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Practical Objects

Lateral Thinking as a means of teaching Object Think

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So what is Lateral Thinking?

Term was invented by Edward de Bono

Lateral Thinking is a set of related techniques primarily intended to **support creative thinking**

Lateral Thinking is based on the idea that the *Mind is a pattern making and using system*

The Mind is a **Self-Organizing System**, not a **Passive Recording System**

The Mind reacts to every input by attempting to fit it into **what is already known**

- This is a good source of **Optical Illusions**, since it is not possible to reserve judgement

With just a little information the mind will attempt to construct the entire object

With the end result that we have an *unstable figure*

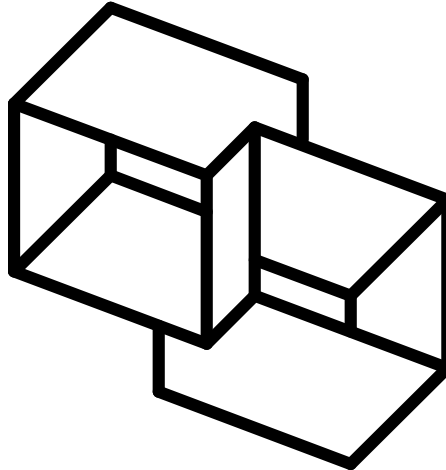
We look at one side and our mind builds the 3D Shape

Then the eye scans to the other side and our mind build a different 3D Shape

We know about perspective drawings

So we see the “real” 3D image

We find it *impossible* to see this as a simple flat arrangement of lines



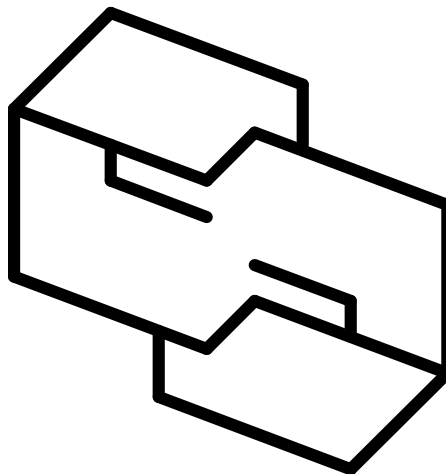
The *capture* effect is so strong that even with minimal clues we can see the illusion

But with this figure the clues are weaker so we can override them

But because we have seen the original we can still see the effect

***Capture* happens because our minds try to recognize everything**

It can only be circumvented by focussing attention



Capture occurs since our minds are set up to be sensitive to different *Patterns of Perception*

Incoming Stimuli are channelled by what we already know

Perception is the process of setting up and using these Patterns

- ☺ Recognition is possible with incomplete information
- ☺ Enables mind to deal with massive number of Stimuli

The World

Everything gets fitted into pre-existing patterns

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Slide 5

Implications - What you know influences what you *can* see and learn

Side Patterns are suppressed by the Dominant Patterns

Glide-Past with full confidence on main track

Benefit is less distraction
Allows for Concentration on a particular thought

Downside is that it is possible to miss things
“Did you consider using X?”

Glide-Past

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Implications - All useful ideas are logical and obvious in *hindsight*

Patterns are Asymmetric

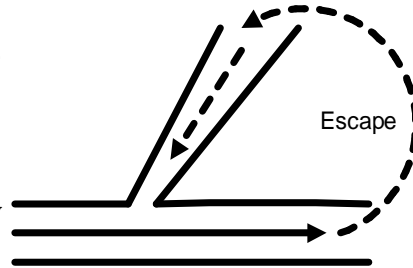
Basis for Humor and Creativity

Ah Ha!
Now I see it

All Creative Ideas are logical after they have been found

If cannot find link back to known pattern, then just a Crazy Idea

“*Lateral Thinking*” is process of jumping tracks to get new insight



Downside of great ideas is that they are so obvious

So effort to reach new idea is not appreciated

Logical in Hindsight

Consequences of the Lateral Thinking Model as related to learning

Relevance and Meaning - attention shifts to those areas that trigger existing patterns

Knife Edge Discrimination is possible if have appropriate Patterns already in place, i.e. experts see more detail

Asymmetry of Patterns allows for new Insight simply by entering Pattern at different point

Context is important since the way something is interpreted depends on the patterns in effect at the time

Learning Backwards - chronological sequence may not be ideal learning sequence

Possibly better to move towards known destination

So how does all of this relate to learning Object Technology?

