

**Perceptions of the STEM students of English Medium Instructions based on lecturers’  
teaching styles**

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## Table of Contents

List of Figures .....	ii
List of Tables.....	ii
Abstract.....	1
Аңдатпа .....	2
Аннотация .....	3
CHAPTER 1 Introduction.....	4
1.1 Background information.....	4
1.2 Problem statement.....	5
1.3 Aim of the study.....	7
1.4 Research questions.....	7
CHAPTER 2 Literature Review.....	9
2.1 The peculiarities of English Medium Instructions.....	9
2.2 Students’ challenges in EMI connected with teachers’ approach.....	10
2.3 Teaching styles.....	13
CHAPTER 3 Methodology.....	21
3.1 Research design.....	21
3.2 Participants and sampling.....	23
3.2.1 Teachers.....	23
3.2.2 Students.....	24
CHAPTER 4 Results.....	26
4.1 Interview results.....	26
4.2 Questionnaire results.....	35

CHAPTER 5 Conclusion.....	43
References.....	49
Appendix A.....	54
Appendix B.....	56
Appendix C.....	61

**List of Figures**

Figure 1. A diagram “Students’ Preferences of teaching styles” .....	37
Figure 2. A diagram “Connection between teaching styles and EMI” .....	40

**List of Tables**

Table 1 Five Teaching styles, Grasha (1994, p.143).....	15
Table 2 Research Questions and Methods of Data Collection.....	22

## **Perceptions of the STEM Students of English Medium Instructions Based on Lecturers' Teaching Styles**

### **Abstract**

The English Medium Instruction system has been adopted by a number of educational organizations due to its particular peculiarities. Yet together with the row of advantages, such as access to the wider academic library or international mobility, the EMI system can additionally provide some challenges, connected to English language knowledge. This study is predominantly focused on the STEM students' perspectives who face EMI. Admittedly, students of STEM can meet a variety of obstacles, such as understanding English terminology, their individual level of preparedness to study in EMI context, and other issues. Furthermore, it is not excluded that STEM teachers' teaching styles may represent a new challenge for them. Thus, this research aims to explore STEM students' perceptions of EMI based on their teachers' teaching styles. In order to explore this area, a mixed research method was utilized. Firstly, the semi-structured interviews with five STEM teachers were conducted. The objective of this stage was to identify what teaching styles STEM teachers use. Secondly, the questionnaires were sent to 40 STEM students in order to establish what teaching styles, which were received from the previous stage, they find most and least supportive, and explore whether they perceive the EMI system differently based on teachers' teaching styles. After the data analysis, it was revealed that STEM teachers have facilitator, delegator, personal model, and expert teaching styles. Facilitator teaching style was the most preferred one by STEM students, and delegator was the least preferred one. In conclusion, facilitator and delegator teaching styles can appear the most and the least supportive teaching styles for STEM students in an EMI classroom; furthermore, STEM students may perceive EMI positively or negatively depending on their teachers' teaching styles.

**STEM Бағытындағы Студенттердің English Medium Instructions Жүйесін  
Оқытушылардың Оқыту Стильдеріне Байланысты Қабылдауы  
Аңдатпа**

