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Motivation to study and work with talented students

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Abstract

Motivation to study and work is a quite variable process, which should be paid a high attention to constantly. The term “motivation” originates from the Latin word “movere” i.e., to move, and it is a hidden activity of internal driving force in the human psyche for his/her action. The inner stimulus is the motive, which can be expressed as a rational impulse making the human behaviour psychologically meaningful; therefore it is the cause of a human behaviour. The human mind is always simultaneously and parallelly affected by several impetuses and motivation should be understood as the whole set of motives.

These may differ or match up in intensity, direction and stability. Generally, in case the motives are targeted similarly, they reinforce each other; otherwise they weaken each other or can completely be eliminated.

The efforts to explain the motivation and knowledge date back to the history. Various theories differ in their assumptions and specificities of human behaviour in particular situations. Generally speaking, there are three basic groups of motivation theories:

- the theory focused on motivation causes,
- the theory targeted at the motivation process itself,
- theories covering special purposes, decision-making, participation-oriented, etc.

1. The paper presents the authors' approaches to work with talented students at technical universities in Brno, their broad experience as well as various motivation methods, which are successfully applied and used in the educational process.

The main aim is to prepare graduates with adequate professional, cultural, ethical and social training so that they are capable of creatively solving conceptual problems and adapting to practical requirements

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1. Introduction

A human being is characterized as a biological and social unit; both components make up a functional personality entity. While creating any personality, complex of various factors have to be considered and combination of positive and negative phenomena become evident. Every personality is somehow based, i.e., biology, history, economy, geography, society and psychology play crucial roles. Personal and psychic determination can be divided

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into current determination (current formative circumstances and causes, both ancestral and inborn) and practically acquired one - experience.

Teachers, regardless they teach mathematics, forestry or languages have always to realize that they cannot teach something to someone who does not want to learn. This is a reason why educators spend so much time on motivation methods: teachers of talented students face the same challenge: how to motivate students to learn and how to offer and present them skills and content that they consider and value as relevant and important.

Speaking about motivation and work with talented students brings about questions targeted at teaching approach, i.e., what we do when we teach:

- a) planned teaching and learning activities (lectures, workshops, self-directed learning),
- b) methods we try to engage students (providing new knowledge, finding relationship between new knowledge and what they already know,
- c) ways we support the students (encourage questions, constructive feedback);

therefore we always try to ensure that we do our best to facilitate students' learning and put educational theory into practice.

The term "foreign language communication" is one of frequent requirements in the advertisements for applicants not only for managerial positions. In technology, science as well as in everyday life, the word communication is used in the meaning of exchange and transfer of information: foreign language communication - information transfer - possible attractive career = high motivation to get a well-paid or glamorous post. Nowadays, professional knowledge, skills and experience must be a foreign language knowledge supported to ensure proper information transfer and prevent misunderstanding.

2. Teacher's role

Everybody has his/her dreams, goals, and priorities since the very childhood; gradually dreams become aims and we strive to look for ways how to make them true and make them more specific and purpose-oriented. Adolescence period is usually period when the young start to realize being young men and ladies they would like to be attractive and understood as acceptable entities within the society. To reach that, relevant education is needed, i.e., desire for as much knowledge as possible and ability to share it with other regardless the distance using a foreign language and the latest means of communication.

The teacher's role in the past consisted mainly in being the major source of knowledge; nowadays, teachers provide information and show their students how to tackle them. They are still considered to be a kind of leader in the class but at the same time they can be thought of as facilitators in the learning process whose main task is to set goals and organise the learning process accordingly. Teachers should be masters of their profession; they also have to be the artist of it. Researchers have examined and described the different components of teachers' knowledge. They have come up with the importance of content knowledge, pedagogic content knowledge, general pedagogic knowledge, curricular knowledge, contextual knowledge and process knowledge. Many teachers today, however, are encouraged to adapt and adopt new practices that acknowledge both the art and science of learning. They understand that the essence of education is a close relationship between a knowledgeable, caring adult and a secure, motivated student. The task of a modern teacher is to encourage positive motivation traits in students to push them to prepare for their future life. Rather than see themselves as masters of subject matter such as math, science or language, teachers increasingly understand that they must also inspire a love of learning.