Well the transition to Object Technology is a *Paradigm shift* to a new set of patterns

A Paradigm is a set of rules and regulations (often unwritten) that defines two things

1. It establishes or defines *boundaries*
2. It tells you *how to behave* inside those boundaries *in order to be successful*

A *Pattern of Perception* is just a paradigm that we have internalized and use unconsciously

It requires that we change to *a new set of rules*, and breaking out of your old rules can be a challenge

- Especially if you are not consciously aware of the old rules

Switching into a new pattern is easier when the old patterns are blocked in some manner

Learning an Object Oriented programming language is easier if the syntax is distinct

Converting developers from *Pascal* to *C++* is faster than converting experienced *C* developers to *C++*

Smalltalk is often used as a teaching language

Understanding the Message/Method distinction is a commonly cited reason for using Smalltalk

Just to get the concepts across before moving to the implementation OO programming language



Block existing Path

An alternative technique is to use *Attention Directors* to redirect existing patterns

Destinations

Pay attention to something in the environment

- “Notice how exceptions are handled in C++”

This forces attention to one small aspect of the problem

Directions

Look in a Particular Direction

- “How do you want to handle exceptions in this program?”

This prevents Glide-Past by forcing people to look

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Slide 11

Creation of new patterns may require the use of *new terminology*

Concepts that are well known capture attention

Being channelled by our Pre-Understanding is natural

New terminology helps to establish new *patterns*

But new terminology gives a learning-curve effect

Jargon allows proficiency in the long term

- Confusion initially, leading to new understanding
- With practice, new pattern replaces old pattern

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Use Cases are a good example of *Capture* and how to avoid it by *Directing Attention*

On first look, the most visible part of a Use Case are the steps in the Scenarios

So the **Procedural** paradigm captures this and we see the sequence of steps as a **procedure**

The Actor:Goal format for Use Cases avoids this problem by directing attention to the Outcome

Attention is directed to “What does **goal success** mean?”, “What does **goal failure** mean?”

The steps in the scenarios are then just seen as one **possible path** to success or failure

Class Diagrams are an example of *Capture* by the *Data Modeling* paradigm

Experienced Data Modelers often end up using the Entities from their Data Models as Classes

This leads to sub-optimal object models since the behavior of the objects is not considered

- Using Interaction Diagrams to capture initial ideas rather than Class Diagrams directs attention towards **behavior**

Responsibility Driven Design introduces new terminology to avoid capture

Classes have **Responsibilities**, which are eventually implemented as **Attributes** or **Methods** as appropriate

- The focus on Responsibilities forces us to think at a higher level of abstraction

The *Attention Directing* tools are great for evaluating alternative designs ...



But this pre-supposes that the designers are able to come up with alternatives

At least 3 alternative designs are useful to avoid *polarization* during evaluation

A useful lateral thinking tool to apply at this stage is PMI

PMI - Plus Minus Interesting

- Plus - Good things about the design
- Minus - Bad things about the design
- Interesting - Whatever else you notice about the design

Look in each direction and record the points that can be seen in that direction

Summary: Lateral Thinking techniques are useful in teaching Object Think

Understanding the role of perception in learning allows us to break out of existing paradigms

And to step into the Object paradigm

The *sequence* of exposure to Object Concepts is important to ensure that the appropriate patterns of perception are created

With an inappropriate sequence, the existing paradigms can capture us leading to a slow transition to objects