English Medium Instructions (EMI) жүйесі өз ерекшеліктеріне байланысты бірқатар білім беру ұйымдары тарапынан енгізілді. Алайда, кең ауқымды академиялық әдебиетке қол жеткізу және халықаралық мобильділік сияқты артықшылықтарымен қатар, EMI жүйесі ағылшын тілін меңгеру деңгейіне байланысты белгілі бір қиындықтар туындатуы мүмкін. Бұл зерттеу негізінен STEM бағытындағы студенттердің EMI жүйесін қалай қабылдайтынына бағытталған. Аталған мамандықтар бойынша білім алатын студенттер әртүрлі кедергілерге тап болуы мүмкін: ағылшын терминологиясын түсінудегі қиындықтар, EMI-де оқуға дайындық деңгейінің әртүрлілігі және басқа да мәселелер. Сонымен қатар, STEM оқытушыларының оқыту стильдері студенттер үшін қосымша қиындық туындатуы мүмкін екендігін де жоққа шығаруға болмайды. Сондықтан бұл зерттеу STEM студенттерінің EMI жүйесін қабылдауын, олардың оқытушыларының оқыту стильдері негізінде зерттеуге бағытталған. Осы аспектіні зерттеу үшін аралас зерттеу әдістемесі қолданылды. Бірінші кезеңде 40 STEM студенті арасында сауалнама жүргізіліп, олардың қай оқыту стильдерін қолдаушы немесе қолдаушы емес деп санайтыны және оқытушының стилі олардың EMI жүйесіне жалпы көзқарасына әсер ететін-етпейтіні анықталды. Деректерді талдау нәтижесінде STEM оқытушылары фасилитатор, делегатор, тұлғалық үлгі және сарапшы сияқты оқыту стильдерін қолданатыны анықталды. Студенттер үшін ең қолайлысы - фасилитатор стилі болса, ең аз қолдауға ие болғаны - делегатор стилі. Қорытындылай келе, EMI сыныптарында STEM студенттері үшін фасилитатор және делегатор стильдері сәйкесінше ең қолдаушы және ең аз қолдаушы ретінде қабылданады деп айтуға болады. Сонымен қатар, EMI жүйесінің өзі де оң немесе теріс әсер етуі мүмкін, бұл көбінесе оқытушының қандай оқыту стилін қолданатынына байланысты.

## **Восприятие Студентами STEM Системы English Medium Instructions в Зависимости от Стилей Преподавания Учителей**

### **Аннотация**

Система English Medium Instructions (EMI) была принята рядом образовательных организаций ввиду своих особенностей. Однако наряду с перечнем преимуществ — таких как доступ к более широкой академической литературе и международной мобильности — система EMI может также создавать определённые трудности, связанные с уровнем владения английским языком. Данное исследование сосредоточено преимущественно на восприятии системы EMI студентами STEM-направлений. Очевидно, что студенты этих специальностей могут столкнуться с разными препятствиями: сложности понимания английской терминологии, индивидуальный уровень подготовки к обучению в EMI, другие трудности. Более того, нельзя исключать, что стили преподавания STEM-преподавателей могут представить отдельную сложность для студентов. Потому, данное исследование направлено на изучение восприятия студентами STEM-специальностей системы EMI, опираясь на стили преподавания их учителей. Для изучения данного аспекта была использована смешанная методология исследования. На первом этапе были распространены анкеты среди 40 студентов STEM, чтобы определить, какие из ранее выявленных стилей они считают наиболее и наименее поддерживающими, а также выяснить, влияет ли стиль преподавателя на их общее восприятие системы EMI. Анализ данных показал, что преподаватели STEM используют такие стили преподавания, как фасилитатор, делегатор, личностный пример и эксперт. Наиболее предпочтительным среди студентов оказался стиль фасилитатора, наименее — стиль делегатора. В заключение можно отметить, что стили фасилитатора и делегатора воспринимаются как наиболее и наименее поддерживающие соответственно в EMI-классе для студентов STEM. Кроме того, было выявлено, что самой системы EMI может быть как положительным, так и отрицательным в зависимости от того, какой стиль преподавания использует учитель.

