

TYPES OF KNOWLEDGE

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So, learning is the ability to commit information to memory.

The information we can learn is called knowledge.

Knowledge may be taxonomized in different ways, but in this concept, knowledge are divided into 3 types:

- *Information* knowledge, simple facts, that stands alone (John R. Anderson -1976).
- *Compound* knowledge, information that is deduced from a collection of facts.
- *Action* knowledge, information that relates to how a physical result is obtained (Paul M. Fitts - 1956).

Examples of *information* knowledge could be the alphabet, words of a languages and their meaning, the multiplication tables and so on. This type of knowledge is learned simply by repetition. It may be difficult to put into context, but is easily structured.

Examples of *compound* knowledge could be the discipline of calculus which contains no elements from math not already covered by arithmetic or trigonometry, but that needs guidance to grasp the very particular approach required to understand the techniques used.

Typically the level of complexity in compound knowledge is not evident to the learner and therefore this type of knowledge needs guidance when learning - what we perhaps normally refer to as: "it needs to be explained".

Compound knowledge normally divides into know-ledge used for decision making (such as background knowledge) or knowledge used to produce infor-mation (such as calculations, causality analysis).

Examples of *action* knowledge could be how to get a car moving from a stand still. This is often referred to as a skill, simply because it involves physical actions, however it may also be broken down into a collection of knowledge about each process step required. It is important to recognise, that in a learning manage-ment context, there is no difference between learning a skill and learning other types of knowledge, since action knowledge simply is a collection of information or compound *knowledge, in a specific order*.

If you are qualified to drive, you will probably agree that these information are not recalled as a procedure, rather you have been exposed to them so many times that you no longer recall them as information, but rather as a decision to get the car moving.

Examples of knowledge types

Learning is the act of preparing to be able to reproduce a given result. Either recalling knowledge in the form of facts or in the form of a skill - in such cases where the result requires physical interaction.

Ex 1.

Someone needs to learn the right of way on the road.

The person can read in a book that a vehicle must let other vehicles coming from the right, pass, before entering a traffic stream.

This information may contain some data related to facts, such as “traffic coming from your right” and “give way”, but it also contains some form of context - “when you wish to enter a stream of traffic that are on a collision course with you”.

All of it is knowledge, since it is facts about the rules of the road. Clearly this is not producing a physical result other than leading to correct behaviour when moving through traffic. This can therefore be characterised as data that is recalled for decision making. I call it information knowledge (not because it is used for decision making, but because it is simple information to be recalled).

Ex 2.

Consider advanced mathematics such as calculus or matrices. These operations may be considered, by many who have not had academic training in the natural sciences, to be rather complex levels of knowledge. Yet they are only constructs made up by the elemental operations of arithmetic and trigonometry.

Even so, you would agree that calculus is not something you can learn without assistance. You don't need to learn something new, to understand calculus, but you need guidance (and maybe to refresh your math) to understand the very specific use of math these operations require.

So the knowledge of calculus is then a compound of some basic information knowledge and knowledge about a specific use-strategy.

Ex 3.

How to start moving a car from a stand still (using manual clutch):

This can be characterised as skill, since the result is a physical manipulation (of a car). It contains the following knowledge and the order it is applied is the strategy:

1. *Depress the clutch pedal*

2. *Use you left foot*
3. *Use the upper part of the foot, just below the toes.*
4. *Use sufficient force until it contacts the floor.*
5. *Select first gear, using your right hand.*
6. *When the clutch pedal is depressed and first gear is selected, depress the accelerator approximately 1 cm.*
7. *You should hear the engine RPM increase a little bit.*
8. *Use your right foot.*
9. *Use the upper part of the foot.*
10. *Lift your left foot of the clutch rather slowly - perhaps 1 cm per second*
11. *As soon as you hear the engine RPM drop, depress the accelerator an additional cm.*
12. *The car should now start to move.*
13. *As you release the clutch, the acceleration and engine RPM should increase.*
14. *When the clutch is fully released, repeat the process, only select a higher gear.*

We call this a skill because it is not normally perceived as a series of conscious decisions, but rather as a series of actions performed without thinking of each individual process segment, but as a result to be achieved.

Nonetheless, we all learned it step by step, until our memory structure was sufficiently stimulated for us to address the entire process rather than the individual segments of knowledge of actions.

You could therefore say that the aggregation of action knowledge into one process is what constitutes a skill, but you must remember that in a learning framework *a skill is still a process that involves recalling knowledge* from memory and is learned in by the same principles as information knowledge.

When managing learning, you should note that knowledge may have different levels of complexity, whether it is action-knowledge, compound-knowledge or simple facts. But knowledge and skill are one and the same - a memory recall. It then follows that knowledge and skill are also learned in the same manner.

As you see from the examples, you are forced to fix the prerequisite for your grouping of knowledge. For some people, the elementary operations of arithmetic may very well be compound knowledge. And for some people calculus may be information knowledge. You should include this assessment during your course design or when evaluating the adequacy of your course.