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Short Communication

Non scholae sed vitae discimus (Not for school but for life we learn): Thoughts on the traditional lecture in medical education

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INTRODUCTION

Modern life sciences have been characterized by a great expansion of knowledge in recent years, placing a considerable workload on our undergraduate and graduate students in pharmacy and pharmacognosy. A popular adage that may first come to mind when one thinks of learning is the classical *non scholae, sed vitae discimus* (not for school but for life we learn). Despite the popularity of this proverb, few of us have read this sentence in its original context. I was highly surprised when looking up the original text of the Roman philosopher Lucius Annaeus Seneca the Younger (1-65 A.C.; Figure 1), because in the original text the exact opposite is written: *non vitae, sed scholae* - for school, not for life we learn! Did generations of Latin teachers teach us the wrong thing in high school? In fact, the corresponding translation of Seneca's 106th letter about morality to Lucilius is: "We are playing kid games. The sharpness and fineness of thinking are blunted by unnecessary problems. Discussions like these do not help us to live right, but at best, to speak in a scholarly way. Wisdom of life is more open to light than wisdom of school, so let us say it out straight: It would be better, if we could take pleasure in a common sense from our learned education. But we are wasting, like all our other values of superfluous luxury, our greatest asset, philosophy, on unnecessary questions. As to the other immoderate addiction after all, we suffer from an

inordinate addiction to learning: **not for life, but for the school we learn.**" (*"Latrunculis ludimus. In supervacuis subtilitasteritur: non faciunt bonos ista sed doctos. Apertior res est sapere, immo simplicior: paucis <satis> est ad mentem bonam uti litteris, sed nos ut cetera in supervacuum diffundimus, ita philosophiam ipsam. Quemadmodum omnium rerum, sic litterarum quoque intemperantia laboramus: non vitae sed scholae discimus."*) [1].

Seneca sharply criticized the existing social relations in the Roman education system by using exaggeration and caricature. In ancient Rome, education was restricted to a small, rich and elite minority. Because their livelihood was secured, they had time to devote to the fine arts. *Philosophia* is the Latin word for "beautiful wisdom", and the main focus of teaching and learning at that time was on the intellectual debate of how to lead a good and moral life. That was the *schola*, the school, that Seneca addressed, not the harsh reality of life on the street outside [2]. Seneca smugly attacked this circumstance in his letter and in doing so he came very close to what we think and feel today. What we should learn is very likely to be useful to us in proving ourselves in the professional world. That is exactly the intent of our programs at the universities. In this respect, our ancestors may be forgiven for teaching us Seneca's quote backwards in well-meant intention.

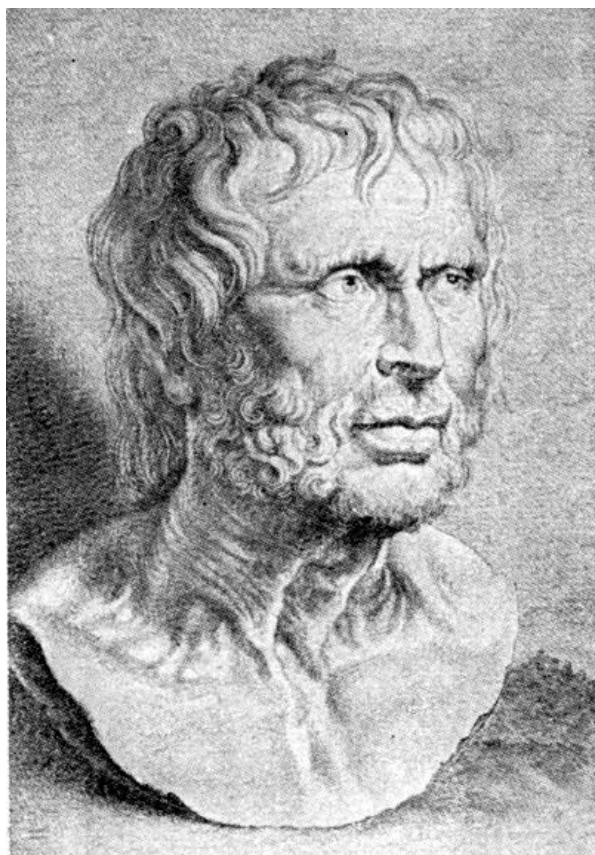


Figure 1. Lucius Annaeus Seneca, the younger (1-65. A.C.) (Image taken from Wikipedia)

After the downfall of the Roman Empire came the darkness of the Middle Ages, which nevertheless had several quite bright periods in the development of education. In 529 A.D. Benedict of Nursia, the founder of the Benedictine order opened the first convent school. Over the centuries, many other monastic schools (*scholae monasticae, claustrales*) were founded. Initially monastery and cathedral schools were only open to the abbey clergy, but later they were also opened to laymen and even girls (which was very modern for those times). Convent schools in their time were particularly progressive, not only because they were the only institutions of higher learning in the Middle Ages, but also because they taught the classic subjects from antiquity in addition to Bible study. The seven liberal arts of the Roman *Schola* consisted of the *trivium* (grammar, rhetorics, dialectics) and the *quadrivium* (music, arithmetics, geometry, astronomy). There were also new arts such as medicine and herbology. Saint Hildegard of Bingen (1098-1179) is a well-known figure in German history; it is believed that she wrote thirteen medical publications. Hildegard compiled the knowledge of the time and developed her own hypothesis on the development of diseases. Two of her most famous books were *Causae et curae*

(Causes and cures) and *Liber subtilitatum diversarum naturarum creaturarum* (Book on the inner essence, constitution and healing power, of various creatures and plants). The idea of holism is crucial to Hildegard's scriptures. Salvation and healing are based on turning to faith, performing good deeds, and leading a modest life [3].