## CHAPTER 1

### Introduction

#### 1.1 Background information

The trend of English Medium Instructions (EMI) in educational institutions is significantly increasing in the current global context due to the beneficial side of the system where English emerged as the dominant language. According to Macaro (2018, p. 19), “English Medium Instruction (EMI) has been defined as ‘the use of the English language to teach academic subjects (other than English itself) in countries or jurisdictions where the first language (L1) of the majority of the population is not English’”. This global trend can be particularly noticed in science, technology, engineering, mathematics (STEM) disciplines as well, where the learners can face the peculiarities of the system, which are appropriate for their range of disciplines. English proficiency has been considered as a new opportunity provider, thus leading non-English speaking students to become more competent in English in terms of their discipline; a greater number of institutions nowadays adopting the EMI system in order to deliver academic and professional success to their students. Knowledge of English has become an integral part for students. After school, without having time to adapt to the university, studying in English carries a serious burden and can become a source of anxiety and self-doubt. This is especially true for technical specialties, they are difficult in themselves, and the learning environment in English only doubles the difficulty. Terminology, the separate aspect which will be mentioned within this study, can appear as a meaningful aspect for potential learners in EMI classrooms. Automatic translators do not always convey the exact text, you need to constantly feel responsible for understanding and conveying the idea. A person may be well versed in his specialty; however, a foreign language can become a psychological barrier to the effective use of professional knowledge. Yet, while EMI suggests the range of potential benefits, such as access to a larger

quantity of academic resources, international mobility, exposure to authentic language, and other advantages, proponents remark on the negative sides of it, which cannot be ignored. For instance, institutions may have a lack of ethical consideration, or the perception of the native cultural aspects can be individually distorted. In addition, what is the most noticeable is that potential issues in EMI context may appear from students' low level of comprehension of the content or teacher's instructions, especially if considering the terminology (Wang, 2021). Students indeed face various obstacles while studying in English, especially students from STEM environments due to the row of reasons which appear from their STEM faculties' peculiarities themselves. Consequently, it is significant to deliver the lessons for STEM students with the guidance which they may consider appropriate, and emphasize teachers' efficacy, since instructors' teaching style can dramatically influence the process of studying. Furthermore, students' perception of the EMI system may be distorted to the positive or negative side due to teachers' individual teaching styles, thus resulting in EMI providing more challenges to the students of STEM.

## **1.2 Problem statement**

Within the English Medium Instructions context students hypothetically can perceive the phenomenon specifically in a positive way or in a negative way according to their lecturers' teaching styles. Teaching styles refer to the teachers' specific way to solve problems, provide tasks, and behave during the lessons; teaching styles may vary, depending on the individual and the educational organization (Sternberg, 1997). Taking into account that studying within the EMI system, where the disciplines are taught in English, can possibly appear complicated, it can be also hypothesized that a teacher's teaching style can significantly influence the learning process. Various factors in teaching may have an impact on the effectiveness of students' learning and their academic outcomes in standard setting itself, and with EMI students can possibly meet new

opportunities or challenges. For instance, the teaching styles which students may find supportive in EMI setting, can noticeably serve as one of the motivational factors to continue studying and improve academic performance. From the other hand, not appropriate teaching styles can have a negative effect on STEM students' learning or, furthermore, it is not excluded that they can perceive the subject differently based on their teacher's individual teaching style or can start perceiving the whole EMI system in a varying way, since STEM teachers' teaching styles can possibly direct students' perspectives. In addition, it is significant to remark that the factors in teaching styles which students may find helpful for them has a possibility to not coincide, since students' preferences are individual, yet there can be theorized about some general characteristics in preferences, which students of one faculty or specialty have. Thus, the students may find it supportive, when their instructor implements direct communication into their lessons, joke, or, oppositely, try to keep status within the classroom walls by their role in educational organization, by their impressive amount of working experience, or by strict regulations some teachers introduce beforehand. However, is it possible to establish what concrete teaching styles can guide students in an EMI environment, taking into account the peculiarities of their specialization? There are a number of studies dedicated to some students' learning needs in terms of student-centeredness, the role of a teacher in the classroom, and other influential factors. The factors which students of Humanitarian specialties prefer, may not coincide with the factors which students of STEM, in this particular context, may perceive as suitable, especially, considering EMI environment. The fact that EMI setting may add more complacy to the process of studying, is necessary not to ignore. There is a need to pay attention to the alignment between what teachers perceive as effective and what students indeed find helpful for them. Firstly, it is necessary to identify what exact teaching styles exist, what their specific aspects are, and how

students of varying specialties may perceive them. This study follows the goal to nominate the teaching styles and particular factors in instructors' teaching which may influence STEM students' process of studying in EMI classrooms in a negative or positive way. The main fact is to explore how STEM students' can perceive the EMI system based on their teachers' teaching styles.