In each group of students there are always excellent, average, below average, extremely talented and gifted students as well as those who have to work very hard to achieve at least good results. The challenge of a teacher is to master work with all types of students: the talented have to be always busy, not bored and the weakest have to be able to follow the explanation and be able to handle the material later. Every teacher prefers working with groups of students, which are talented, hardworking, willing to work and permanently motivated to achieve the best results. One of the authors of the paper works at the University of Defence in Brno and she has been working for seven

years with groups of such students. These students, resulting from their self-assessment, decided to make their study more complicated; they were offered a chance to study either mathematics or physics or both in the English language instead of in the Czech language.

However, it should be noted that the University of Defence provides for accredited education in bachelor, master and doctoral degree programmes. Moreover the follow-on training is organized in life education programmes in the forms of career purpose and special courses of post-gradual.

The system of education also includes a system of specialty, specialization, refreshment that enhances professionalism of every participant.

In addition, the system of language training is running. In order to increase the capability of mutual communication with NATO components, the Defence Language Institute orchestrates language courses.

The level of language proficiency of the military personnel is increasing continuously. Members of the Armed Forces are capable of fulfilling given tasks not only on missions abroad, but also working in NATO structures. The Czech Republic thus significantly contributes towards enhancing the interoperability between the NATO and EU states, despite being a small country. Therefore, even the

- mutual comparability of education and
- readiness of graduates of various educational systems

(e.g. within the Erasmus program) is becoming more and more important (www.unob.cz).

The need to increase the level of language knowledge as well as better chances of future graduates to participate in missions abroad were reasons why in 2006/2007 were the gifted and hardworking students in the first bachelor's year offered by the Department of Mathematics and Physics to study mathematics and physics in the English language.

Selected students are offered to extend the number of the English language lessons (both active and passive) significantly. However, at the same time, studying load increased as well. They can extend active and passive knowledge of a foreign language, they work in comparatively small homogeneous groups and these facts bring about teachers faster pace and higher level of teaching because there is no need to consider weaker and slower students and teachers can really enjoy working with talented students.

3. Specific experience and approach to students

To ensure teaching mathematics and physics in the English language was a problem at the beginning; no textbooks, no dictionaries were available at the Department. However, enthusiastic teachers were able to collect math terminology and released the first version of a dictionary, which students could use as a basic tool for further lessons. The dictionary has two parts: basic general expressions and particular professional terminology for each further lesson. Students know what they are to learn, what they will need and the number of new words increases very fast. In addition, students studying both subjects in English can profit from interdisciplinary links between both subjects.

In the following years, textbooks and teaching materials in the English language from other universities were purchased; unfortunately they did not cover exactly subjects Mathematics I and Mathematics II. The ESF project activity Expanding teaching in English enabled improving teaching and resulted in preparing two textbooks on differential and integral calculus of functions of one variable, i.e., the material covering almost the first semester period of undergraduate study. The textbooks contain the necessary theory and a number of exercises with detailed explanation and summarized exercises at the end of every chapter. Moreover, the hypertext version allows listeners to “set static pictures in motion” and thus obtain better idea what the term really means. The multimedia version also contains interactive texts and auto-tests making possible to test the knowledge immediately.

Another benefit consisted in extending the English dictionary of math terminology where new terms and sections were added; therefore it covers concepts discussed in the first and second semesters. Students do appreciate its hypertext version completed with several tables of integral and differential calculus and pictures of basic quadrics. Current students prefer multimedia version to the printed one. The English pronunciation is still a problem: listening practice would be useful; however, there are time and finance blockers so far. The native speaker could help and

consulted the English texts, which resulted in quality text and broaden and enrich variety of both math and general phrases.

Textbooks of statistics and probability are further materials supporting teaching math in English; they cover partially the second and third semesters. The textbooks include a large number of both solved and unsolved examples, which supports self-study activities. The topic itself is considered difficult to be understood in the Czech language; therefore the language barrier makes the subject even more complicated when it is taught in English.

Most textbooks include examples solution using Maple. This program was purchased in sufficient quantities both in fixed and floating licenses; students can use it not only at university but also using their computers being connected to the university network. We have had good initial experience with this program in lab exercises as it offers symbolic and numerical computations and mathematical functions covering many branches of mathematics from basics of differential and integral calculus, linear algebra, solving equations to the solution of differential and difference equations.

The advantage of the program consists in Matlab system collaboration (source code translation, import and export of data files and direct Matlab call from Maple), which is used at the university by several specialized departments. Students, in particular skilled and experienced ones have a chance to recognize and find out possibilities and benefits of individual programs while studying the basic course; later they can profit from this knowledge having better chances in practice and future career advancement.