The principle achievement of the monastic schools was the very fact that they taught at all rather than how they taught. It was not until much later that systematic considerations were made on how to teach subject matter in the best possible way. One of the pioneers was the 17th century philosopher, theologian and educator John Amos Comenius. He postulated, "Everything flows of its own accord, violence shall be far from all things" (*omnia sponte fluant, absit violentia rebus*) and adopted a non-coercive method of education [4]. Comenius is considered the founder of modern didactics. He saw education as a way to maintain divine order and he associated it with the hope for a humane world. The progressiveness of his pedagogy is especially evident by the fact that he called for general education for all and compulsory education for boys and girls of all social classes, a standard that still exists today.

Today we are facing new problems at universities. The enormous growth of knowledge in the natural and life sciences fields has lead to a large variety of subject matter and a curriculum overload. New pedagogical approaches have been previously described, need only be implemented:

Behaviorism

Gathering of new knowledge is tightly associated with behavior and conditioning. Learning leads to a change of behavior and the learning environment influences the behavior of the learner [8]. Major determinants of learning are reward and punishment. A showcase example from biology for behaviorism is Pavlov's dog. Upon food supply a bell rang. Over time, the dog was conditioned and reacted upon bell ringing alone, whether or not food was served. Assuming that learning of human subjects underlies similar rules, teachers should generate learning environments which facilitate learning.

Cognitivism

Starting from existing knowledge new information can be converted to knowledge by brain-driven processes. Rather than behavioral reactions to external stimuli, cognitivism emphasizes brain work of the learner as central factor of learning. Cognitivism has been developed in the early 1900s. Modern developments in

cognitivism are theories on cognitive load, information processing and transformation [9]. Learning efficacy is determined by intrinsic and extrinsic cognitive load. Intrinsic cognitive load is the complexity and difficulty of leaning contents, while extrinsic cognitive load are external factors such as addition of irrelevant information, suboptimal preparation and presentation of learning contents and so on [10]. A third factor influencing learning efficacy is germane cognitive load which is the effort a learner has to spend to understand learning contents. To optimize learning success, intrinsic and extrinsic cognitive loads have to be reduced and germane cognitive load has to be increased.

Other theories concentrate on processes how motivation regulates learning, how new information is transformed to new knowledge based on existing knowledge, or how existing and new knowledge are compiled to conceptual understanding of a learning subject [11-13].

Recently, the value of neurosciences to understand learning processes has been recognized. The biology of brain functions may lead to novel insights of determinants of successful learning. From neurosciences, we know that certain neural networks in the brain allow for learning. In particular, the dorsolateral cortex is devoted to short-term memory in and the hippocampus is devoted to long-term memory. Information is absorbed in time intervals of 3-5 seconds with faster-paced in-between periods of half a second each. The information is recorded in this way, retaining 15-20 seconds worth of information before it is either forgotten or added to the short-term memory. Thus, it is understandable that the brain is quickly overloaded by an excess flow of information [14]. Two other factors influence whether knowledge is then transferred from short-term to long-term memory: (1) existing knowledge and (2) having fun while learning. Knowledge can be acquired by connecting small bits of new information to already existing knowledge. For this purpose, multiple repetitions of the content matter may help students to learn more of the subject matter with each iteration. How to give pleasure in learning is, of course, not that easy. Modern teaching concepts emphasize elements of self-directed and problem-based learning. Diverse teaching approaches of discovery- and project-based learning have also been developed that may be superior to traditional classroom instruction. But even classic lectures may be considerably different from each other. Two types of lectures can be distinguished: the impulse and the instruction lecture. The impulse lecture is a speech delivered by a charismatic orator, who thrills the audience. The manner of recitation is more important than the contents. You all have heard speeches of

politicians and other dignitaries that are remembered not for their content, but because they were spoken so beautifully. At the other extreme, instructional speeches deliver a large amount of content, but often in a dry and boring manner. After a short time, it is difficult to follow, and the content of such lectures is quickly forgotten [14].

A challenging learning concept is **constructivism** [15]. This theory postulates that there is no absolute truth and all knowledge is constructed and determined by the individual experiences and biography of a learner. Self-directed learning and individual knowledge generation are central topics of constructivism.

Finally, I would like to mention as an educational concept that the good professor not only inspires students by his lecturing style, but also develops new ideas while he is talking. Thus, the students are direct participants in the process of developing new knowledge [16]. If you think now that this is just another one of those unrealistic new-fangled ideas that do not work anyway, you are wrong. The idea that students held develop new knowledge was put forth as early as 1808 by Friedrich Daniel Ernst Schleiermacher, who later became rector of the University of Berlin [16]. It is up to us to implement already existing and valuable teaching strategies, and to offer good teaching that meets the needs of our students and serves them well in their professional futures.

Annotation

The contents of this paper have been given as a lecture at the Graduate Ceremony of the Pharmacy students, Johannes Gutenberg University, Mainz, Germany, on October 19th 2012.

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