### **1.3 Aim of the study**

The research aim of this study is to investigate STEM students' perceptions of English Medium Instruction (EMI) in relation to various teaching styles and identify the factors which can influence students' perceptions. This study follows the objective to establish what teaching styles are preferred by STEM teachers and STEM students, how STEM students perceive the EMI system connected to their teachers' teaching styles, and what the most supportive and least supportive teaching styles are. The research has a potential connection to the CALP theory, thus providing a theoretical value by eliminating a gap between academic language proficiency and subject-specific learning in STEM. This theoretical framework may deliver an image of instructors applying CALP to the Bloom's taxonomy; students who use academic English for the curriculum.

Considering the novelty of the research, study will reveal the perceptions of STEM students of EMI not just taking into account the peculiarities of their program, yet considering their lecturers' teaching styles, which has not been particularly investigated before. Furthermore, the findings, some recommendations, can be practically implemented to the course program as supportive, leading to decreasing some challenges of STEM students facing EMI. The practical recommendations can be provided from both cohorts: STEM teachers and STEM students.

### **1.4 Research questions**

The research questions:

- 1) What are the STEM teachers' perceptions of teaching styles in EMI?
- 2) How do STEM students' perceptions of EMI differ across different teaching styles?
- 3) What are the specific aspects of different teaching styles that STEM students find most supportive or least supportive in EMI settings?

## CHAPTER 2

### Literature Review

#### 2.1 The peculiarities of English Medium Instructions

English Medium Instructions has become a frequent case in education, and the system is overall supported due to a number of beneficial factors. It is complicated to ignore the specific peculiarities of this educational system: numbers of students around the world experience the EMI system being implemented to their educational organizations; and the effect of EMI can vary according to students' individual preferences and learning needs. EMI, or English Medium Instructions, refers to the educational systems in jurisdictions or educational organizations, where English is not the first language of the majority of the population, according to Macaro (2018). English has become a global language, spread all over the world, and a large quantity of educational organizations adopted the EMI system in order to improve the quality of education, considering it from various sides. For instance, the EMI system can provide new academic opportunities to the learners, such as access to a wider range of academic libraries, preparedness to work abroad, obtain authentic experience to work and study in English; it provides a spectrum of opportunities for students whose first language is not English. Following Elkhayma (2022), the EMI system can deliver higher chances for graduates from universities to receive "good" working positions, improve English proficiency, and introduce the chance to the circle of learners to consume authentic content which is taught in the world's first, global, language. Furthermore, studying in an EMI context can significantly increase students' level of critical thinking or even students; academic performance, in some cases, receiving to a greater extent high marks in standardized tests; improves students' cultural competence and overall understanding of the cultures. However, the negative aspects of the EMI system should not be

ignored. Admittedly, despite its potential positive impact, the system indisputably delivers challenges to students, thus resulting in dissonance between two existing consistencies. For instance, Campbell and Qorro (1997) add that the dominant presence in English is not a permanent sign of new opportunities, but it is also indeed about blocking the opportunities of the learner due to the individual level of the second language knowledge, skill and attitudes within the EMI context. Additionally, EMI can hypothetically serve as a moving factor for both low and high academic performance (Benjamin, 2004). Yet, the negative impact can be dominant in this case, since it was mentioned that in this context the row of issues appears, such as low level of comprehension of classroom language and teacher's instructions, as well. Students face obstacles during the study; the specific challenges can be characterized by various reasons but generalized as "English proficiency". Regarding the perspective of the complexity of the EMI system, Bälter et al. (2022) even nominates that the students who enrolled for studying within the EMI context, had their test results comparably lower than those who were studying in their native language. Furthermore, adding to all the mentioned factors, the EMI system can appear in truth more challenging for STEM students due to the peculiarities of their faculties, compared to others (Dafaouz, Camacho-Minano, 2016).

