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Sustainable Learning – how Storyline can support it

What is “sustainable learning”? Isn’t all learning by definition sustainable? Evolution granted the human race a rather big brain (even though the present state of this globe suggests that we don’t use it much). Our speciality, in comparison to most other animals, is our ability to learn – this is what we can do best and it has helped us to survive for quite some time in different environments. The fact that man has survived up to now, is not a sufficient indicator of successful, sustainable learning. And indeed, there are forms of learning we would hardly like to call sustainable, rote learning of historic dates for instance. Or think of the huge amount of facts that schools make students pick up even though we know that these facts are likely to get lost within a short time. And what about learning that goes along with physiological change? As neurobiology has taught us, our brain is busy all day long (and for quite some time during the night as well). Each time we pick up information and connect it to other information already stored in the billions of neurons in our heads, minute alterations take place in our brains. Is that sustainable learning? I am afraid not, at least not always. Just because we have the opportunity to learn all day long – also when watching TV or listening to music – the results of this sort of learning are not necessarily sustainable; in many cases the learning is non-permanent and sometimes even harmful.

When I speak of sustainable learning I rather think of the following:

1. Learning with consequences. Many students call something learning what we would rather call the “cramming for a test”. They try to memorize as much information as possible but are unable to apply it to a meaningful context. So it’s not surprising that some time later most of the “learned” facts have mysteriously disappeared. Simple storage and retrieval of information is obviously not a very effective form of learning. It should only be called sustainable learning, if it leads to changes of behaviour. To give an example: It is not enough that children know what makes a diet healthy (well-balanced, fiber-enriched, vitamin-packed etc.). That information could also be repeated by a parrot. Much more important is the ability to make connections and understand consequences when learning new information. Sustainable learning incorporates changing one’s behaviour as a result of acquiring new knowledge.

2. Life-long learning. This involves an **attitude** that comprises learning as a kind of lifestyle. In a world where change is getting faster (and where the threats to the existence of mankind are becoming more and more obvious) we cannot afford to stop learning at the end of school, not even at the end of our vocational career. If we want to continue to contribute to society, we must keep learning until the very end of our lives. In this sense, sustainable learning is a process of personal development that is completed only by death.

3. Learning as an autopoietic process. A persons’ identity can be viewed as a construction of the self, how we organize our thoughts and actions as we acquire knowledge. We try to be or to become the individuals we imagine we are and so we invent and reinvent ourselves again and again. This “making of oneself” is called autopoiesis. And here we meet again the concept of sustainability. Because what we call sustainable never ends but always has to be reinvented, adapted and optimised. So a third form of sustainable learning is described as the process of learning how to sustain oneself as an autopoietic system.

4. Construction, reconstruction and deconstruction. Most content we learn sooner or later turns out to be different, more complex, or simply wrong. It is said that roughly half of

our school knowledge becomes obsolete within 20 years after we have left school. So not only do we need to learn new content but we must unlearn what we thought to be true. We **construct** knowledge, if we actively learn (e.g. doing project work or learning by discovery). **Reconstruction** is the most common form of learning at school. It takes place, for instance, when students listen to information they get from their teachers and then make it part of their own cognitive structure. **Deconstruction** is what happens if we correct an idea that we previously thought was true. In doing so we constantly rearrange what we know and feel in order to accommodate the demands of an ever-changing environment. To give an example: The older ones among us attended university when behaviourism dominated the theories of learning. As time passed and understandings changed, we had to deconstruct our original views and replace them by more contemporary models (e.g. the constructivist one).

5. Social learning. Each one of us is a part of and contributes to larger, more complex social systems. To exist we need a group, a tribe or a society¹ which forms a supportive environment. Since we are not (at least not completely) controlled by instinct, we must also learn how to become and remain a part of society, how to profit from the support of others and how to create and contribute to an adequate environment for others. This is what I call the fifth form of sustainable learning: learning how to become a useful member of society – preferably of a sustainable society, a society with a future.

