Journal Article

“Deep drilling“ requires “surfing“

Author(s):
Folkers, Gerd; Folkers, Laura

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Deep drilling is a very attractive term. Apart from geological discussions, we heard it for the first time in a conversation with Gottfried Boehm, who coined the term “iconic turn”. The debate was about the interpretation of a photographic image that depicted the situation in an operating theatre. This was quick and easy to interpret superficially (surfing). But the question was: Did the photographer want to present a very critical situation or moment? Or was the photograph just a random snapshot? How can you decide or know if the photograph has a particular message? Does the expression of the surgeon, the assistant or the anesthetist reveal something? Is there a special type or constellation of medical equipment depicted? Can one read and conclude anything from the displays of the monitoring instruments that are visible in the photograph?

In this example, the surface of the image does no longer provide any obvious information, probably except to the experts, the surgeon and his team. Finding the answers, the possibly additional information, requires deep drilling at specific locations on the image’s surface. This immediately raises a new question. Where to drill? Some points are evident, such as the surgeon. If the drilling provides information about his specialty, we can at least make a guess. A liver specialist will intervene less frequently in an emergency situation, as maybe will the urologist. The more detailed analyses of the monitoring instruments or the apparatuses provides less information, because often the same parameters are measured, the same constellation of technical aids are used in an operating theater. Thus, the number of questions increases: Why have which parameters been measured? Who determines the parameters by which a normal situation is distinguished from a critical situation? The decision-making processes associated with these analyses are anything but trivial. The frequent outcome of going deeper is the accumulation of more questions.

Of course, the patient himself is the most promising person for a deep drilling. However, the information about him is securely protected, so that the chisel ends up on photograph’s negative.

Not visible of course, but present, is the photographer. This is where a deep well is most likely to be found. What was to be shown, what was the motivation for taking the photograph? Public relations for the clinic, or the description of a working environment, or showing a prominent surgeon or a prominent patient?

The deeper the driller’s hole goes, the more information is disclosed. Not all information is equally useful in answering the question: “What does this image want to tell us?”. The assistant’s mean blood pressure is probably irrelevant, as is the anesthetist’s cat’s name. The photographer’s shoe size is probably irrelevant, but the chemical composition of the photographic paper is not.

Therefore, an important perspective has to be added, that of the (presumed) relevance. A discussion of relevance relations prevents a too deep drilling, which is too often seen, probably due to the widespread conviction that the “truth” can always be found at the lowest level. This unfortunately applies neither to images nor to oil.

Subatomic states can nowadays be measured, simulated and constructed, and there is undoubtedly a connection between them and the photograph. However, knowledge of these subatomic states is not necessary for an interpretation of the image. Hence, deep drilling should explore the level of granularity, needed for interpretation of what can be seen on the surface. The aforementioned is explored by surfing. Only a certain distance, surfing above the surface will grant you with the detection of “hot spots”, pictorial elements with putative importance for understanding the whole, hinting at promising drilling points. Like in aerial archeology.

The very same question about the relevance applies to teaching. It is only natural that the further one advances with one’s education, the fewer and the more involved the topics become. That would be drilling deep. This is good and useful, yet those responsible for Higher Education keep constantly trying to prevent their students from becoming what in German may be called a “Fachidiot”.

Therefore, curricula are getting crammed with more and more topics – and most of them are still fitting into the general field of the particular study. However, more and more additional topics like ethics appear on the agenda. Ethics is important beyond doubt, but is it to the extent of cutting courses shorter which actually belong to the study field and enable students to drill themselves? Those measures foster surfing in two aspects. One is the fact that the time available to become excellent in either field of specialization is reduced, the other is the – wrong – belief that ethics can be taught in a couple of hours. By that, ethics itself becomes subject to surfing, while it should be an attitude, not an examination topic. Thus, make ethics an integral part of a scientist by serving always as a role model and don’t award credits points for ethics.

In a similar fashion, one could wonder about the benefits of keeping the curriculum topics broad – even in the master year of the study program. In case of the chemistry programs at the ETH Zurich, there are three major fields...
– organic, inorganic and physical chemistry –, which are all continued until the end. On one hand, this is brilliant as it gives all graduates an overview over all those topics that reaches further than named reactions, batteries and some selection rules. On the other side, the proper “granularity” provides the understanding of the whole image. Subsequent surfing donates the pleasure to identify “hot spots” for individual deep drilling. It is the challenge (time and space) to get the course granularity fine enough for advanced students to identify their special field where they want to drill deep with all their enthusiasm.

Prof. (em.) Dr. Gerd Folkers
ETH Zurich
Department of Humanities, Social and Political Sciences (D-GESS)
8092 Zurich, Switzerland
Phone +41 44 633 87 07
gerdfolkers@gess.ethz.ch
ORCID 0000-0002-3620-705X

Laura Folkers
MSc Chemistry (ETH)
PhD Student Inorganic Chemistry
Lunds Universitet
Sweden
laurafolkers@chem.lu.se
ORCID 0000-0002-3424-1932

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