



**Learning: The Human Brain and the School for Life**  
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(Nekaj misli iz uvoda v knjigo)

### What is learning?

– As long as nobody asks, we know the answer. When we have an insight, we often say that we have learned something. But then, we have forgotten it the next day. So clearly, learning may start with insight, but this cannot be the whole story. Moreover, chimps and dogs learn, pigs and rats do, as do fruitflies, flatworms and sea snails. So learning needn't be set in motion by insight. And when artists and athletes produce are asked how they do it the garbage they produce clearly shows that knowing *how* and knowing *that* can be lightyears apart. Just think about yourself, having learned to walk and to talk. Now, THAT certainly was learning! Was it? There appears to have been development and maturation, too. Let's face it: We all know what it is, but then again, we don't. We foster a basic preconception and a few misconceptions that we must first address, if we want to avoid misunderstanding. In other words, if we want to know more about learning, we must first ask ourselves what we already know, or think we know, about it. So let's start at the beginning.

Have you heard of the Nuremberg funnel? It's a great learning device. You hold it on top of your head, right in the middle, and pour in knowledge. Just like you use a funnel to put liquid into a narrow bottle. How practical. Unfortunately, the Nuremberg funnel does not exist. Yet often we do find ideas and even products quite similar to this non-existent funnel: You can buy audiotapes for learning – without any conscious effort on your own – while you sleep. The problem is, this does not work. Then there are programs for speed reading (a book an hour, or so), which don't work, unless you ignore what you're reading. (Like Woody Allen said: "I read *War and Peace* in half an hour. – It's about Russia.") ...

Now, some people think that the more colorful, exciting, fun, and playful, the more interactive or realistic those contents are made, the more easily they will slip from the outside to the inside. So it is no wonder that the funnel metaphor is widely popular in a market full of multimedia products, computers, and learning enhancing software. The corresponding industry wants you to believe that a computer can act like a funnel. And lots of people fall for it.

And they feel they have good reason to. After all, we live in a society flooded with information. The media and computers give us access to information just about everywhere.

This makes learning appear not only more important, but also easier if we just use the right technology. The Web provides us with an abundance of information. Some people actually believe that this solves the problem of learning: European Union leaders have resolved to provide at least one Internet connection for every 15 pupils by the year 2008, as if mere access to information itself facilitates learning.

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This is not so! The Internet relates to learning like a supermarket relates to preparing a good meal. Compared to the amount of food we actually eat, a supermarket supplies us with unlimited quantities. But preparing a good meal implies more than mere ingredients. It takes appropriate selecting, combining, and preparation in the right order to make foodstuffs into a well-rounded meal.

The same holds for preparing intellectual nourishment for learning, ...

Intellectual nutrition also requires not just any information, but balanced components that meet our needs. As we shall see later, what we experience leaves memory traces within us. Our brain takes fleeting impressions and creates permanent changes in the connections between nerve cells. Experiences of the mind leave traces within the brain. How this happens and what follows from this is the subject of this book.

Think of a park on a winter morning with a foot of just-fallen snow. People walk in the park and leave traces, but the wind blows over the traces and wipes them out. Now add a booth where they sell hot punch at one end of the park and a public toilet at the opposite end. Some people may go to the booth, and some of them may then cross the park to get rid of some of the fluid they just bought. And now imagine standing on a hill in the afternoon looking down on the park. You will notice a path in the snow, a trace that came into existence because of some regular use of the space.

Such use-dependent traces form in the brain, too. Whereas in the park, people walked through the snow, in the brain electric signals travel between neurons – and leave traces. In fact, the notion of a memory trace, from a neuroscience perspective, could not have been chosen more appropriately.

Thinking of learning as a passive process is like still searching for the right funnel method. But knowing that learning is an activity like running or eating, we can forget funnels and investigate which conditions best promote that activity. Locked in a cage, you cannot run. When your plate is empty, you cannot eat. That may sound trite, but when it comes to learning, an extraordinary number of people suffer from similar deficiencies: basic conditions for successful learning are just not fulfilled.

Academic courses alone do not put some countries ahead of others in terms of schooling success. Instead, it is the respect we show towards teachers and their work. And it is their belief in the children and their positive attitude towards the children that makes the difference. But we shall return to this in detail later, once we have seen how the brain learns and which conditions are most supportive for the process.

I'm sure you have come across terms like "ultra short-term memory", "short-term memory", and "long-term memory". We tend to think of them as boxes filled with contents and, accordingly, think of learning as a matter of moving contents from one box to the next. Learners often ask how they can force facts from short-term to long-term memory. But that idea, just like the funnel notion, is wrong. There are no three such isolated memory systems within the brain. Ultra-short-term, short-term, and longterm memory are simply useful abstract names for functions, like team spirit on the soccer field. We can talk about team spirit, but to ask where it is physically playing on the field is obviously foolish. When it comes to learning, some of our preconceptions are just as ridiculous. Yet we take them seriously, and they shape our schools and educational policies. So if we can't use the box metaphor to depict how memory works, how should we describe learning and memory appropriately? Let's take a look at two important concepts: working memory and processing depth.

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[Nazaj v arhiv](#)