

## SHORT TERM SCIENTIFIC MISSION (STSM) – SCIENTIFIC REPORT

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Home institution: Riga Technical University, Riga, Latvia.

Objective: the main objective of STSM is - collecting the information for providing researches in the field of „Teaching, Learning, Research and Writing - Borderlands and Motivation” based on worlds literature, scientific publications, own experience, experience obtained by Kaunas University of Technology and international experts.

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## **Abstract**

The main goal of current STSM is - collecting the information for providing researches in the field of „Teaching, Learning, Research and Writing - Borderlands and Motivation” based on worlds literature, scientific publications, own experience, experience obtained by Kaunas University of Technology and international experts. This report examines questions of teaching, learning, research and writing through the prism of motivation.

This report is divided into six sections including introduction and list of references.

The first section is "introduction". It gives a brief answer to the question "what is the nature of science?" It also underlines that all the components such as: teaching, learning, research and writing are in close connection. And all the components are impossible without motivation.

The second section examines the phenomena of motivation. It is described wide in the frame of current section. In the next subsections it is learned and appreciated how relevant motivation is for the processes of teaching, learning, research and writing. First two chapters are based on the experience of world's experts and scientists; a lot of literature has been studied and analyzed during the research.

The third chapter of current report consists from real experimental data collected during STSM at Kaunas University of Technology. There have been summarized motivational and de-motivational factors in connection with processes of teaching, learning, research and scientific writing.

The fourth chapter summarizes results of STSM.

The fifth part of current report gives some conclusions and aims to validate significance of further researches in the field of the topic of current research.

And last, but not least section - are references. Seventy three references have been used in the frame of preparing current STSM report. In order to understand and investigate the problem wider, it is possible to use them if information have not given enough in current report.

# 1. Introduction

What is the Nature of Science? The nature of science is a multifaceted concept that defies simple definition. It includes aspects of history, sociology, and philosophy of science, and has variously been defined as science epistemology, the characteristics of scientific knowledge, and science as a way of knowing. Perhaps the best way to understand the nature of science is to first think about scientific literacy. Current science education reform efforts emphasize scientific literacy as the principal goal of science education [71, 72]. Reform documents describe scientific literacy as the ability to understand media accounts of science, to recognize and appreciate the contributions of science, and to be able to use science in decision-making on both everyday and socio-scientific issues [73].

Science educators have identified three domains of science that are critical to developing scientific literacy (Figure 1). The first of these is the body of scientific knowledge. Of the three, this is the most familiar and concrete domain, and includes the scientific facts, concepts, theories, and laws typically presented in science textbooks [73].

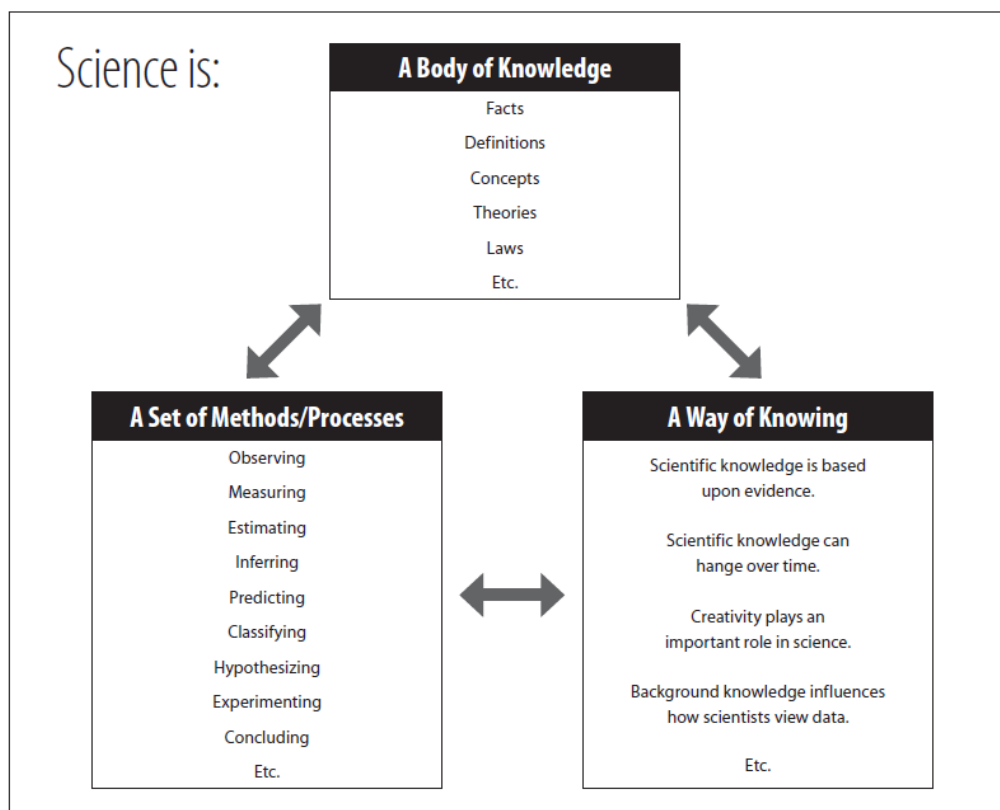


Figure 1. Three Domains of Science [73].

Scientific methods and processes comprise the second domain, which describes the wide variety of methods that scientists use to generate the knowledge contained in the first domain. Science curricula delve into this domain when they

address process skills and scientific methodology. The nature of science constitutes the third domain and is by far the most abstract and least familiar of the three. This domain seeks to describe the nature of the scientific enterprise, and the characteristics of the knowledge it generates. This domain of science is poorly addressed in the majority of curricular materials, and when it is addressed, it is often misrepresented. The myth of a single “Scientific Method” and the idea that scientific theories may be promoted into laws when proven are two examples of misconceptions that are directly taught in science textbooks [69, 70].

At first glance, teaching about the nature of science can appear esoteric and far removed from students’ daily experiences. Decades of research on teaching and learning about the nature of science points to some specific approaches that can make instruction about the nature of science both more effective and engaging [73].

Process Skill	Relevant Nature of Science Concepts
<b>Observing</b>	Scientific knowledge is based upon evidence. Scientific knowledge changes as new evidence becomes available. Scientific laws are generalizations based that summarize vast amounts of observational data.
<b>Inferring</b>	Scientific knowledge involves observation and inference (not just observation alone). Scientific theories are based partly on entities and effects that cannot be observed directly, and hence are inferential.
<b>Classifying</b>	There is often no single “right” answer in science.
<b>Predicting/Hypothesizing</b>	Scientific theories provide the foundation on which predictions and hypotheses are built.
<b>Investigating</b>	There are many ways to do science. There is no single scientific method that all scientists follow.
<b>Concluding</b>	Scientific conclusions can be influenced by scientists’ background knowledge. Theories provide frameworks for data interpretation.