## **2.2 Students' challenges in EMI connected with teachers' approach**

Since it was remarked that STEM students are more intended to have a wider range of issues regarding their course, according to Dafaouz, Camacho-Minano (2016), it can be supplemented that the struggles may be connected with understanding the technical vocabulary or expressing themselves. Yet, the obstacles which the students of STEM faculties face are not limited with these factors; instructors' teaching styles and the ways they implement teaching and language strategies play a significant role in students' learning process in EMI (Wanyu and

Mingyu, 2024). Ismailov et al. (2021) report about key obstacles which prevent students succeeding in EMI system: the increased attention is recommended to be paid to the instructor's inappropriate pedagogical strategies, majority of which are oriented on teacher-centered approach; lack of language knowledge from the teacher's side, combined with the student's low level of preparedness to work in EMI system. Evans and Morison (2011) supplement the issues which can potentially be met by the students - besides the problematic comprehension of the lectures there can appear issues with academic style and disciplinary requirements. Theoretically, this particular type of challenge can be overcome with the teacher's specific implementation; therefore, teacher's instructions in fact can have potential influence on the learners' studying process.

The challenges which students of STEM faculties face in EMI context can differ, depending on the individual aspects of each student, and various approaches can be implemented into the lessons in order to reduce the possibility of delivering the obstacles. In this case, it is recommended to implement EMI into universities with the great account of a well-organized curriculum, avoiding the ambiguity of teacher's instructions, which is to some extent problematic (Wang, 2021). Furthermore, the author suggests that instructors' grammar and pronunciation can have no dramatic impact on students' learning process. However, the study is limited in terms of one country and place, where the research was conducted. Karabay (2017) provides the results of the qualitative study, where it was investigated that teachers are recommended to have more frequent interactions with their students in purpose of supporting them in overcoming the challenges within disciplines, since it is to a greater extent complicated for STEM students to improve English during the lessons, in comparison with the other faculties. Chaoqun et al. (2021) report about the issue being concluded in passive teaching strategies for providing science

lessons in EMI context. Continuing the existing suggestions on improving the teaching strategies in EMI context, code-switching from the instructor's side can appear as an appropriate supporting tool, which can play a crucial role in reinforcement learning (Phuntsog, 2018). According to Cicillini (2023), the role of code-switching in the EMI environment is directing for the students, replenishing the possible gaps, providing the needed explanation to some specific cultural references, jokes, and establishing guidance in social interactions. Moreover, Moulisa (2020) indicates code-switching is a beneficial variant for STEM students due to its support in cases of issues with communication, lack of understanding one another in classroom interactions, need for explanation and students' anxiety, as well. Yet, what is intriguing, in contrast, Ospanova (2017) revealed the outcome of the qualitative study, where the code-switching phenomenon from the teacher's side was met by the students of translation studies to a greater extent negatively. In this case code-switching appeared as retarding the English learning process, which refers to the code-switching truthfully being not absolutely supportive in all possible cases. However, the usage of the teachers' strategies can in fact depend on from which faculty the students are. Thus, Zhang & Lütge (2022) deliver that the perceptions of code-switching by Humanities students can be contrasting with the perceptions of students of STEM. For instance, code-switching can possibly represent an obstacle in social interactions in classroom settings for students of Humanities while STEM students are considered to have to a greater degree positive perceptions. The fact is that the usage of code-switching in the classroom should be purposeful, strategic, and the frequency of implementing it has to be appropriate (Nurhamidah et al., 2018). Kaur (2020) considers international and local students' challenges in the EMI system from varying perspectives: passiveness of students can significantly reduce the possibility to study; issues with understanding the contributions in interactions; teacher's code-switching to the

language according to the majority of the particular language speakers, which normally provide obstacles for international students or for students of the minority in terms of their first language. In addition to the linguistic strategies which a teacher can apply during the lessons, Rahman and Singh (2022) provide the positive aspects of STEM teachers' translanguaging in the EMI environment. The study of Yuan and Yang (2021) demonstrated the possibility of planned and generative translanguaging implementation into the lesson, and receiving the finding that translanguaging usage depends on the teacher's context, it is significant to have reflective practice in their execution and development of translanguaging applications. Considering the policy of the universities, it is a frequent case that STEM students or students from another spectrum of specialties are required to pass the English knowledge examination which will confirm that they will be able to study on the courses in EMI. Thus, the necessary level for applying to SDU university, for instance, is Intermediate. In case the language level of a potential student is lower than the required level, a student will be asked to pass English as a mandatory subject (SDU, 2025).

