

You must study the masters: extracts & commentaries

James D. Wells

Scholarbox F3 / May 18, 2016

Contents

University of Florida president rails against intercollegiate athletics and fraternities , 1920 ... 2

Spring break can lower your IQ ... 3

Longhand writing better than laptop for note taking ... 4

Factors that determine success in learning ... 5

Advice from the Soviet Union on how to become a great physicist ... 7

Strict oversight at Collège de Dainville, Paris, 1380 ... 8

The process of creativity ... 9

Learn from your elders but follow your convictions ... 10

Martin Luther rose to the top of class by studying hard ... 11

You must study the masters ... 12

University of Florida president rails against abuses in intercollegiate athletics and fraternities ... in 1920

Nearly a century ago President Albert Murphree of the University of Florida pleaded to his fellow university presidents to rein in football and fraternities:

“Now I come to the last menace to good scholarship that I shall mention. It is probable that the emphasis which is now placed upon extra-curricular activities is one of the most potent causes of low intellectual standards. Thoughtful executives contemplate only with alarm the abuses which have crept into intercollegiate athletics, fraternities, dramatics, social affairs and student clubs of every conceivable nature.”

– F.L. McVey (ed.). *Transactions and Proceedings of the National Association of State Universities*, Volume 18, 1920, pp. 51-66.

Comment: For many decades we have had the same “menace” to universities, ever increasing in intensity it seems, and yet we have survived and people get educated. Perhaps stability has been maintained largely because of the constant vigilance by people like President Murphree and the core of students that are very dedicated to their studies. Yet, as always, balance is the key. Extra-curricular activities at some level are good for students to maintain health and vigor.

Spring break can lower your IQ

Spring break is arriving for most students across the country. They may wish to keep in mind Telegraph's curious report on the research of Professor Siegfried Lehrl at University of Erlangen on the ill-effects of vacation on mental acuity:

"'Fourteen days of complete rest can be enough to bring your IQ down by 20 points – more than the difference between a bright and an average student,' says Prof Lehrl. 'Vocabulary shrinks, and we even detect personality changes.'

"So how can you negate the nightmare effects of your dream vacation? According to Prof Lehrl, you should exercise your brain on holiday for at least 10 minutes a day by playing an intellectually stimulating game (chess or Scrabble, for instance), mitigate inactivity with regular long walks, rehydrate constantly – and chew lots of gum. Gum? 'The part of the brainstem that keeps us alert is constantly stimulated by chewing, as a result of which the attention level rises, as does the flow of blood to the brain.'"

Michael Hewitt. "Sun, sea and shrinking brain power." The Telegraph, 15 August 2011.

Comment: Hard to believe such things. Nevertheless, it is probably beneficial to keep up at least some reading and problem solving over an extended holiday. Forgot your books and class notes and don't know what to do? Try reading online Feynman's Lectures on Physics. Or you can just chew gum, but that's not as fun.

Longhand writing better than laptop for note taking

“In three studies, we found that students who took notes on laptops performed worse on conceptual questions than students who took notes longhand. We show that whereas taking more notes can be beneficial, laptop note takers’ tendency to transcript lectures verbatim rather than processing information and reframing it in their own words is detrimental to learning.”

P.A. Mueller, D.M. Oppenheimer. “The Pen is Mightier Than the Keyboard: Advantages of Longhand Over Laptop Note Taking,” *Psychological Science* vol. 25, 1159-1168 (2014).

Comment: The implication is that the slowness of writing requires the brain to process lots of information into a smaller number of words that the student must come up with him/herself, thereby requiring more engagement with the material while being presented. Makes sense to me. It should also be noted that this is a study about today’s students who are much more used to the computer than to writing. The results would be obvious for people of my age, who grew up with more longhand writing, but I presume it was less obvious to researchers that the result would stand for the very young. I hope that means spiral ring notebooks will be around forever.

Factors that determine success in learning

At the start of the new academic year many first-year university students will find that they must sharpen their study skills to be successful in demanding majors. I came across an edition of "Student Success" by Walter and Siebert (1990) which gives excellent advice to those who wish to "succeed in college and still have time for [their] friends."

In their survey of the research literature they found ten factors that students should know when attempting to learn and remember new material:

"Information can't be remembered when it isn't learned well."

"Recognizing the material read is not the same as learning for recall. Recognition is the easiest learning; recall, the most difficult."

"You don't learn or retain information well if you are distracted. Noise, television, music, and people talking all divert part of your brain's attention from what you are studying. Being preoccupied or worried can also distract you from learning and remembering."

"Information does not transfer from short-term memory to long-term memory without effort, repetition, and practice."

"Your memory of information lasts longer when learning is spread out over a period of time."

"Your ability to remember information drops very sharply following the learning. Although the main points of a morning lecture may be recalled while talking to a friend at lunch, much of what was learned will be forgotten two weeks later. Only a small percentage of information is retained if you do not use it or practice relearning it."

"Trying to learn too much information too fast interferes with accurate recall. The nervous system needs time to assimilate new learning before taking in more."

"Information recently learned will be interfered with by similar information learned soon after. This is a process called retroactive inhibition, in which you have difficulty recalling new information too similar to other new information."

"When you have an emotional dislike for the material being learned, you will have difficulty recalling it objectively and accurately."