Figure 2. The relationship between sample process skills and the nature of scientific knowledge [73].

Science process skills are a familiar topic for most elementary teachers. At an early age, students are taught to observe, measure, infer, classify, and predict as part of normal science instruction. By linking instruction about the nature of science into lessons involving process skills, students can learn about science as they learn the skills necessary to do science (Figure 2). Thus, any science process skills lesson is a potential lesson about the nature of science, provided teachers highlight the connection between the two [73].

Talking about the science, it is significant the underline, that all the components such as: teaching, learning, research and writing are in close connection. And all the components are impossible without motivation. The phenomena of motivation will be learned better in the frame of current report.

## 2. Motivation

### *2.1. Motivation Theories in Learning*

Motivation and learning process have a deep connection. Motivation is the core for human being's aspirations and achievements. Thus, motivation is crucial to succeed in educational matters and without the fighting spirit nothing is possible not only in education but also in real life. The learning process is an endless life long process. In order to continuously achieve a high motivation is crucial. Motivation is the force that encourages students to face all the tough and challenged circumstances. Motivation itself is a huge scope to cater. Hence, this study emphasizes on several motivational theories that are related to the learning domain [59].

Motivation is a theoretical concept utilized to clarify human behavior. The motivation provides the motive for the human beings to react and fulfill their needs. Motivation can also be defined as one's route lead to behavior, or to the construct that trigger someone to desire to replicate behavior and vice – versa [1], [2]. Motivation is defined as the process to make a start, guides, and maintains goal-oriented behaviors. Basically, it leads individuals to take action to achieve a goal or to fulfill a need or expectation.

Previously, there is no standard definition for motivation in education [3]. Up to now, Houssave's definition regarding motivation was adopted for the educational researchers [3]. According to the motivation definition proposed by Houssave, motivation is the kick off and behavior behind the strength [3]. Aristotle and Plato have endorsed that motivation is associated with physical, emotional and logical [4]. Other than that, there are few other definitions proposed by several researchers. Woolfolk's definition regarding motivation is an internal condition that arouses, directs and maintains behavior [5]. Furthermore, it is a factor which leads to behavior and determine the directions, the force and insistence of it [6]. Based on [7], motivation is considered as the reason underlying behavior. Brophy [8] defined motivation as a theoretical concept that is used to explain the beginning, direction, force and insistence of goal-oriented behavior. According to [9], [10], [11], motivation is an attribute that instigate movements, an energy, direction, the reason for our behavior and "what" and "why" we do something. The working definition of motivation is a persuasive feeling that always provides positivism to students to accomplish a task or activity to the end and succeed in it no matter how hard and tough it is. Motivation is a kind of feeling that always finds ways to go down and cultivate anxiety and tension in human mind and thoughts indeed, with the positive motivation; we can revive the positivism energy and apply it in performing tasks [12]. Apart from that, individual with self-motivation always can find a motive and intensity without expecting external encouragements to complete a task even though the task is challenging [13]. In contrast, negative motivation illustrates the behavior is motivated by expectation and fear of not able to achieve the aimed outcome. Fear

considered as a powerful motivator, notably when the fear is regarding our survival and future endeavors [14].

## ***2.2.Motivation in learning***

The will power associates students with academic activities [3], [15], [16]. Besides that, students' level of motivation reflects on their engagement and contribution in a learning environment. Active and highly motivated students will spontaneously involve in activities without expecting any external rewards [17]. Meanwhile to encourage a low motivated student, external rewards are needed to convince students to participate in activities.

According to [18], there are seven factors that endorse motivation, namely; challenge, curiosity, control, fantasy, competition, cooperation and recognition where many of which are present in games. Currently, the standpoint of learning not only draws attention to the cognition, but also the students' motivation and preference are among the fundamental factors for effective and useful learning and achievement [3], [16]. Motivation is able to initiate to succeed in our choices and at the same time lack of motivation can initiate to major barrier that prevents the success[19]. Due to lack of motivation, the feeling of frustration and annoyance can hinder productivity and wellbeing [20].

There are several reasons that influence the motivation level in learning such as the ability to believe in the effort, the unawareness of the worth and characteristic of the academic tasks [20]. The following section discusses the intrinsic and extrinsic motivation and other related theories in learning motivation in detail [59].

## ***2.3.Theories of learning motivation***

There are several motivation theories for instance the instinct theory which is considered as the root for all the motivation and motivation is to survive [21]. The theory depicts that biological or genetic programming causes the motivation to occur and all human beings share the same motivation as all of us are sharing the similar biological programming [21]. Then, the incentive theory is among the major theories of motivation. This theory illustrates the desire to motivate behaviors for enrichment or incentives [22], which means we are motivated to perform actions because of internal desires and desires, yet at other times, our behaviors are passionate by a desire for external rewards. Besides that, the arousal theory illustrates the maximum level of eagerness or arousal [23]. People with high optimum levels of arousal will perform high enthusiastic behaviors, like bungee jumping, scuba diving and so on. While the rest of us are feeling contented with less exciting and less unsafe activities. The theory depicts the ability to do what needs to be done, without influence from others or circumstances [23]. Basically, motivation can be categorized as intrinsic motivation, extrinsic motivation and de-motivation [9], [24], [25]. Moreover, there are several theories that could be implemented, especially in the education domain. They

are intrinsic and extrinsic motivation theory [9], self-determination theory (SDT) [9], the ARCS model [26], social cognitive theory [27] and expectancy theory [28]. These theories are able to stand alone to contribute to the outcome in the learning process without being dependent on any other theories in the education domain [59].

### *2.3.1. Intrinsic and Extrinsic Motivation Theory*

According to [9], intrinsic motivation depicts an activity done only for own contentment without any external anticipation. The challenge, curiosity, control and fantasy are the key factors to trigger up intrinsic motivation. In education, lots of will power and positive attitude is very much required to sustain the motivation. Moreover, [9], [30] claim that intrinsic motivation and academic achievement share significant and positive bonding. Intrinsic motivation directs an individual to participate in academic activities only to experience the fun, challenging and uniqueness without any external pressure or compulsion rather than expecting external rewards, gifts or under any compulsion or pressure [9], [24], [31], [32]. Attitude in learning is considered prominent and it influences the academic achievement [33], [34], [35]. Intrinsic motivation is able to spread the positivity and make the gained knowledge to sustain for a long time.

