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Education with an Extended Mind

A couple of months ago we went mushrooming in the nearby forest with my family. I don't really know much more about mushrooms apart from the fact that you probably should not eat the red ones with white spots. My wife, in turn, is an ex-girl-scout. She knows mushrooms by heart.

In the forest, it occurred to me that as mushrooms go, there might be an app for that. I logged into the App Store on my iPhone, and lo and behold: I found a Finnish app called Sieniopas, "The Mushroom Guide."

The change was instantaneous. Instead of a series of unrecognizable blobs, the mushrooms each got a name and a history. I punched in the properties of the mushroom on the app, and it returned the name and a brief description of the thing. Now I could even recognize mushrooms, such as the russula paludosa, that my wife had never heard of.

The Extended Mind

What I did in the forest was access my extended mind. According to the philosophers David Chalmers and Andy Clark, if I can access given information in the same time it takes for me to recall it from memory, that information is a part of my mind the same way my memories are. In terms of functionality, it does not make any difference whether the information is stored in my brain, or on a server in California, insofar as I can access it fast enough.

The extended mind is accessible to anybody using an iPhone. Anything you can google as fast as you can remember it, is as useful to you as your memory. The extended mind has also important consequences to learning.

Just In Case Learning vs. Just In Time Learning

Just in case learning means memorizing information in case it is one day needed. Just in time learning means retrieving information only when it is actually needed. With a device such as the iPhone you can access the information you need wherever you are. With an iPhone, just in time learning becomes learning with an extended mind.

Traditionally, we have had to memorize large amounts of information, like mushrooms, just in case we will one day need that information. With the

extended mind, such information does not need to be memorized – it can be accessed just in time when needed on the iPhone.

As Dr. Keith Sawyer from the Washington University has argued, with the advance of technology we are constantly moving towards just in time learning. The question is, what happens when our children are equipped with an extended mind. If most information is immediately accessible, just in case learning is going to become much less useful as it was yet ten years ago. If you can google something up instantaneously, you won't need to memorize it. You can, instead, use your biological memory to store information that is of real value to you: what you are really interested in. Everything else you can access just in time when you actually need it.

What We Teach Our Children in School?

Currently, a great deal of the school curriculum is still taken up by just in case learning. Much of what is taught at school is taught by rote learning: by memorizing and repeating memorized data. Such learning is not, however, very efficient.

UC Berkeley's professor of developmental psychology, Alison Gopnik, has argued that modern school is optimized to produce capable factory workers. According to Gopnik, school teaches children efficiently only four things. It teaches children to read and write. It teaches them to follow a schedule, and it teaches them to follow orders, regardless of if they make any sense to them. Much else that children learn in school is mostly accidental, and dependent on their interests. Or how many of you still know mushrooms by heart?

In the information age, we do not need factory workers. The modern society needs independent and creative individuals who can work and collaborate productively on different kinds of projects. To this end, we should shift the emphasis on schooling children from rote learning to skills that are more useful in the context of the information age. With the extended mind, it does not make sense to teach children to remember possibly useful information by heart. What should we then teach our children?

What Should We Teach Our Children?

Reading and writing are central skills to our society. Ubiquitous literacy is the cornerstone of Western civilization. Here the modern school has already done an amazing job in dispersing literacy throughout the entire Western world.

Much of the just in case learning done in school can, however, be replaced with subjects that are more suited for the information age. Instead of memorizing mushrooms, dates of wars or types of rock, children could rather learn to access and arrange information efficiently, to use creative thinking techniques, to learn efficient argumentation, to use productivity techniques and finally to focus on subjects that really interest them.

Instead of rote learning, children could be taught to use web for fast information retrieval and storage. Nowadays, children gain access to the web at an early age. They could be taught skills in accessing and evaluating the information they find on the web. They could also be taught to evaluate search queries and to arrange information in cloud storage for later access. To this end, children could be taught how to use such web services as Google, Wikipedia and Evernote efficiently. This way children would learn how to access the information they need when they need it and store it for further usage.

The problem with memorizing information for repetition in an exam is that not much of the information is retained after the exam is over. The capacity to repeat trivia is also not very useful outside of a Trivial Pursuit game. Much more useful is the capacity to create new ideas. Instead of mindless repetition of memorized information, children could be taught to use creative thinking methods such as brainstorming, mind mapping and lateral thinking. Lateral thinking, developed by Edward de Bono, is a highly powerful creative method that is of tremendous use in producing new ideas and innovations.