"Learning and remembering are less efficient when you lack interest in the material or motivation to learn."

In addition to knowing what it takes to learn and remember new material, they also state that active time management is a key to success. Here are a few of the questions they pose that one should answer “yes” to in order to increase the odds of success:

- “Have I outlined a weekly study schedule for myself?”
- “Do I write out and follow daily time schedules?”
- “Is my study free of distractions?”
- “Do I avoid studying one subject too long?”
- “Do I record my progress at achieving study goals?”
- “When I achieve study goals, do I reward myself?”

Good luck students in the new academic year!

Reference

Walter, T., Siebert, A. 1990. *Student Success*, 5th ed. Chicago: Holt, Rinehart and Winston.

Advice from the Soviet Union on how to become a great physicist

Whatever you might think of the Soviet Union, they undeniably had incredible physicists. There are many reasons for this, but a culture of grit and personal determination to tackle physics problems on one's own appears to me to be one of the key factors. To illustrate, here's a quote from I.V. Savelyev, author of the three-volume "Physics. A General Course," a successful Soviet-era textbook of undergraduate physics:

"The solving of problems will yield the maximum returns only if a student does this it by himself. It is often not easy to solve a problem without any aid or prompting, and this is not always successful. But even unsuccessful attempts to find a solution, if they were undertaken with sufficient persistence, will give noticeable returns because they develop thinking and strengthen one's will power. It must be borne in mind that the decisive role in working on problems, as in general in studying, is played by will power and diligence."

I.V. Savelyev. *Questions and Problems in General Physics*. Mir Publishers, Moscow, 1982 (English 1984).

Strict oversight at Collège de Dainville, Paris, 1380

Students in residence at the Collège de Dainville (founded in 1380 and part of the Université de Paris) were subject to very strict study rules:

“Day and night, until they go to bed, the door is not to be closed, so the master can visit whenever he wishes and so that the pupils will increase their zeal for study and fear to fall into idleness or bad habits. If he deems it necessary, the master shall be allowed to hold the key to each room.”

G. Duby, ed., trans. by A. Goldhammer. *A History of Private Life*, vol.II: *Revelations of the Medieval World*. Belknap Press, 1988. As quoted by P. Lin. “Student Life”. Cal Poly Pomona.

The Process of creativity

In chapter 17 of Gell-Mann's *The Quark and the Jaguar*, the physicist Gell-Mann explains the process of creativity:

Stages leading to creative idea (stages expressed by Hermann von Helmholtz)

- Saturation: filling our minds with everything about the problem
- Incubation: letting it churn subconsciously
- Illumination: idea comes at some random time or circumstance

Incubation can be aided by brainstorming, and applying random thoughts or random learning to the idea.

Characteristics of those who are creative and escape to deeper basins of thought: "Those characteristics include a dedication to the task, an awareness of being trapped in an unsuitable basin, a degree of comfort with teetering on the edge between basins, and a capacity for formulating as well as solving problems."

From M. Gell-Mann. *The Quark and the Jaguar*. Little, Brown and Co., 1994.

Comment: M. Gell-Mann's first characteristic of creative people is "dedication to the task", which I agree with. The rest is secondary and is merely descriptive of what generally inevitably happens when dedication is present. When strong desire is there, and total dedication applies, all this stuff about basins and teetering on the edge between them, etc., just happens.

Learn from your elders but follow your convictions

"From the earliest times the old have rubbed it into the young that they are wiser than they, and before the young have discovered what nonsense this was they were old too, and it profited them to carry on the imposture."

Somerset Maugham. *Cakes and Ale*. Vintage Books, 2000.

Comment: This is tricky. You must simultaneously learn all the wisdom of the old, while at the same time have the courage, wisdom and confidence to go a different direction when warranted. Striking out on your own in directions that make no sense and will lead to your destruction is a risk. However, doing something great requires that kind of abandon. What makes young people revolutionize physics and mathematics more often than older people is that they are usually not experienced enough to know that their ideas cannot pan out. And then it does.

Martin Luther rose to top of class by studying hard

“University authorities in Erfurt sternly regulated academic life. At four each morning the bell roused students for a day of rote learning and often wearying spiritual exercises. Starting low in class ranking, Luther studied hard and moved toward the top, usually enjoying his courses.”

Martin Marty. *Martin Luther*. Penguin, 2004

Comment: Martin Luther came from somewhat humble beginnings, and started “low in class ranking.” But his hard work in classes, which originated from his enjoyment of the courses, made him rise to the top. The stern environment did not sway him. Students today collapse if they have a class at 9am. Not Martin Luther. His commitment level to education, study, and knowledge enabled him to seize the opportunity that he did, to become a leader and to reform Christianity.

You must study the masters

Paraphrase of comment by the great pianist Lang Lang: “You must respect the masters and study them, and then you can do your own work.”

Charlie Rose Show. PBS, July 18, 2003.

Comment: This is true in physics. You must study what is known before you can do something important that hasn't already been done before. A physicist who has not gotten past first semester mechanics instruction is not going to revolutionize scattering amplitude theory or come up with brilliant breakthroughs on grand unification. You must study the great body of knowledge we already know, while at the same time keeping your own creativity and own initiative to create new knowledge. This is hard, and that is why there are so few who make truly new insights of nature.