In contrast, extrinsic motivation depicts external activities such as a reward [9], [24], [31], [32], compulsion [4], [36] and punishment [4]. An individual is extrinsically motivated if they are receiving any reward or under any pressure or compulsion [4]. According to [4], the motivation can be cultivated extrinsically at the initial stage and transform it as intrinsic motivation in the learning process as it goes deeper. This kind of motivation provides a high level of will power and engagement yet it would not be able to sustain longer than the intrinsic motivation can do. If they are continuously motivated through the use of external rewards or compliments, it could be habitual for students to perform only to gain the rewards and not for own sake or to mastery skills or knowledge. Other than that, when an individual is not able to perform either intrinsically motivate or extrinsically motivate, then de-motivation occurs. De-motivation is a state where intrinsic motivation and extrinsic motivation is no longer exist [9], [24]. Either intrinsic motivation or extrinsic motivation, both have its own unique features to motivate students. Both intrinsic and extrinsic motivation is needed in a learning process [37], [38], [39]. Learning is a complicated process and motivation is the hard rock of this process [37]. Hence, students have to be highly motivated to face the challenges, understand the process and able to apply in real circumstances. Intrinsic motivation leads to self-motivation in pursuing the learning meanwhile extrinsic motivation gives the purpose to pursue the learning [37].

### *2.3.2. Self-determination theory*

Self-determination theory, also known as SDT evolves from the intrinsic and extrinsic motivations [9], [13], [40]. In this case, the intrinsic motivation illustrates the human's natural tendency to encompass several features in the learning process;

meanwhile extrinsic motivation depicts a different considerable in its relative sovereignty. Hence, it only can reflect either its external control or true self-regulation. In short, autonomy is related to volition and liberty [9], competence is related to the feeling of effectiveness and self-confident in pursuing and accomplish a task meanwhile relatedness provides the feeling of protected and connected in a learning environment [41], [42]. The aforementioned learning environment is able to enhance the students' academic performance and motivation [41], [43]. Other than that, the self-determination theory is comprised of five sub-theories. Firstly, the Cognitive evaluation theory (CET) is a theory in psychology, which is designed to explain the effects of external consequences on internal motivation [44]. CET draws the attention to the critical autonomy and competences' role that supports in fostering intrinsic motivation, which is vital in education, arts, sports, and many other domains. Ten years later, Deci & Ryan [45] and Deci & Ryan [46] have included Organismic Integration Theory (OIT) and Causality Orientations Theory (COT) as sub-theory of self-determination theory. OIT is a spectrum of motivational states with three primary divisions. In this impersonal or de-motivational stage, the focus is towards the competence. Followed by basic psychological needs theory (BPNT) where humans' needs are classified into three main psychological needs likely need for autonomy, competence and relatedness [47]. A research identified that the need for the satisfaction is crucial in order to gain engaged, motivated, healthy progress and well-being among individuals [47]. Finally, Goal Contents Theory (GCT) shows the difference between the basic need for satisfaction and well-being based on intrinsic motivation and extrinsic motivation [9]. The intrinsic goals within the social setting is pertinent to the educational environment and more useful for students to focus on intrinsic goals compared to extrinsic goals in order to achieve and present a better academic performance [9].

### ***2.3.3. ARCS Model***

Fundamentally, humans' motivation associated with the behavior and emotion [48]. It is a prominent strength to deal with the learning process and succeed [49]. Students' can be motivated directly through the use of attractive, satisfying and stimulating learning material [48], [50]. According to [51], ARCS model is a systematic way to determine and deal with learning motivation. ARCS abbreviated from Attention, Relevance, Confidence and Satisfaction attributes. Firstly, catch the attention of students is very crucial to gain and sustain the students' engagement in learning [51]. Secondly, students' experiences and the needs related relevance [51]. Then, Confidence related to the students' emotion and anticipation [51]. Lastly, the positive feeling regarding the learning process and the gained knowledge leads to satisfaction as completing the whole learning process [51]. According to [48], students can be motivated directly by grabbing the students' attention through the use of attractive and stimulating medium or learning material. It is important to sustain and arouse the student's attention and curiosity in the learning process [59].



#### *2.3.4. Social Cognitive Theory*

Social cognitive theory (SCT) has been proposed by [52]. This theory has been implemented in various domains such as education, communication and psychology. SCT refers to the acquisition of knowledge by direct observation, interaction, experiences and outside media influence [53]. SCT is derived from constructing meaning and knowledge from the social influences. Bandura [52], conducted an experiment to prove that social influences affect people including children. The continuous learning and constructing meaning are from communication among the community and transform to internet now. SCT depicts the interrelationship between behavior, environment factor and personal factor. They are connected and there is consequence action for every action. SCT illustrates how people gain and maintain several behavior patterns and providing basic intervention strategies [54]. Environment factor can influence people and classified as social and physical environment. The social environment refers to family and friends while physical environment refers to the comforts [54]. According to SCT, interactive learning allows students to gain confidence through practices [59].

#### *2.3.5. Expectancy Theory*

Expectancy theory was developed by [28]. This theory was developed based on the working environment to motivate employees and later it was expanded and revised by [55]. Expectancy theory is more on motivation and the way it is connected to everyone [55]. It is believed that there are relationship between the amount of effort put into a task and the performance that can be achieved from the effort and receive appreciation for the effort and performance [55]. This theory depicts that strong effort will lead to better performance and lead to rewards. Hence, it would motivate to accomplish an effort even though has to face difficulties [28], [56]. According to Vroom, effort, performance and intrinsic attractiveness are interrelated to human motivation [28], [55]. This theory is more to external rewards and appreciation. There are several stages before receiving the reward [55], [56]. First of all, the student has to be fully motivated and believe that he/she only will receive the acceptable performance if he/she puts a genuine and maximum effort [55], [56]. Then, the performance will be rewarded and this stage is known as an instrumentality. Lastly, the value of the rewards is fully positive and known as intrinsic attractiveness at the final stage of expectancy theory [55], [56].

As it is underlined in [59], there are several motivational theories that have been discussed in this chapter. Previously, self-determination theory (SDT) and ARCS model are widely utilized in the motivation domain for learning discipline. The implementation level of theories such as social cognitive theory and expectancy theory is still in initial stages. The entire idea was to determine the theories that are able to contribute to motivation in learning. Learning is a complicated process and it needs guidance to successfully achieve the objective. Theories play a vital role in accomplishing the committed efforts. If not, the effort would stray far from the

objective that needs to fulfill. Therefore, researchers have designed conceptual theories to guide the path of these efforts. The theories are beneficial in conducting a learning process yet they also provide guidance to face the challenges in real life [59], research, science, teaching and writing.

#### ***2.4. Ways to Motivate Your Research Group to Write Papers***

As it is shown in [57], even the best research labs will not attain true and lasting success without good communication, be it within the laboratory amongst its members or outward to other audiences. It is commonly said that a research group is only as good as its next publication, and getting that Nature or Science paper (or Neuron, Cell or JAMA for specialized topics) is always a coveted goal. Yet, writing is seldom, if ever, discussed in the laboratory setting except perhaps as an afterthought. Professors who want to sustain a successful research group should integrate good writing practices into the culture of their laboratories.