6. Coping with change. With respect to the original meaning of sustainability, sustainable learning can have an additional meaning: It can be viewed as learning how to cope with situations which cannot be fully controlled but are of predominant importance for the existence of mankind. To make this a bit more precise, let me briefly name a few principles of sustainability. Having decided to attend this conference you will be familiar with most of them. The main question reads: How does our use of natural resources effect present and future generations of mankind and other species? An advocate of sustainability might answer this question with some of the following hypotheses:

- **You can't have your cake and eat it too. (Or: Rich isn't always better.)** Take for instance a society where wealth is based on the ownership of cattle. As we can observe in parts of Africa and the Middle East, a growing number of cattle soon devour the limited amount of grass in the semi-desert. Consequently most of the cattle die leaving their owners in poverty.
- **Exponential developments.** Most processes which look linear at first sight turn out to be exponential developments if you watch them for some time. It was Gregory Bateson, one of the most influential thinkers of the last century, who developed the idea that all processes can be viewed as slipping on exponential curves.² Think for example of the abundant amount of carbodioxide in the atmosphere of our planet some 700 million years ago. When most of the carbon was combined by the huge forests, the rate of carbon dioxide in our air decreased rapidly and life became possible for mammals. Only over the last 50 years, when these deposits have been exploited as oil and gas, there has been a dramatic increase in carbon dioxide again – due to our constant burning of fossil fuels (see figure 1).

¹ As Aristotle said in "The Politics", p. 1253 a3: "Man is a political animal" (ζῷον πολιτικόν).

² "I think you have to assume that all important physiological or social change is in some degree a slipping of the system at some point along an exponential curve. The slippage may not go far, or it may go to disaster." (Bateson 1999, p. 437)

