

# **Three Types of Learning Cycles**

By

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# Types of Learning cycles

- There are three types of learning cycles: descriptive, empirical-abductive, and hypothetical-deductive.
- The main difference among the three is the degree to which students merely attempt to describe nature or explicitly generate and test alternative hypotheses.

# Descriptive Learning cycles

- ❑ Descriptive learning cycles generally require only imperical-inductive patterns (example; seriation, classification and conservation)
- ❑ In descriptive learning cycles students discover and descibe an emperical pattern with a spesific context (exploration). The teacher gives it name (term introduction), and the pattern is then identified in additional contexts (concept application). This type of learning cycle is called descriptive because the student and teacher are **describing what they observe** with out attempting to explain their observations. Descriptive learning cycles answers the question “**what?**” but do not rise the causal question “why?”

# The strength and weakness of Descriptive learning cycle

- ❑ **The strong side of descriptive learning cycles** is easy for most students to conduct it. Because in this case, students are not use higher order thinking pattern.
- ❑ **The weakness are:-**
  - It does not enables students to examine alternative conceptions or misconceptions. Becaus it just depends on students' observation.
  - Most of the time it does not answer the quesition "why?".

# Emperical-Abductive Learning Cycles

- ❑ In emperical abductive learning cycles, students again discover and describe an emperical pattern in a spesfic context (exploration) but go further by creating possible **causes** of that pattern. This requir the use of abduction to transfer terms and concepts learned in other context to this new context (term introduction). With the teacher's guidance, the students shift through the data gathered during the exploration phase to see if the hypothesized causes are consistet with those data and other known phenomena (concept application).

# The strength and weakness of Emperical abductive learning cycle learning cycle

## □The strength

- students discover and describe an emperical pattern in a spesfic context and go further by creating possible **causes** of that pattern.
- Sience abductive learning cycle is **less complicated** as compared to hypothetical deducctive learing cycle, students use it to find the cause of a phenomena.

# Cont...

## ❑ Weakness of abductive learning cycle

- Let us consider the following statements

**Abduction:** rule: All balls in the box are black

observation: These balls are black

explanation: These balls are from the box

- The explanation may or may not be true. Because there is no guarantee of black balls being out of the box. This is one of the weaknesses.

# Hypothetical-Deductive Learning Cycle

- Hypothetical-deductive learning cycle demande use of higher order patterns.(example: controlling variables, corrolation thinking and hypothetical-deductive thinking).
- This type of learning cycles requires the explicit creation and testing of alternative hypotheses through acomparation of logical deductions with emperical results, hence the name hypothetical-deductive.



# Cont...

- This involves the statement of a causal question to which the students are asked to create alternative explanations. Student time is then devoted to deducing the logical consequences of these explanations and extrinsically designing and conducting experiments to test the hypotheses (exploration). The analysis of experimental results allows for some to be rejected, some to be retained, and for terms to be introduced (term introduction). Finally the relevant concepts and thinking patterns that are involved and discussed may be applied in other situations at a later time (concept application).

# Cont...

□ example, “what caused the water to rise?”

To start, students invert a cylinder over a candle burning in a pan of water. They observe that the flame soon goes out and water rise into the cylinder. Two causal questions are posed.

1. Why did the flame go out?
2. Why did the water rise?

# Cont...

- ❑ Students typically explain that the flame used up the oxygen in the cylinder and left a partial vacuum that sucked water in from below. This explanation revails two misconceptions:
  1. Flame destroy matter, producing a partial vacuum
  2. Water rises because of a nonexistant force is called suction.
- ❑ Testing these ideas requires use of **hypothetical-deductive pattern of thinking** and the isolation and control variables. Let us see the figure below.

Causal Question

Why did the water rise  
in the cylinder?

If...

Hypothesis

The water rise because  
oxygen was burned up and  
a vacuum was created.

And

Experiment

We measure the level of  
water rise with one and four  
candles (all other thing  
being constant.)

Then

Prediction

Water should rise the same  
in both cylinder because  
the same amount of oxygen  
is consumed.

Therefore

Conclusion

The hypothesis is probably wrong.  
We need new hypothesis to be  
tested.

Results

Water rose much more with  
four candles than with one  
candle.

# The strength and weakness of hypothetical deductive learning cycle

- ❑ **The strength of hypothetical deductive learning cycle.**
  - Hypothetical-deductive cycles enables students for the creation and explicit testing of alternative hypotheses to explain a phenomenon.
- ❑ **Weakness of Deductive hypotheses learning Cycle**
  - The process of creation alternative hypotheses, explicit testing of these hypotheses to explain a phenomenon through the deduction of predicted **impose a heavy burden** on students initiative and thinking skills. It is **time consuming** to test alternative hypotheses.

Thank you