Here are a few strategies to make sure that everyone in your research group is motivated to write:

1. Treat writing as part of the research process. According to the historian of science, Frederic L. Holmes, even such famous scientists as Antoine Lavoisier and Hans Krebs acquired some of their most crucial scientific insights while writing and rewriting their papers, not just during their experiments [58]. Steer the members of your laboratory (and yourself) to think this way, and encourage everyone to write about their work and their ideas regularly, regardless of their seniority or role in the lab.

2. Dedicate a part of every group meeting to discussing current papers. Take some time to discuss manuscripts that are in progress, engage in different types of exercises or strategize about where to submit particular papers. The key to this strategy is to have a very organized and specific schedule for discussion to prevent wasting the valuable time of all of your group members. Perhaps even require the updates to be submitted in writing prior to the group meeting, and then discuss specific issues with everyone at the meeting to get feedback and ideas. This will not only update you (as the PI) about the progress of a particular paper or project, but it also holds your group members accountable. Another idea is to have one meeting a month just for writing. The phrase “practice makes perfect” became a cliché for good reason.

3. Read widely and critically. The best writers are good readers, so train your laboratory members to be both. Good research advisors mentor their students on the practice of critically reading the literature in their field. Additionally, nearly every research lab or department has some form of a journal club in which members get together to discuss papers of common interest. If you form a journal club for your group, in addition to discussing the scientific content of the papers, set aside a portion

of each discussion to intentionally talk about how the paper is written. Pose and invite questions about such topics as the rhetorical effectiveness, the structure, assumptions the authors made from the results, or the specific language - anything should be fair game. Every now and then introduce a different type of paper, e.g., review articles (if short), editorials, perspectives or historiographic essays, to the mix.

4. Make writing into a group activity. The days of single-authored papers are fast disappearing especially in science, perhaps mirroring the trend toward interdisciplinary scientific research. Thus, make sure everyone who was involved in a project writes some portion of the manuscript to develop the first draft. Another option, if time, is to have different members (e.g., who have worked very closely on a particular experiment or project) write up their account of the experimental methods independently and then attempt to synthesize the ideas by working in small groups to assimilate the text. Then, be sure to always give credit where it is due.

5. Practice blind peer reviews. Laboratory technicians, undergraduate and graduate students and new members of a research group are often intimidated when confronted with papers that they know were written by the laboratory PI or professor or another senior research scientist or post doc. Instituting a policy of blind review in which the reader does not know the author of the paper (if possible in your group) will encourage more useful and effective feedback. It is also helpful to have all group members blindly review each others' papers to provide suggestions about improving the structure, content, grammar, or flow of the manuscript.

These suggestions are only a few of the many options to consider motivating your research group to write and actively think about writing. By organizing your approach, developing a routine, and properly mentoring your team on different aspects of the writing process, soon your research members will be writing papers with ease![57]

## ***2.5.How to Motivate Students***

As it is given in [60], we've all had them, or at least seen them, the student who simply has no motivation to do well at school at all. Students like this simply have no interest in academics and see no value in learning. When the unmotivated student graces your presence you know from that very second they enter your classroom that you are in for a tough year. Well, that doesn't have to be the case, with a few tips and techniques you can turn the unmotivated student to the motivated student. Here's how to motivate students:

### ***2.5.1.Relate to Them***

Try and relate to the student by coming across understanding and taking a genuine interest in them. By taking the time to really get to know each student, it's

sending the message that you care and appreciate them. When students feel appreciated, it motivates them to work harder, and do better.

#### ***2.5.2. Have them Visualize Their Financial Future***

Every child loves "things," their iPod, i-Phone, TV, etc. Point out that in order to get these material "things" they have to work hard in school. Even the most unmotivated student wants to envision that they will live in a nice house, and have a plethora of materialistic things in their possession. Make sure the student has a clear vision and can correlate that doing well at school will create opportunities for them to live a comfortable life. An easy way to show older students this is by giving them the facts. For example, studies show that educated individuals live longer, and have a better chance of finding a job. For younger students try creating a graphic organizer so they can visually see how the two correlate.

#### ***2.5.3. Failure May Lead to Learning Gaps***

Many unmotivated students don't really grasp the fact that by failing to do assignments and/or failing classes eventually leads to a gap in learning. A dramatic example of this is, if a student does not learn how to add, how will they ever learn multiplication? Discuss with the student that they need to be diligent in turning in homework assignments, and if they aren't, then explain to them the effects it will have on their future. Something as simple as relating it to money may do the trick. For example, you can say, "If you don't learn math, how will you be able to write a check and pay your bills?"

#### ***2.5.4. Compare Them to Their Peers***

This tip is a little tricky; you will have to tread lightly depending upon the students' social acceptance. Point out that his/her peers may gain access to better schools, or higher-paying jobs. By doing this, the unmotivated student may all of a sudden feel motivated just for the simple fact that children are naturally competitive and he/she may not like the idea of a certain person having more success than them. Children are also drawn to role models. Identify a fellow peer or role model that they look up to, and discuss how that person is a positive influence.

#### ***2.5.5. Increase Motivation with Choices***

Give your students options, and allow them to be a part of their own learning experience. This can be something as simple as picking their own partners or choosing between homework assignments, or as complex as determining how they will be graded. By allowing the unmotivated student to have options it gives them a voice and in turn leads them to feel a sense of autonomy.

#### ***2.5.6.Create Attainable Goals***

When the unmotivated student doesn't believe they can attain a goal, they begin to feel frustrated and tend to check out. Push your students, but not too much. Students like to be challenged, but only if they can see the light at the end of the tunnel. Don't be afraid to try and get the most you can out of them, but make sure your expectations are within their reach.

#### ***2.5.7.Find Intrinsic Motivation***

It's great that you want to help your students get motivated; just by reading this article it proves that you are invested in your students. But, you're not always going to be there to cheer them on and motivate them to do well in school. One of the best things you can do for your students is to help them find their own personal motivation to do well. You can do this by getting to know your students and talking about what drives them to succeed, and use that information as a platform to keeping them motivated [60].

### ***2.6.How to Motivate Students to Love Science***

It is significant to understand the possibilities, how to motivate students not only to learn, but also to love science. Some interesting strategies are described in [61], where Janelle Cox say, that as educators, we know that STEM education (Science, Technology, Engineering, and Mathematics) is the wave of the future. In the past decade, jobs that require routine skills have decreased, while technically centered jobs have dramatically increased. As President Obama fights hard to increase the number of students to be proficient in STEM fields, we as teachers have an important role in promoting and finding out how to motivate students to excel in science. By raising its profile and increasing student participation, we can ensure that the youth of today will have a successful tomorrow.