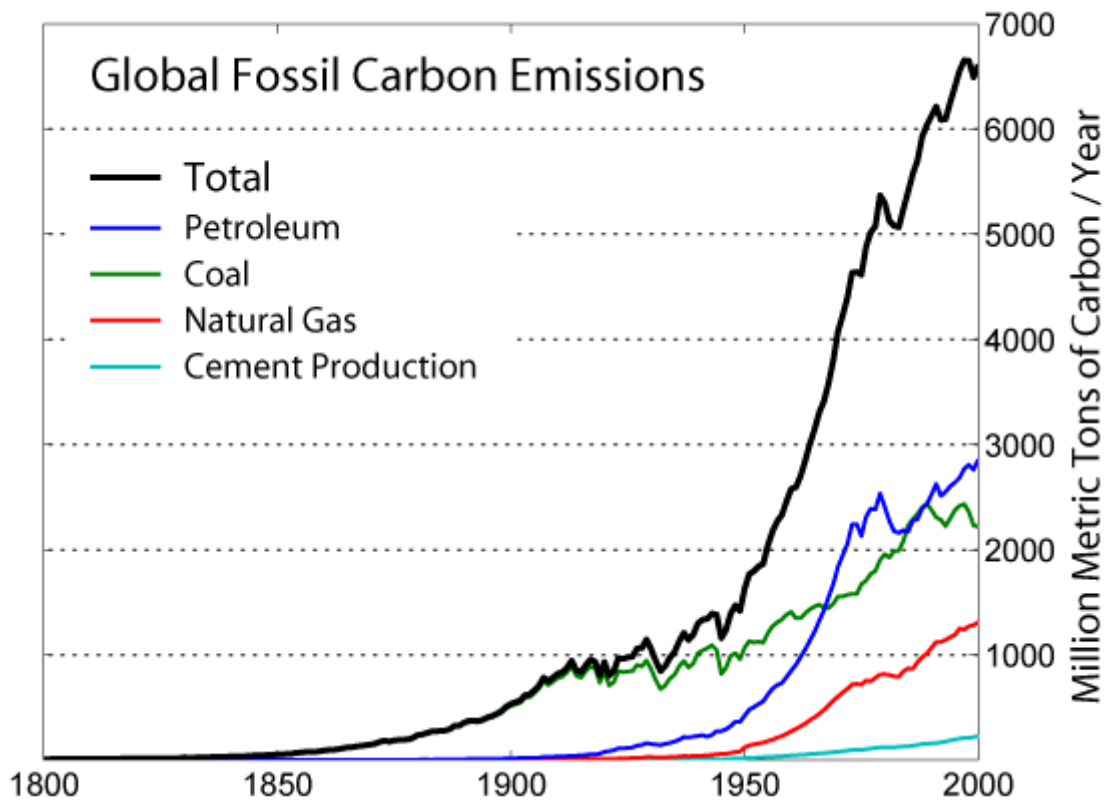


Figure 1: Global fossil carbon emissions. Source: Wikipedia, the free encyclopedia³

Natural processes are typically non-linear and this applies to many other processes as well; think for instance of the development in the stock market or of the waves of interest into so called very important people generated by the tabloid press.

- **Systems theory.** For centuries man has believed that most processes are following causal laws whereas systems theory convinced us that circular or interdependent developments are much more predominant (see figure 2). Part of systems theory is the concept of homeostasis: the property of a system, which regulates its internal environment in order to maintain a constant condition. As the Greek word “stasis” means stagnancy, it has been suggested rather to speak of “homeodynamics”, because all systems have to undergo frequent minor changes or as Wikipedia puts it “multiple dynamic equilibrium adjustments, controlled by interrelated regulation mechanisms” to maintain themselves. Any system, and especially each autopoietic system, has to become different in order to stay the same – it ceases to exist as soon as it becomes resistant to change. This is also true for ourselves. Were it not for millions of small changes in our cells – including repair mechanisms preventing unlimited cell growth which we call cancer – we would not live more than a few years. In fact biologists say that every second about 4 million cells are generated (and the same number is destroyed – a procedure called apoptosis).⁴ So it may take only a few years until all of the 100 trillion cells of the human body are replaced.

³ Original data: Marland, G., T.A. Boden, and R. J. Andres. 2003. "Global, Regional, and National CO₂ Emissions." In Trends: A Compendium of Data on Global Change. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A. http://cdiac.esd.ornl.gov/trends/emis/tre_glob.htm

⁴ Bulletin of Max-Planck-Gesellschaft 19. July 2004. <http://www.mpg.de/bilderBerichteDokumente/dokumentation/pressemitteilungen/2004/pressemitteilung20040716/index.html>

