappers will have specific. Like in children, if it is a wrapper they can have a lozenge and after taking these lozenge, if we write some good health tips and etcetera in a colorful manner design they will like it.

So, they can spend some value time there instead of wasting time and doing some nuisance. They can keep this thing with them. Like that, in a corporate waiting area the same thing can be there, where different company information etcetera may be put for an advertisement like that. So, there is a chance of developing this lozenges package for a corporate use also.

This is a thought that was developed like this but then we need a proper study on this. So, the hanging triangle type of anatomy says that flexibility in selecting shape structure and material is no constant. You can have varieties of shape, size obvious thing. May have single or 3 compartments single or may be like this or we may have 3 compartments like 1 compartment 2 compartment 3 compartment for different type of lozenges and with different types of information oriented things. May have single or 3 compartments wrappers have specific imprinted identity. Assumption is that, it can be used in waiting hall along with corporate doctors and other reading etcetera material. May be used as multiple storage for small items and be placed on work table. If it is used as a gift item, after finishing these lozenges it may be used for some other storage purpose in an office area.

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With these possibilities we can say that, some human information about the **likingness** and etcetera if it is used likely. The design ideation should follow appropriate context specific human information to fulfill a perceived need and anticipate the need. See the surroundings, get a feel and identify the possible need that can be handled with a design approach and if their ergonomics criteria and ergonomics principles used properly then it will be a good and acceptable design to everybody.

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Ergonomics for beginners Industrial design perspective

Modules	Area of discussion	No. of classes
Module 1	Introducing Ergonomics and content details	2
Module 2	Discipline approach: Ergonomics/ Human Factors	5
Module 3	Human physical dimension concern	7
Module 4	Posture and movement	
Module 5	Behaviour and perception	5
Module 6	Visual issues	2
Module 7	Environments Factors	1
Module 8	Ergonomic design process	4
Module 9	Performance support and design intervention	5
Module 10	Design Ergonomics in India: scope for exploration	1

Next Module

NPTEL

With this we are concluding today's module, ergonomic design process. Next module is the module number 9, the performance support and design intervention. There are total 5 sessions will be there and so today with this level and see you next day.

Thank you very much.