In this chapter below, there are a few strategies described by Janelle Cox in [61], that will help you learn how to motivate students to enjoy science, and highlight the relevance that science has on our students' lives.

#### ***2.6.1.Improve the Image of Science***

The public image of science is rather negative. Part of the problem is due to the image of nerdy scientists in old films and textbooks. In order to changes society's view, teachers can portray what science has done thus far, by relating the subject back to something that interests them. For older students, try discussing popular TV shows such as "CSI" that incorporate forensics. For younger minds, you can conduct fun experiments or use hands-on apps.

### ***2.6.2. Act as a Positive Role Model***

When students see a teacher who is passionate, knowledgeable, and enthusiastic about science, it will resonate with them.

### ***2.6.3. Make Science Fun***

Experts believe that in order for students to stay interested in science long term, they must be involved with the subject by fourth grade. You can nurture this attraction to science by making it fun and interesting—hands-on experiments and programs like DragonFly TV combines interactive media with textbook knowledge for the K-12 audience.

### ***2.6.4. Connect Science to Students' Everyday Life***

An essential element to turning students on to science is to show them how it's used in their daily lives. Science is behind the creation of their cellphones, tablets, and videogames—let your classroom explore and understand how this subject matter touches more in their day-to-day activities than they think.

### ***2.6.5. Expose Students to New Opportunities***

Along the same exploration track, you can create contests that encourage your children to use science to generate a design that may peak their interest. For example, most students love playing on their smart-phones and tablets—challenge your classroom to create an app that they'd use every day. You could even turn this into a friendly, group competition. This opportunity may be just the motivator to keep them students interested in a STEM field.

### ***2.6.6. Incorporate Technology***

It can be quite difficult to get students to be interested in science when your only resource is a textbook. Sites like Donors Choose created a platform for teachers to request funding for supplementary classroom technology. You can request science stations, iPads, computers, and such to help promote STEM education and get (and keep) students captivated.

### ***2.6.7. Bring Science to Life***

The best way to spark interest in science is to bring it to life with exciting experiments. Younger students will be memorized by glowing water, or how specific items float or sink whereas the older crowd will benefit from observing a mock crime scene. When students “do” science they are more apt to be excited about it.

You can develop student interest in science by enhancing their natural curiosity and connecting science to their daily lives. To help students develop an even deeper understanding (and form questions of their own), we can create new

explorative and creative opportunities to ensure that our students will be able thrive in the many years beyond their scholarly career [61].

### ***2.7.How do you stay motivated while writing a scientific article?***

There is the personal recipe given by Alexandre Coninx in [62]:

1.Start by the easiest part. It's usually the results, sometimes the material and methods. The results are usually something that's easy to write about: that's the stuff you have done, that worked and that you want to show to your community.

2.Once you have written the results, it's usually easy to write the material and methods. You just have to explain how you got those nice results. Skip parts that are too boring or go deep into technical details (except if they are really interesting) for now, just flag them as to do and focus on the interesting stuff.

3.Then I usually feel motivated to write a first draft of the introduction and previous works, to explain how all that fits with the existing research. Don't go deep into the SOTA (State Of The Art) (that could be quite boring) but write a detailed outline and develop the main points, and flag the rest as to-do.

4.Intro + results = discussion/conclusion. Now you have all of the beginning of your article, you should see clearly how the end should unfold. Compare your results with the SOTA and explain what they bring, what their limitations are and how those could be overcome.

5.Now your paper is nearly over! You have a first draft and it tells a nice story. Now you should be motivated to fill in the little missing things (in intro/SOTA/methods) that prevent you from finishing it. Do it.

6.At any point you feel like it, write the abstract. At any point you feel like it, re-read the abstract and improve it as you see fit.

7.In the beginning, write a stupid title. Every time you see it and think of something better, change it.

8.At any time you feel confused or unable to properly explain what you want to explain, switch to drawing figures and charts and go back to it afterwards. (That last piece of advice is also useful for writing thesis and dissertations, I think).

Also: Ask other people to reread your drafts and give you feedback or advice. Not only will it give you valuable feedback, but it will probably heighten your engagement into your own work [62].

### ***2.8.Motivation of writing: better science writing through peer learning***

Science is increasingly interdisciplinary. Scientists must therefore communicate across disciplinary boundaries. For this communication to be

successful, scientists must write clearly and concisely, yet the historically poor standard of scientific writing does not seem to be improving. Scientific writing must improve, and the key to long-term improvement lies with the early-career scientist (ECS). Many interventions exist for an ECS to improve their writing, like style guides and courses. However, momentum is often difficult to maintain after these interventions are completed. Continuity is key to improving writing [63].

Peer learning – within writing groups – offers a powerful tool to motivate early-career scientists (ECSs) to improve their writing and communication skills [64, 65].



Figure 3. The writing process [63].

Peer learning – within writing groups – is shown graphically in figure 3.

Very interesting example is described in [63] - in 2013, a small pilot group started at the University of East Anglia (UEA). In the first two years, this small group developed into a successful writing group that has published 25 papers by 11 authors with two collaborative posts by the whole group. Members of this group have identified three key aspects that they believe have contributed to the group's success: the social atmosphere, high attendance with gradual initial growth, and strong leadership.

The UEA writing group places a strong emphasis on the social atmosphere of the group meetings. The resulting friendly ambiance is thought to facilitate the high attendance rates. Group members also share a common desire for communicating their science. Although each meeting has an agenda, off-topic conversations are



tolerated and have led to new ideas for future posts. The social atmosphere further encourages members to provide honest and constructive feedback but also to ask for help or advice if needed. Another key attribute to the writing group's success is the high attendance rates. At present, there are 21 members, of whom 15 are active and regularly attend meetings. The monthly meetings are arranged to take place immediately after the department coffee break, which may help maintain high attendance rates. These large numbers decrease pressure on individual members to contribute. Over time, this decreased pressure could obviously be counter-productive.

However, it also allows new members to only observe during their first meetings and contribute with their own writing when they feel comfortable. In addition, a sufficiently large group means that if not all members can attend every meeting, the group is still large enough to function, and the peer-learning process can continue. During the pilot phase of this writing group the size was limited to five members. Since then, the group size has steadily increased. New members benefit from the experience that has developed within the group.

Members of the UEA group have described the leadership as “strong but friendly” and suggest that this may play a key role in sustaining the large, enthusiastic, and productive group. The leaders have played an active role in raising attendance by introducing new members to the group and have also set an example by writing multiple posts themselves. The members feel that there needs to be a balance when encouraging people to write. On one hand, a leader can gently inspire people to write. On the other hand, a leader might insist too much and scare people away. Recently, the leadership role of this group was passed onto newer group members; the group remains keen to continue the collaborative learning process that has been successful so far [63].