### **2.3 Teaching styles**

The existing hypothesis appears there: whether the correlation between specific teaching styles and students' academic success is present. First of all, what does the term "teaching styles" refer to? According to Sternberg (1997), teaching styles refer to the teachers' particular individual way to conduct the lessons, direct the flow of the lessons, solve the existing problems, manage the tasks, and other specific details which are related to teachers' ways to deliver their lessons. Teaching styles themselves, is an intriguing phenomenon. Every teacher has their own approaches and techniques to teach, and not every teacher knows what the exact teaching style they have. From this perspective, the hypothesis arrives whether teaching styles can influence

students' process of learning, especially, taking into account the concrete faculties. Moreover, it is equally important to shed light on teachers' perspective, as well. What teaching styles are preferred by teachers? Thus, the study presented by Ahmed et al. (2021) established what concrete teaching styles are the most preferable for students. It was revealed that teachers frequently used formal authority, personal model, delegator and facilitator teachers' styles in their research context. Delegator style, eventually, benefited. It means that the students of their setting to a greater extent preferred teachers' manner to teach the way, therefore, students could work autonomously, it is not important to be alone or in a group. The reason is that some students appreciate the opportunity to obtain experience by practicing with their hands, with the minimum of interactions with the instructor within the classroom. The choice of teaching styles within the research was based on the study about Expert, Formal-authority, Personal model, Facilitator and Delegator (Grasha, 1994), which appears in the majority of the articles dedicated to the teaching styles. This research can be interpreted to a greater extent as the guide to the teaching styles, not the self-existing empirical study. It has a great theoretical contribution to the articles dedicated to the teaching styles, and serves as a base, from which readers can derive what exact styles of teaching exist. Aliu and Raheem (2023) delivered the research that appeared significant in terms of deepening into the phenomenon of teaching styles; teaching styles can influence various groups of people in a different way. It investigated the direct relation of instructors' teaching styles to Science, Technology, Engineering and Mathematics (STEM) students succeeding in the learning process differently, since their teachers follow their own individual styles of conducting the lessons. It was demonstrated that sometimes teaching styles can influence differently even to various groups of people; for instance, taking into account gender. For example, there is the number of researches dedicated to the students of Humanitarian

disciplines, where it becomes obvious what teaching styles they prefer in different contexts. Developing this aspect, there is the study conducted by The research provided by Rosalia (2024) remarked on the positive impact of facilitator teaching style on students' process of learning process due to its specific peculiarity: students, in this case, have a larger quantity of interactions with their instructor within the classroom. Pineda-Carbonel (2021) investigated the STEM students' most preferable teaching styles in the new normal and employed the most preferred teaching style in developing Weekly Home Lesson Plan and Teaching Materials based on the most Preferred Teaching Style of the respondents in the New Normal. This research analyzes the five specific teaching styles, taken from Grasha's (1994) study, predominantly investigating the teaching styles from STEM students' perspectives. For this purpose, a Grasha Riechmann survey-questionnaire was implemented. To summarize, it became obvious that in this concrete case, students from STEM specialities found Facilitator and Personal Model as the most suitable. The study of Grasha (1994) provides the description of five teaching styles.

**Table 1**

*Five Teaching Styles, Grasha (1994, p.143)*

Teaching style	Description
Expert	Possesses knowledge and expertise that students need. Strives to maintain status as an expert among students by displaying detailed knowledge and by challenging students to enhance their competence. Concerned with transmitting information and ensuring that students are well prepared.