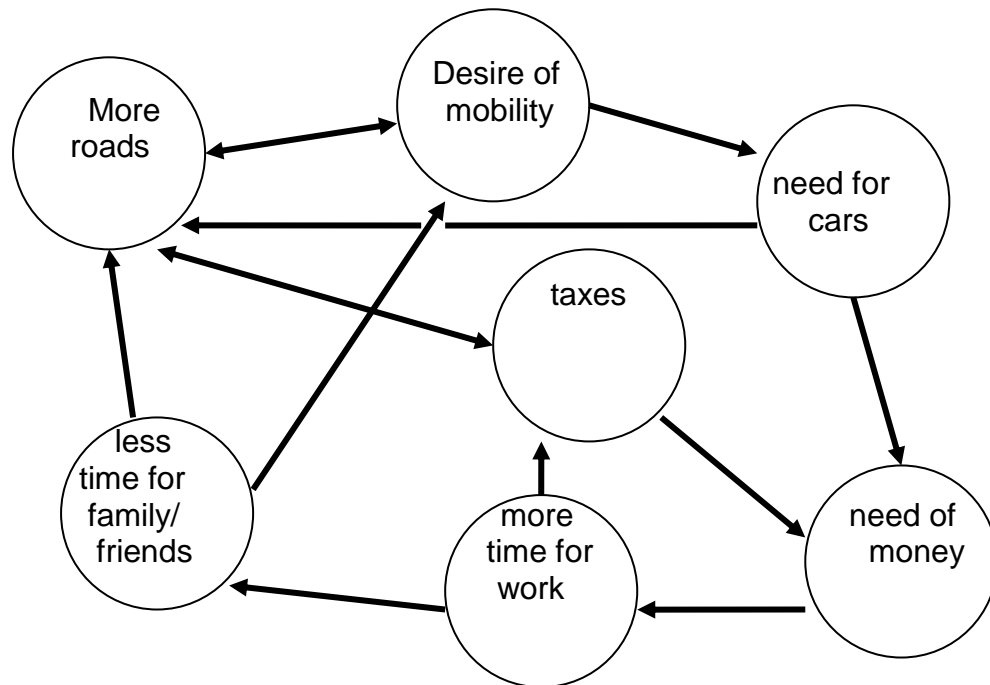


Figure 2: Simplified web of interdependent trends

- **The impossibility of planning.** For more than 7000 years – from the beginning of agriculture in ancient Assyria to the counseling companies of today – we have been toying with the idea that everything can be planned. Examples are – among many others – the ever increasing number of laws and regulations, the host of software for almost any computer application, the existence of pension funds or the invention of financial products designed to reduce the risks of investments. It seems we are addicted to managing the future. We know from experience that things turn out differently than predicted but still we try to “plan what cannot be planned”. I am not saying we should stop planning at all, but instead of focusing only on the desirable aims we should rather give more attention to possible negative outcomes – so called side effects. In Eastern Germany for instance it seemed very important to build sewers in the early nineties after the fall of the wall. Collecting and clearing the waste water seemed an important aim in order to improve the living conditions of the people. No-one had thought of the possibility that many people might leave the area and move to the West. This is exactly what happened; so nowadays the oversized sewage networks have to be flushed with huge amounts of fresh water now and again in order to prevent them from becoming overgrown by weeds.

In short, there is more than one definition of “sustainable learning”, but maybe we can agree upon the view that learning under this headline

- is more than just taking in information
- generates knowledge that is not easily forgotten
- is changing not only the learners’ thoughts but also his/her behaviour
- is long term or even lifelong learning
- helps to create an identity
- strengthens the ability to become a useful member of society
- helps us cope with the imminent threats to the human culture.

Now – what has all this got to do with Storyline? If you agree that sustainability is a very worthwhile aim that is difficult to reach, we can reformulate the main question of this talk:
How can Storyline support sustainable learning about the principles of sustainability?

I suppose you are familiar with the concept of Storyline. So I am not going to describe what this approach stands for – especially since there are a number of books written about this topic.⁵ The only thing I would like to mention beforehand is the fact that “den skotske metode” as Storyline used to be called in Denmark for some time, is much more than just a method.

In fact it is an integrated, pedagogical approach comprising

- a constructivist view of learning as an active process
- a strong emphasis on meaning (rather than on content)
- the encouragement to pursue the topics raised by the key questions
- a preference for student activities other than sitting and listening
- a high value for creativity and
- a narrative functioning as a logical connection of different contents.

Let us now look at the main traits of Storyline in order to discuss how they are connected to the sustainable learning ideas I have explained above.