### ***2.9. Instructional strategies to improve student motivation***

Student motivation is probably the single most important element of learning. Learning is inherently hard work; it is pushing the brain to its limits, and thus can only happen with motivation. Highly motivated students will learn readily, and make any class fun to teach, while unmotivated students will learn very little and generally make teaching painful and frustrating. Fortunately, research shows that there is a lot an instructor can do to motivate their students to learn.

It is important to recognize that motivating learning is a central element of good teaching. Often, it is assumed that university students should be motivated to learn in every class, but that is not a reasonable expectation. Course requirements, assignments, and exams exist because students do not yet have the experience and wisdom to recognize which courses to take and what activities they need to complete in those courses to achieve appropriate educational goals. For the same reason, a student cannot be expected to come into every course motivated to learn the material. If a student does not know the material in a course, how can they know it is important

and fulfilling to learn? The instructor, an expert in the subject, is uniquely qualified to show students why the material is important, intellectually interesting, and valuable for them to learn. Conveying this message is an important goal of any effective instructor.

What can an instructor do to motivate their students to learn? This is a subject that has been widely studied, and two excellent references are given below. While individuals vary, there are three elements that are consistently relevant to the motivation to learn: personal relevance, some control of the learning process, and a sense that one can master—and is mastering—the material [66, 67, 68].

*Personal relevance & interest:*

First, the material must be seen as personally relevant, interesting, and/or useful to the learner. The emphasis and challenge here is on “to the learner.” That means recognizing the students’ backgrounds and experiences and aspirations, and finding ways to connect the material to those. What you see as interesting may not be interesting for many of your students. In practice, making the material relevant usually means finding ways to present it in terms of authentic real world situations and problems that the students can relate to. Showing how the material will be used in careers that they aspire to is also motivational. Rather than first introducing a lot of formalism and jargon, and then at the end showing how it can be applied to solve some meaningful problem, do it the other way around. Present the problem first, and then introduce the formalism as the way to solve the problem. Make sure that your assignments do not leave students wondering, “Why would anyone (besides my teacher) care about the answer to this problem?” [66, 67, 68].

The attitude you convey about the subject is also important. Tell the students why you find the subject interesting. While it is good to show that you are enthusiastic and excited about your subject, it is even better to find ways to convince your students that the subject is interesting. What a person finds interesting is shaped by their knowledge and past experiences. Don’t assume that because you see the material as interesting, the students should as well (and if they don’t, there is something wrong with them) [66, 67, 68].

*Choice and control:*

A second almost universal motivating element is for the learner to feel they have some degree of control over the learning process. Relatively modest amounts of control or choice can make a large difference in motivation. Obviously, there are many elements of a course where you, as the expert, should be determining the choices. However, look for other areas where the students can decide. For example, allowing some choice over assignment topics or formats, and having projects where the student can choose a topic of particular interest to them.[66, 67, 68].

*Sense that one can master the material:*

The third general motivating factor is providing the learner with a sense that they can master the subject, and that they understand the process to follow to achieve that mastery. These are best addressed by having suitable levels of challenge in the course and providing clear feedback as to how well students are meeting those challenges. Assignments that the students see as challenging, but they can then also see they successfully completed (and as a result now have capabilities and knowledge they previously did not have), are highly motivating. It is also important that the feedback and grades are aligned with the course goals. It is de-motivating for a student to feel they worked hard and mastered the material in a course, only to do badly on an exam because it was highly dependent on knowing some solution trick that was quite peripheral to the course as a whole [66, 67, 68].

*Table 1. Some suggested instructional strategies to improve student motivation [66].*

<b>Motivational factor</b>	<b>Instructional Strategies</b>
Personal relevance & interest	<ul style="list-style-type: none"> <li>• When possible, use authentic real world contexts and problems that the students can relate to</li> <li>• Show how material is useful in other courses and/or future careers</li> <li>• Before launching into definitions, procedures, mathematical formalism, etc., introduce a meaningful problem that motivates the need to learn these details and tools</li> <li>• Check that all your assignments pass the “why would anyone <i>care</i> about the answer to this problem?” test</li> <li>• Show your own interest and enthusiasm for the subject</li> <li>• If you are uncertain as to what the students will find interesting or relevant, ask some students (a good group to ask are students who recently took the course)</li> </ul>
Choice and control	Build some flexibility into your course, within reason <ul style="list-style-type: none"> <li>• If there are some optional topics in the course, have students vote on which ones to include</li> <li>• Let students choose the topic for a project or assignment</li> <li>• If there is more than one reasonable way to manage assignments, have students vote on which they prefer</li> </ul>
Sense that one can master the material	<ul style="list-style-type: none"> <li>• Communicate clear learning goals to the students</li> <li>• Express to the students that they can master the material if they put in effort</li> <li>• Create assignments and activities that are challenging, but doable with effort (a diagnostic or other assessments in the course can help determine the appropriate level of challenge)               <ul style="list-style-type: none"> <li>– Build in early success (e.g. ramp up the difficulty in an activity, so that all students can relatively easily complete the first part)</li> <li>– Build “bonus” challenges into activities to keep the faster students engaged</li> </ul> </li> <li>• Regularly provide feedback that gives students a clear sense of how well they are mastering the material</li> <li>• Make sure the course elements and assessments are aligned with the learning goals</li> <li>• Explicitly point out to students how much they have learned</li> <li>• Give students specific advice on how they can improve their learning</li> </ul>

The feedback that best motivates learning is that which stresses the importance of effort and the specific processes and strategies for learning. Feedback and grading

that focuses on what the student has mastered, and how they can improve, is more motivating to most students than feedback that focuses primarily on their standing relative to their peers [66, 67, 68].

Failure to adequately address student motivation has important consequences for students from groups under-represented in the field of study. If the instructor ignores motivation, the students who are most likely to see the subject as worth learning are those whose backgrounds, and corresponding attitudes, are most like that of the instructor. Those students whose backgrounds are different, which by definition (usually) includes most members of under-represented groups, will be less likely to understand the appeal of the subject and consequently more inclined to put their efforts into pursuing some other discipline [66, 67, 68].

Next chapter consist from real experimental data collected during STSM at Kaunas University of Technology. There will be summarized motivational and demotivational factors in connection with processes of teaching, learning, research and scientific writing.

### 3. Crucial motivation and de-motivation factors in teaching, learning, research and scientific writing. Real experimental data collected

This chapter deals with crucial motivation and de-motivation factors in teaching, learning, research and scientific writing. Real experimental data have been collected during current STSM from April 3 2018 till April 20 2018. Data collection has been performed at the host organization - Kaunas University of Technology (Lithuania). Experimental data have been obtained by collecting opinions of experts, researchers, academic staff, administrative staff and students.

Part of these factors are discussable, others - local, some-similar to each other, but in any case they give real information about situation in Lithuania and in Kaunas University of Technology in particular. As well as, such information can be used also for deeper analysis in different European countries.