Having analysed surveys at the end of a year, we can say that students' approach to math programs is mostly positive. Some of them had met these programs before. Others, usually more hardworking and skilled students use programs to check homework, to draw graph functions or to do supporting calculations. However, there were some, which had used programs for accomplishing practical tasks from specialized subjects: this should be the crucial goal of educational process at the departments teaching fundamental basic subjects – to teach students how to apply knowledge to specialized subjects. The big advantage can be seen in the fact that study materials are available for students and other teachers via a university department server. Simultaneously, further materials both for lectures and exercises are being prepared; they deal with numerical sections and animations focused on terminology explanation.

4. MSc program in English

Mendel University in Brno, the Faculty of Forestry and Wood technology, organizes its curriculum at three levels: BSc studies (three-year programme) – offer programmes as follows: Wood Technology, Landscaping, Forestry (Arboriculture, Management of Natural resources in the Tropics and Subtropics, Forestry), Furniture, Wood-based Construction; they prepare students for professional work but they can also continue with two-year MSc-level studies as follows: in the Czech language: Wood Engineering, Landscape Engineering, Forestry Engineering, Furniture Engineering, Wood-based Construction. The MSc study programme European Forestry is fully taught in English. PhD studies are selective three/four year programme either in Czech (Applied Geoinformatics, Phytology, Forest Ecology, Renewable Resources Economics and Management, Forest Management, Game Management, Forest Pathology, Silviculture, Furniture technology, Technology and Mechanization in Forestry, Wood Processing Technology, Landscaping and Landscape Conservation) or in English (Forest Ecology, Forest Phytology/Botany).

The FFWT of Mendel University in Brno has been using the ECTS since 1996/1997; this system enables sharing study result transfer among various universities, Since 2000/2001 many subjects (over 50) in the fields of forestry, landscaping, wood processing, and furniture production have been taught in English Since 2010/2011 MSc study program European Forestry has fully been taught in English.

Foreign languages cover 4 semesters: the first two semesters are focused on general English knowledge, English grammar system, patterns and basic rules. As students generate from various language knowledge backgrounds, the aim of the first two semesters is focused on reaching approximately similar knowledge level of most students. The third and fourth semesters are targeted at specialized terminology, starting from basics of chemistry, physics, mathematics, materials, waste management, technologies, ecology, etc. They further specialize in terminologies from forestry, urban forestry, soil science, wood science, fastenings, arboriculture, silviculture, game management, furniture and design; they learn how to read and understand texts, explain and express problems in English, characterise processes, translate, find the necessary information in the text without detail reading, etc. Finally they

select a printed material from their field of study, translate into the Czech or Slovak language, prepare vocabulary and discuss the topic as a part of their language exam.

Unfortunately, they are no language lessons in the MSc curriculum although more than 50 courses are taught in English at the Faculty of Forestry and Wood Technology. The above mentioned MSc study program European Forestry is taught exclusively in English; the entrance exam as well as diploma thesis have to be accomplished in English but no extra English lessons for students are offered.

5. Discussion and conclusion

Students deserve the best knowledge before starting their career if they are sufficiently motivated and willing to learn. The human touch is the most valuable element in education. Teachers, administrators, and parents play critical roles in coaching and guiding students through the learning process. Many teachers also spend time researching various questions of educational effectiveness that expand the understanding of the dynamics of learning. Effective technology integration is achieved when its use supports curricular goals. It must support four key components of learning: active engagement, participation in groups, frequent interaction and feedback, and connection to experts. Technology has changed education; we have new educational tools to personalize learning, encourage collaboration, and prepare students for the future. Technology also changes the way teachers teach, offering educators effective ways to reach different types of learners and assess student understanding through multiple means. It also enhances the relationship between teacher and student. When technology is effectively integrated into subject areas, teachers grow into roles of adviser, content experts and coaches.

The effort devoted to talented students brings its results. According to surveys conducted at the end of each semester, the average score in mathematics at the regular (non-English course) students ranges from 2.48 to 2.63, while the average mark for students studying mathematics in English ranges from 1.52 to 1.73. Thus, the number of attempts needed to pass the exam differs significantly; regular students need 2.4 attempts of three possible, while students studying in English need on average 1.48 attempts in order to pass the exam.

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