

Dealing with Students' Requests for a More Transparent Process of Education

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Introduction

One common theme in what students ask their teachers are the questions about the process of education *per se*. These questions obviously include questions about grading, but they also include questions on the design of the course. For example, "Why this much was deducted for this specific error?" pertains to grading, but "Why don't we practise to solve the actual problems from the test?" pertains to the course design. These requests are fairly uniform as far as author observed (students from Dept. of Mathematics and Mechanics at SPbSU, HSE, LETI all ask almost identical questions).

These questions cannot be swept aside, as they are actually good questions. They do in fact indicate the emergence of a mindful approach to the problem at hand. They indicate that at very least the student is making a conscious effort to improve his grades, and at best they may indicate that the student is actively trying to understand how the course design is going to help him to master the course. This kind of thinking, of stating the problem and then addressing the problem as stated must be encouraged, and thus these questions must be answered to the student's satisfaction.

However, answering these questions must be done within the student's existing context. The purely pedagogical statement of the reasons behind this and that design decision, while true and academically impeccable, may sound unfamiliar and fail to resonate.

Nature of transparency requests

Broadly speaking, transparency requests can be broken in three broadly defined classes: contextual, structural and grading-related.

Contextual requests pertain to the substance of course design and concern the place of the given course in the program as a whole, e.g. "what do we learn

this thing for?" and relation between parts of the course, e.g. "why do we learn this thing in this specific way?" Both kinds of requests are answered by immersing the students into their professional context (which is why the umbrella term "contextual" was chosen to denote this kind of request).

Structural requests pertain to a lower level of course design and include *all* questions pertaining to the structure of the course, ranging from "why is it good to volunteer to solve the problem in front of the class" and "why learning to solve the problems is not enough for a passing grade" all the way to questions regarding the relative number of lectures vs practice sessions, discrepancies of speed with which theoretical material at lectures and practical skills at practice sessions are covered, and questions on the degree to which "theory" must be covered at practical sessions, the exact place of the boundary between "theory" and "practice", and whether this boundary exists at all.

Grading-related requests include all requests aimed at better understanding of the grading criteria. This includes criteria for individual tests as well as criteria for grading the mastery of course as a whole. According to classification suggested in [3], grading criteria can be either formal (quantitative, can be applied and understood by those outside the field, easily automated) or expertise-based (qualitative, substance-based, hard to understand for those outside the field, not automatable by the current technology). Despite the fact that grading criteria pertain to the lowest level of course design, discussion of expertise-based grading criteria is extremely important, as it encourages the students to shape the concepts of expertise and professionalism in general, to value the expertise, and to understand the relation between the level of expertise and the amount of resources invested into improvement of such expertise.

A competent teacher will have answered any of these questions even before the classes started. The gap lies in the ability to explain these answers to the student's satisfaction.

Making answers comprehensible to students

Both contextual and grading-related questions are rather easily answered. Answers for the former require a bird's eye view of the program as a whole, and answers for the latter are usually quite technical and close to the ground, so to speak. The trait these answers share is that they require relatively few steps from their initial point of view. The big picture whys of the contextual questions and detail-specific hows of grading-related questions are easily contextualized with student's current experiences and expectations.

The structural questions are more difficult to tackle. Their answers often hinge on cognition theory, which most STEM students are barely aware of. There seems to be a way around this obstacle, and it is to use the machine learning simile. As the human learning served as a starting point of developing the concept

of machine learning, so can the machine learning serve as a familiar model illustrating some points of student's own journey through the course. Indeed, some of more curious students will have independently gained some knowledge, however incomplete, about machine learning and its problems and practices. For example, the concept of training and testing data-sets and the overtraining problem can immediately explain why problems in the test are going to be a bit different from what was covered in classroom.

Conclusion

Transparent communication on the course design is extremely important. If done correctly, it can encourage the students to adhere to the most efficient practices of learning built into the course structure, dissuade them from many maladaptive strategies such as, but not limited to, rote learning or outright cheating, and shape such important values as the concepts of expertise and professionalism, and correlation between effort invested and result obtained. For that, two main ingredients are necessary. One is a mutual respect, teacher to student and vice versa. The other is the teacher's ability to attune his explanation to the student's current context, and not some desired end-state.

References

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