#### 3.1. Motivation and de-motivation factors in teaching

Next table deals with crucial motivation and de-motivation factors in teaching. Real experimental data have been collected during current STSM.

Table 2. Crucial motivation and de-motivation factors in teaching.

Nr.	<i>Teaching</i>	
	<i>Motivation factors</i>	<i>De-motivation factors</i>
1.	Personal satisfaction in the job	Inadequate salary
2.	Satisfaction in sharing gained knowledge and experience in the field	Inadequate requirements
3.	Some students with high motivation	Some students with low motivation
4.	Some students who are good prepared for the studies	Some students who are not prepared for the studies
5.	Valuable colleagues	Bureaucracy
6.	Interesting courses, topics, etc.	Permanent reforms
7.	Respect	Inadequate workload
8.	Flexibility in terms of study process, methodology, etc.	Inadequate time given for preparation for lectures, classes, courses, etc.
9.	Modern didactics	Lack of study equipment, computers, etc.
10.	Personal motivation	Too formal attitude
11.	Sharing knowledge and experience	High workloads
12.	Motivated students	De-motivated students
13.	Modern facilities	Relatively old facilities
14.	Good team	No-team
15.	Cooperation	Lack of cooperation
16.	Reasonable regulations and requirements	Constantly changing regulations and requirements
17.	Good internal atmosphere	Bad atmosphere
18.	Personal motivation	No-motivation
19.	Financial evaluation	Low financial evaluation
20.	Good management of the process	Extra activities
21.	Share of knowledge	Motiveless students

22.	Satisfaction with positive feedback of graduates	Low salary at first stage of academic carrier
23.	Self realization	High workloads
24.	Quite good salary for lecturers at higher level	De-motivated students
25.	Sharing knowledge and experience	Motiveless students
26.	Self-realization	Constantly changing regulations and requirements
27.	Motivated students	Bad atmosphere
28.	Personal motivation	Low financial evaluation
29.	Communication with students, academic	Long academic activity related hours
30.	Good internal atmosphere	There is not enough space in some rooms for personnel
31.	Good management of the process	It was hard life being teacher few years ago: no time to eat, sleepless nights checking works, courses. Some tea-cheers had especial status in getting in-formation about reorganization, projects and contracts. Now they are promoted and have an exclusive position while others may be called unsuccessful. This was influenced by unequal working conditions.
32.	Exchange experience	5 articles in 2 ears -no extra points
33.	Finding students interesting in research/ writing articles	Motiveless students
34.	Consultations are available	Inadequate requirements
35.	Personal satisfaction in the job	Inadequate workload
36.	Self realization	Low activity of students
37.	Motivated students	Low financial evaluation
38.	Communication with students	Low activity of students
39.	Financial evaluation	Poor motivation of students
40.	Possibility to share knowledge and experience	
41.	Communication with people, students, academic	

### ***3.2. Motivation and de-motivation factors in learning***

Next table deals with crucial motivation and de-motivation factors in learning. Real experimental data have been collected during current STSM.

*Table 3. Crucial motivation and de-motivation factors in learning.*

<b><i>Nr.</i></b>	<b><i>Learning</i></b>	
	<b><i>Motivation factors</i></b>	<b><i>De-motivation factors</i></b>
1.	Knowing why you are doing this	Belief that learning is meaningless
2.	Having a plan	Heavy workload without plan
3.	Curiosity	Old Books and hundred of pages to read
4.	Knowledge in a particular content area	Lack of knowledge
5.	Support of the teacher's	Difficulty of the task
6.	Support of the other classmate's	Limits of time
7.	Staying positive	Thinking about failure
8.	Good relationship with the teacher	The appearance of fear (tests, exams)
9.	Mind concentration	Problems in family
10.	Rest and good sleep	Good weather

11.	Internal and external goals	Pressure
12.	Positive attitude	Negative attitude
13.	Good time management	Time limits , deadlines
14.	Excellent teachers	Uninspiring teachers
15.	Modern didactics	Old didactics
16.	Inspiring lectures	Lack of interest
17.	Practical application	Non-applicable results
18.	Field visits	Pure theoretical learning
19.	Valuable classes	Valueless classes
20.	Group projects and activities	Alone learner
21.	Continuous growing skills	Lack of time
22.	Curiosity	Low level of teachers
23.	Possibility to raise qualification and salary	Lack of time
24.	Excellent teachers	Pure theoretical learning
25.	Modern didactics	Pressure
26.	Practical application	Uninspiring teachers
27.	Internal and external goals	Old didactics
28.	Possibility to raise qualification and salary	Lack of interest
29.	Attending courses	No extra points if hours spent in the courses exceed 2-3 times! No extra points having all the classes for foreign students in English being Lithuanian
30.	Possibility to increase skills of knowledge	Lack of time due to other activities in work

### 3.3. Motivation and de-motivation factors in research

Next table deals with crucial motivation and de-motivation factors in research. Real experimental data have been collected during current STSM.

Table 4. Crucial motivation and de-motivation factors in research.

Nr.	<b>Research</b>	
	<b>Motivation factors</b>	<b>De-motivation factors</b>
1.	Possibility to participate in research projects	Lack of funding
2.	Interesting research fields, topics, etc.	Lack of research equipment
3.	Personal satisfaction in researching	Lack of personnel maintaining equipment and aiding experimental research
4.	New ideas	Bureaucratic obstacles
5.	Public interest	Lack of cooperation
6.	Scientific curiosity	Not enough time left from teaching
7.	Social progress	Low interest from industries
8.	Inspiring leaders	Unjustified opposition
9.	Personal development	Short-sightedness
10.	Ambition	Lack of support
11.	Being guided about what to research	Difficult to read research text
12.	Having a good research team	Too many unknown words
13.	Enjoyable to search	No interesting genre
14.	Concentrated minds to reach a goal	No updated information
15.	Increased knowledge of the world	Wanting results but don't want to work
16.	Opportunities for carrier progress	Having a research team without skills
17.	Opportunity for training	Bad working conditions