1. **A Storyline is a kind of adventure.** The set for a Storyline is always a complex and/or problematic situation, which to cope with needs more than the wisdom we normally require when thinking about ideas presented in school books. As Erik Vos (1997) points out, a Storyline is some sort of an adventure that can lead the whole class, including the teacher, to a different goal than planned. Thus children adjust to dealing with unforeseen situations and anticipate the creation of new possibilities. If “intelligence is knowing what to do, when you don’t know what to do” as Jean Piaget once put it, the Storyline approach is most suitable to promote the students’ ability to consider complex problems that arise in social systems as well as in ecological systems.
2. **Key Questions.** Each episode of a Storyline starts with open-ended key questions which require autonomous thinking on the part of the learners. Rarely is there only one “correct” answer to a key question. Far more often there are a variety of “viable” answers. Sometimes the teacher doesn’t expect a certain answer but will readily accept it because of its plausibility. The requirement is not to present a standard solution but a thoughtful, creative and appropriate idea. So the students not only experience that sustainability sometimes needs new approaches instead of “more of the same”, they also learn to ask key questions themselves, e.g.: What would happen, if every human being on this earth was using as much energy as the average European? Well – questions of this kind have become quite normal in our post-modern era. Most educated people have the feeling that we have already passed the point of no return – regarding sustainability – years or decades ago. So the question whether the European life style can be made a standard for the whole world sounds like a rhetorical question without any impact on actual behaviour. In a Storyline classroom however, this nonchalant ignorance would not be tolerated. A story of despondence where there is no struggle between good and evil (or between truth and lie) is simply not a good story. Why should children want to investigate a situation where there is nothing else to be done? So the Storyline in such a case will always ask a subsequent key question aiming at the students’ behaviour, for

⁵ Cf. Falkenberg/Haakonson 2002 (Danish and Swedish), Eik 1999 (Norwegian) Bell/Harkness 2006 or Rendell 1980 (English), Vos 1997 or Letschert 2006 (Dutch), Schwänke 2005 (German).

instance: Even if we passed the point of no return, what do you think you should do to make the situation a little bit more agreeable for you and the other people living in this world? In short: The idea of the key questions is it to make the students think about meaningful choices. This leads us to the next item.

3. **Ownership and identification.** The narrative on which the Storyline is based always contains a number of characters. It is vital for the teaching and learning process, that students identify with one or more of these characters. Mostly this is achieved by having the children produce small collage figures showing their character's physical appearance. The character is also given a name and a biography describing their interests and/or personality. As soon as the students identify with the character they created, they start to imagine the problems of the fictitious people are their own. That is the moment, when sustainable learning begins, when learning by discovery takes place in the sense that students do not simply listen to the teacher, but actively work on solving meaningful problems. That way they learn new facts as well as they start to change their behaviour. The story – originally thought up by the teacher – is propelled by actions and ideas of the students and thus becomes eventually **their** story. So at an early age students accept the responsibility for considering and acting upon difficult situations and their resolution. The parallel to the item of sustainability is evident: Only if a majority of people inhabiting this globe accept the responsibility for preserving our natural resources will there be a chance for sustainable development.
4. **Cooperation and individuality.** Storyline asks learners (and teachers as well) to frequently decide whether a certain task needs the interaction of two or more students or should rather be done individually. Working together on the resolution of a given problem (and problem solving is a typical form of learning in Storyline classes) helps children to cope with the paradoxes of planning described above. Even more important is the fact that children, who cooperate and share their visions for the resolution of meaningful situations, practise the ability to become useful members of society – one of the above mentioned forms of sustainable learning.
5. **Models and other representations.** The Storyline teacher asks the students frequently to build models, to design facilities for different purposes, to invent shift plans or to produce a collage picture and so on. All these products have to prove their applicability for a certain purpose and in many cases mistakes will be discovered by the learners themselves about how their product fits into the scheme of things. So they find out by experience that planning is a never ending process of surprise and optimizing. They learn to deal with unexpected and unwanted “side” effects. The learners get used to viewing them as just “effects” which should be expected as natural results of the overwhelming complexity of reality. In other words: They develop a systemic perspective on natural, historic, or social events and get used to distinguishing between simple models, designed to improve understanding, and a complex and irritating reality that cannot fully be managed.
6. **Meaning.** One of the secrets explaining why Storyline works so well is the fact that the underlying narrative helps the students understand the meaningfulness of what they are asked to do. People who know, why they are doing something mostly also accept that their activities have consequences. At this point I would like to quote a German educator who draws the connection to sustainability in a rather philosophical way. In an essay on “death in a society of winners” Fulbert Steffensky (2007, p. 5) wrote: “We are living in a society with weak wisdom and strong instruments.” As an example he names the German car factory VW, who exhibited a car at the Auto-Salon Geneva 2003 with a horsepower of 1000, able to do as much as 400 kilometres an hour. “This is an example of highly intelligent idiocy, a form of thinking