One of the central types of lateral thinking is challenging. This type of thinking could probably be taught to elementary schoolers in no time. In presenting a lateral challenge, existing patterns of thought are broken down by introducing a ridiculous element in the problem solving situation.

For example, the active suspension of the Formula One series was invented by lateral thinking. The engineers had tried out all materials and forms they could think up, but could not make any advances. Eventually, they introduced a lateral challenge. The engineers thought what would happen if the car was equipped with square tires. This would, of course, produce a bumpy ride. The bumps could, however, be predicted, because the tires were square. Therefore, the onboard computer could be programmed to drive the suspension and thus produce a smoother ride.

No racetrack is, of course, completely smooth. Therefore, the engineers thought they could install a little ultrasonic sensor in the front bumper of the car, and drive the suspension by the information provided by the sensor.

Now, equipped with round tires, the computer would anticipate irregularities on the road and drive the suspension accordingly. As a result, the newly equipped car gained a tremendous advantage.

In the medieval school, the core of the curriculum was the trivium: logic, rhetoric and grammar. It was thought that oratory was the most important topic of education. The skill of argumentation and rhetoric is, indeed, at the very heart of human interactions. As Winston Churchill once said: "Of all the talents bestowed upon men, none is so precious as the gift of oratory." Instead of mindlessly following orders, we could rather teach our children how to argue efficiently so as to be able to make a case when needed. No person is infallible, teachers included.

Words have also tremendous power: no wars have been started without somebody arguing in favor of them. According to the legend, when Mark Anthony sent his men to kill the orator Cicero, he advised them not to let the man of words speak. He knew that as a skilled orator, Cicero could talk his men out of it. The proper use of language is at the very heart of being human – and it is a skill much more important than the mere ability to follow orders.

Being able to follow a schedule is of tremendous use when you need to catch the three fifteen train. But in terms of learning new things or producing results, mindless following of schedules is of scarce use. What's the use of being there on time, if no results are produced? Instead of mindlessly following schedules, the children should be educated in productivity skills such as prioritization, project management and various productivity techniques such as GTD. Children should not need to attend to class if they figured out a way to produce the needed results otherwise. This way, children would be encouraged to find creative ways to follow the curriculum, and yet produce the needed results.

Finally, not everything should be taught to everyone. Rather, children should be given the opportunity to deal with a wide base of different topics in an inspiring form, and encouraged to focus on those areas that they found the most interesting. My four-year-old daughter learned to tell apart the two white cell types called b-lymphocytes and macrophages before the age of three by watching the animated series "Once Upon a Time... Life" – because she was interested in it. When I checked a couple of weeks ago, she could still tell that b-lymphocytes are the ones that protect you from infection, and macrophages eat dead bacteria.

Children could be shown inspiring films, they could participate in inspiring games and other forms of pastime that could contain material from biology,

geography, history, mathematics and so forth. This way children could naturally and enthusiastically grow to learn to what really interests them.

The school could then offer children ways to deepen and broaden their knowledge in the areas that truly interest them in a similar fashion as is these days done in Montessori pedagogy. The teacher would pay attention to the children and offer further information in those areas which the child would find naturally interesting. When children are truly interested, they learn amazing things even by just watching Youtube, as was demonstrated by the TED curator Chris Anderson in his TED talk last summer. As Arthur C. Clarke once said, "If children have interest, then education happens."

By educating our children to access information efficiently, to craft new and creative ideas productively, to share those ideas and to focus each on what they are love the most, we are ultimately producing a network of vocational experts. Furthermore, we can share information faster and faster each day. Already, information can be googled in seconds. But what happens, when we can access information that other people know in seconds? What happens, if I ask a question about quantum mechanics, and Bimal in India answers it in real-time? This is the direction we are headed – a direction that we should start to educate our children for.

Conclusion

As a conclusion, I would like to make a general remark about learning. Sugata Mitra presented in the summer TED talks his revolutionary experiment called Hole in the Wall. He had installed a computer containing biotechnological information in English in India in an area where the local children spoke only their mother tongue Tamil. After installing the computer, Mitra and his team left the children to use the computer on their own.

During the following months, the children self-organized to start learning the information on the computer. One of the children nominated herself as teacher and the group all together tried to make sense of the information stored on the computer.

When Mitra returned after two months, he asked the children what they had learned. One of the girls raised her hand and said,

"Nothing."

"Really nothing?" asked Mitra.

"Apart from the fact that problems in the duplication of DNA cause genetic disease, we have learned nothing."

The future is now. It's time we stop educating our children for the industrial age, and start educating them for the information age.

Thank you!