18.	Learning from mistakes	Lack of money
19.	Focus on goals	Lack of responsibility
20.	Rest and good sleep	Good weather
21.	Internal and external goals	Limited finances
22.	Good research team	High workloads
23.	Participation in projects	Relatively old facilities
24.	Cooperation	Pure internal research
25.	High results	Low results
26.	Good cooperation	Lack of cooperation
27.	Valuable partners	Lack of partners, team
28.	Community	No community
29.	Good internal atmosphere	Bad atmosphere
30.	Financial support	No motivation
31.	Internal and external goals	Limited finances
32.	Rising in qualification	Lack of finances
33.	Possibility to participate in conferences	Lack of good and new laboratory equipment
34.	Possibility of international collaboration and change of knowledge	Lack of finances
35.	Possibility to receive financing for projects	High workloads
36.	Possibility to collaborate with industry	Lack of good and new laboratory equipment
37.	Rising in qualification	Pure internal research
38.	Good research team	Low results
39.	Participation in projects	Research that cannot give money right now is your "own business"! To be promoted extra authors are added to article or book what artificially creates unfair competition. Bureaucracy „borders" for visiting possible partners in research centers and it doesn't matter you are experienced researcher or you are not. Some bureaucracy „borders" for getting money to attend conferences.
40.	Possibility to receive financing for projects	Lack of finances
41.	High results	Lack of research equipment
42.	Valuable partners	Lack of time
43.	Innovative product creation	Lack of finance
44.	Possibility to participate in research projects	Lack of possibilities to use necessary equipment
45.	Personal development	Lack of time due to other activities in work
46.	Possibility of international collaboration and change of knowledge	
47.	Possibility to collaborate with industry	
48.	Solving interesting problems	
49.	Financial evaluation	
50.	Interesting to do research	
51.	Possibility to increase skills of knowledge	
52.	Communication with scientists, businessmen and etc.	



### 3.4. Motivation and de-motivation factors in writing (scientific/academic)

Next table deals with crucial motivation and de-motivation factors in writing. Real experimental data have been collected during current STSM.

Table 5. Crucial motivation and de-motivation factors in writing.

Nr.	<b>Writing (scientific/academic)</b>	
	<i>Motivation factors</i>	<i>De-motivation factors</i>
1.	Satisfaction in sharing gained knowledge and experience	Inadequate requirements
2.	Personal development	Bureaucratic obstacles
3.	Personal motivation	Lack of cooperation
4.	Interest from students, colleagues and general public.	Not enough time left from teaching
5.	Public interest	Low interest from industries
6.	Respect	Unjustified opposition
7.	Modern didactics	Lack of funding
8.	Public interest	Lack of cooperation
9.	Personal development	Short-sightedness
10.	Ambition	Lack of support
11.	Examples of Interesting texts	Postpone writing start date
12.	Understanding what you are writing	Low self-organization
13.	Access to information which you need	Lack of time
14.	Projective: having a clear start and end	Having a bad start
15.	Having experience	Bad academic language skills
16.	Having good language skills	No template examples
17.	Consultations	Lack of information
18.	Free choice of time	Fear of failure
19.	Believe in good results	Lack of money
20.	Rest and good sleep	Good weather
21.	Sharing of results, experience and knowledge	Long procedures
22.	Financial support	Limited finances
23.	No internal pressure	Lack of free time
24.	Good evaluation	Low evaluation
25.	Cooperation	Lack of cooperation
26.	Good team	No team
27.	Reasonable procedures	Disturbances
28.	Motivation	No-motivation
29.	Reasonable requirements	Disturbing requirements
30.	Evaluation	No evaluation
31.	Share of knowledge and research results	Lack of time
32.	Rising in qualification and salary	Low specific scientific level of some reviewers
33.	Enhance of self international visibility and appreciation	Too long duration from paper acceptance and publishing in journal
34.	Sharing of results, experience and knowledge	Long procedures
35.	Financial support	Lack of free time
36.	Good team	Disturbing requirements
37.	Enhance of self-international visibility	No team
38.	Cooperation	If you are teacher, there is no time for this activity including experienced researchers. Many teachers are being "disturbed" or exhausted because of long teaching hours!
39.	To share innovative research results with an	Teacher may plan but it is difficult to do good

	academic world; scientific experience exchange	both at same time – to write an article and a book. Some teachers are asked to pay by themselves if they want their books are published. Nonsense!
40.	To write a book for students for a better understanding of subject	Inadequate requirements
41.	Possibility to share knowledge and experience	Lack of time
42.	Personal development	Low financial evaluation
43.	Financial evaluation	Lack of time due to other activities in work
44.	Possibility to share knowledge and experience	

### ***3.5. Teaching, learning, research and writing – looking for borderlands***

Looking to collected motivation and de-motivation factors from previous tables, and analyzing the information from previous chapters it is clear, that some borderlands between teaching, learning, research and writing exist. It must be mentioned, that in addition, some little discussion at host-organization have also been performed about possible borderlands between teaching, learning, research and writing. The main idea about it have been summarized below.

"Keeping good balance. Free imagination, achievement of goals, balancing with everything. The teachers must be allowed to plan their personal schedule for 5 years according to their position related requirements. Present situation is very stressful for many teachers. They can't realize themselves using inconvenient plans. Apparently, all de-motivations lead to confidence weakening of administrative decisions. On other hand, the decisions that are made at the faculty are inspired by the policy of administration of KTU. Unfortunately, despite an experience, being on the limit of survival it is difficult to motivate ourselves to enlighten students looking at us every day to have them successful career and, finally, to encourage our families' children to believe in science".

As it was mentioned before, data collection has been performed at the host organization - Kaunas University of Technology (Lithuania) during current STSM from April 3 2018 till April 20 2018.

Part of the data are discussable, other - local, some - similar to each other, but in any case this data give real information about situation in Lithuania and in Kaunas University of Technology in particular. As well as, such information can be used also for deeper analysis in different European countries.

## **4. Results**

The short-term scientific mission (STSM) at Kaunas University of Technology has successfully completed according to the work plan defined before.

The main objective of STSM has been reached - has been collected and obtained the information for providing researches in the field of „Teaching, Learning, Research and Writing - Borderlands and Motivation” based on worlds literature, scientific publications, own experience, experience obtained by Kaunas University of Technology and international experts.

All main activities according to the work plan defined before, has been successfully completed. Current scientific report for the host institution, MC Chair and STSM coordinator has been prepared. Based on scientific report the idea and abstract for next scientific publication has been defined, devoted to the topic of STSM. Discussions about possible further cooperation between Riga Technical University and Kaunas University of Technology has been also performed.

It is also planned to submit an application for connection to COST Action “Advancing effective institutional models towards cohesive teaching, learning, research and writing development.” (WeRELaTE) CA15221 as MC or MC Substitute from Latvia (if COST action still have such position free and will be interested in my candidature).

## **5. Conclusions**

This report has highlighted the importance of motivation in the field of teaching, learning, research and writing. Considerable progress has been made in understanding of the term of motivation and methods, which could help to motivate people in all four areas, such as teaching, learning, research and writing. Current report provides the backbone for wider researches in the field. The report clearly has some limitations. Despite this, the author believes that current work could be a starting point for further researches. The investigations into this area will be and must be ongoing. However, given the short period of STSM, current report is successful step in the research of the phenomena of "motivation" in connection to teaching, learning, research and writing. Author hopes that this research will be useful for the COST Action “Advancing effective institutional models towards cohesive teaching, learning, research and writing development.” (WeRELaTE) CA15221 and for further together successful work.

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