having become its own caricature. Nonetheless it is an idiocy that has become a matter of course... How do we learn to ask for the consequences of this kind of ability for our offspring and for the survival of the earth?" (ib.) Well – I think with the Storyline approach combining key questions and the concept of meaning, we learn to ask such questions. Children who get used to finding out about their environment themselves will begin to ask questions concerning their own future and the future of society. If they are brought up in a classroom where action is encouraged, they will not restrict themselves to just asking questions but they will want to know how to act to get changes. I am convinced that Storyline is an adequate way of empowering our children with voices that are heard.

Conclusion. A student from a Storyline classroom who has become a sustainable learner as above mentioned, would not be surprised to find that

- trend extrapolation is very risky
- processes are most difficult to control when it would be most desirable to control them through planning that works properly (think for instance of the present situation in Iraq)
- every measure one takes produces unforeseen side effects
- in many cases it depends on the point of view whether a certain trend is positive or negative. If the following chart (see figure 3) e.g. was a description of the decline of the world's population between 2050 and 2100, we wouldn't like this idea. But if this chart was depicting how the small pox virus became almost extinct in the last century we would feel much better (a small pox virus itself in its laboratory would probably not agree if asked). Or – if this was a chart showing the amount of rain falling on Northern Africa in the next 10 years we would think of an imminent catastrophe, whereas the same information would be welcome in certain areas of Bangladesh which are constantly haunted by devastating floods.

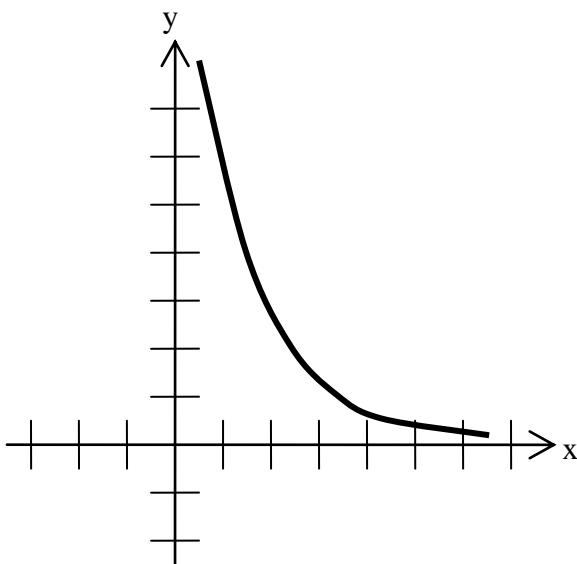


Figure 3: Exponential function

I am not saying – nota bene – that all afore mentioned advantages of the Storyline approach cannot be reached by other methods of teaching and learning.⁶ Nevertheless, in my opinion

⁶ E.g. project work, learning by teaching, problem based learning and so on (cf. Reich 2006).

Storyline is a very suitable approach to sustainable learning because the underlying narrative generates meaning more easily than many other forms of instruction.⁷ In addition, a learner in a Storyline classroom is trained in asking the right kind of questions and is used to systemic views of our social, natural, or technical environment. Most importantly, though in my opinion, is the fact that teachers and learners who work together using the Storyline approach are developing an attitude of mutual respect as well as responsibility for the world we all share.

Still one question remains unanswered: Will all our efforts to enable future generations to cope with the imminent threats to the basis of our life be in time? To draw nearer to answering this last question all of us – teachers and students – have to become sustainable learners.

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⁷ Cf. Egan 2003, p. 4: “The story is the only form of language that can fix the hearer's affective orientation to the events, characters, ideas, or whatever, that make it up. Stories, basically, are little tools for orienting our emotions.”