”Making Teaching of Programming Learner-Oriented and Learner-Directed”
a TACE analysis

Michael Cochez
Department of Mathematical Information Technology
University of Jyväskylä
P.O. Box 35 (Agora), 40014, Jyväskylä, Finland
michael.cochez@jyu.fi

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Introduction

When we received the assignment of reviewing an article in the light of the Teaching Academic Content through English (TACE [1]) program, I immediately knew which article I wanted to review. The article ”Making Teaching of Programming Learning-Oriented and Learner-Directed” [2] written by Ville Tirronen and Ville Isomöttönen from the university of Jyväskylä was the basis for the course structure of the functional programming course which I attended myself in autumn 2011. The course had a structure which was very different from any other course which I had been attending before and the course is very much relevant to my own discipline. Most of the analysis made in this position paper is based on that article. However, some remarks are based on my personal experiences during the functional programming course’s lectures. It should be noted that the author is not a native Finnish speaker, while the course was conducted in Finnish. The experiences of other students in the course, which were all native speakers, can be very different.

The course model is designed for a Master’s level functional programming course. The main idea is to create an environment in which nothing is measured against academic standards. Students are expected to learn themselves what they think they need to solve the exercises. They are given materials and pointers, but students are forced nor tested whether they have read the
material. The only measure of progress is that the students should be able to solve the weekly exercises. There is thus also no explicit exam and also no grades are given; the course is pass/fail. The course’s schedule is according to the schema in Figure 1 taken from the article under review. The cycle can be described as follows: first, students get material to read. Secondly, there is an assignment review session during which (possible) previous assignments are reviewed. Thirdly, the students receive new assignments, which can be made during the supervised sessions. Questions asked about the material are answered as well. Interestingly, before the cycle is over the next cycle already starts here. Lastly, the current cycle is finished by returning the assignments.

In this article several aspects of the teaching method are described in sections which correspond to different modules in the TACE program. The first section tells about the cultural aspects of learning described in the article and elaborates on how these affect the multicultural learning environment. Secondly, technological aspects of the teaching method are described. Lastly, the concept of face is considered to a deeper extent.

1 Cultural and educational cultural aspects

The lectures which were used to design the course were conducted in Finland, for a mainly Finnish audience. According to research performed by Geert Hofstede, Finland has a low power distance, is an individualistic society, is strongly feminine, has medium uncertainty avoidance ranking and a medium-short term orientated culture.[3]
The low power distance is visible in the course design. For instance, the teacher is regarded as a guide which is available for the students, not as a higher authority. On the other hand, it is the teacher who is choosing the group and the student which will present their assignments to the rest of the class. However, the choice is not made to make groups compete. Hence, not necessarily the best solution are presented, but the most pedagogically effective ones. Further, the teacher will assist the reviews which are solely based on what the students need in order to solve the exercises. The learning has thus a constructive scent, there are even no traditional lectures at all nor will the student make exams or tests.

The individualistic society is good for the independent studying, but might be a problem for group work. This is somewhat anticipated by mixing groups in such a way that groups consist of people who are more likely to work together. If the group consists of one strong student and several weak students, there is a big chance that the one student will start working individually without involving his peers. The peers get, in turn, a feeling of uselessness and will underachieve. Therefore, strong students are grouped together and weaker ones as well. More attention on face in group work will be paid in section 3.

When this course model is applied in a multi-cultural context, there might be a problem here: students might not be used to self-study. To circumvent this problem, one could consider organizing some kind of meetings where students can review the materials in group. One way to approach this, which is mentioned in the reviewed article, is to temporarily organize small lectures to push the students in motion.

The strong feminine side of the society is anticipated upon and respected by not relying on competition between students to achieve results. Results are attempted by making the students genuinely interested in the topic by showing them how they can use the studied topics in practice. This might also be a difficult issue in multi-cultural environment. In a mix of people from feminine and masculine cultures it might be difficult to avoid competition.

The course does not use a grading system, nor does it use exams to test the students’ skills. It is questioned in the paper whether not having grades might reduce the will for students to work hard for the course since there won’t be any reward.
2 Technology

One issue with the reviewed article, which is written by IT experts, seems to be that the technical part of the teaching is left out. Perhaps the technical part is considered trivial or not important in that article’s context. Therefore, this section is mainly based on the personal experience of the author of this article during the above mentioned course.

During the course, technology was needed at several points. The course design needs some kind of communication channel where no physical meeting between the teacher and students is needed. The main communication channel is the course website [4]. Reading materials and exercises are posted on the course website weekly, according to the course schedule. Further, the website contains a lot of extra material which interested students can go through individually. All materials are available in digital form and without charge. Interestingly, the website also contains a section on the teaching philosophy used to design the course and a page with graphical motivators to promote the topic of the course (see for instance Figure 2).

Further, every page contains a form, on which students can post comments and ask questions from the teacher. The presentations of the teacher, which were used during the assignment review sessions, are all available on the course website. All presentations are in html format which can be opened by everyone as opposed to presentations in proprietary formats.

Returning programming tasks is done using git (“Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency.”[5]). The university has a git server with web interface available for the students (see [6]). Despite the technical difficulty, using this type of system can be beneficial. Firstly, this type of system is in use in the industry as well, giving the students a chance to use technologies they will be using in the later working live. Secondly, the system is very natural to use when a group of people has to work on a project. The system gives support for versioning, merging of documents and trying out things without breaking someone else’s work. Lastly, the idea of the version control system at the university is that students can see and comment on each others work, providing another channel for peer learning. Students might, however, be afraid of using this channel because they are afraid of getting a negative grading if they have been studying other peoples work when they should make something similar. They might also be afraid of their work being copied. Dates of work are tracked and can in that case be used to see who made the original. The course also had a IRC channel (a public chat service) available for the students. There were several students in the channel, however only few discussions were held.
3 Face

The authors of the reviewed article consider face a very important aspect of their teaching. One of the main targets is preventing face loss for students. Comparison is made to another article which describes a method in which students are asked to write programming code while the other students are spectators. The reason the authors do not believe that this is a good idea is that students might fear demonstrating incompetence. Further attention is paid to face in that competition between students is avoided as much as possible. This competition might be beneficial for strong students who get an extra stimulus. Weaker students get, however, a feeling that they cannot reach a level which is good enough.

On the other hand, face is used as a mean of pressure to perform group work as a real team. When the assignments are reviewed in the classroom, any student from the group can be asked to present the group’s solution. This is supposed to make the members of the group depend on one-another when solving the problems and forces them to come to a consensus. The lose of face is then again limited by provoking comments from others during the class. This also to prevent a feeling of individual evaluation.
References