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Formal authority	Possesses status among students because of knowledge and role as a faculty member. Concerned with providing positive and negative feedback, establishing learning goals, expectations, and rules of conduct for students. Concerned with the “correct, acceptable, and standard ways to do things.”
Personal Model	Believes in “teaching by personal example” and establishes a prototype for how to think and behave. Oversees, guides, and directs by showing how to do things, and encouraging students to observe and then emulate the instructor’s approach.
Facilitator	Emphasizes the personal nature of teacher-student interactions. Guides students by asking questions, exploring options, suggesting alternatives, and encouraging them to develop criteria to make informed choices. Overall goal is to develop in students the capacity for independent action and responsibility. Works with students on projects in a consultative fashion and provides much support and encouragement.
Delegator	Concerned with developing students’ capacity to function autonomously. Students work independently on projects or as a part of autonomous teams. The teacher is available at the request of students as a resource person.

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To summarize, the EMI system represents both supportive and challenging sides for students, yet can potentially refer to the number of obstacles in terms of learners from a STEM educational environment (Defaouz, Camacho-Minano, 2016). The challenges are considered to be connected with various classroom factors including cases of students' passiveness during the lessons, low level of preparedness to work or study in EMI setting, specific disciplinary requirements and other preventing the progress aspects; what should be taken into account is teachers' instructions for STEM students which can influence the process of study positively and negatively. After the collection of data of the number of investigations on this topic, it became obvious that the issue can appear in following: in teachers' instructions being possibly ambiguous; in general students' lack of comprehension of the materials due to the lessons which are held in non-native language; in the strategies which can be, in some cases, improved. There can be implemented various possible solutions which STEM students can perceive as supportive in EMI context. For instance, firstly, it would be beneficial for a teacher to avoid ambiguous instructions during the lectures. Secondly, student-centered lessons with more frequent teacher-student interactions can guide STEM students in understanding the topic. Eventually, strategic and purposeful usage of code-switching and translanguaging, in appropriate amounts, are approximate to be met positively, and, furthermore, teaching styles possibly can affect students' perceptions of the studying process in EMI system significantly. Continuing analyzing the topic of teaching styles in depth, each person perceives information in different ways. In the majority of cases, the reason is in the format or style in which this information is conveyed. A teacher who uses a variety of styles makes learning accessible and effective; it helps to organize the learning process in an appropriate way. A well-selected teaching style is an important factor in learning, which helps to motivate students to be engaged in the learning process; therefore, the

student reveals his abilities. It is important to remember that it is not enough for teachers to provide the materials and deliver the lessons without any strategy, as it was mentioned before. It is in teachers' possibilities to manage the process strategically, thus implementing the helping strategies into the lessons in order to ease the process of learning for students in the EMI setting. Furthermore, it is significant to carefully adapt the style, taking into account the specifics of the student's needs. Teachers have their individual teaching styles, yet they also can adapt their teaching styles, shape them, therefore students will find it supportive in their particular context. Students, as well as teachers, also have their individual needs, pace of learning, and manner according to which they perceive and process the information during the lessons. For some students, it is easier to study if their teacher provides personal stories about past working experience, while for other learners it is not indeed motivated to listen to the teacher's inspiring stories - they would to a greater extent pay attention to the strict regulations or the established deadline within the course. Furthermore, some contrasting styles, such as facilitator and delegator, can possibly lead to the learning gaps from one side of students, however, the other side will follow the teachers' style without any issues. What is interesting is that the problem of the individuals' preferred teaching style, as it was explored, can depend on the specialty of the individual. Thus, for instance, students of EFL specialties, according to the study conducted by Rosalia (2024), are more likely to perceive the facilitator teaching style in the positive way, compared with the other teaching styles. Facilitator teaching style also was observed to be dominant among the other teaching styles in the research provided by Soleimani (2020), where the impact of EFL teachers' teaching styles on their epistemological beliefs was under the exploration. This study utilized the mixed research method: the quantitative stage, firstly, appeared, and then the qualitative part with the row if semi-structured interviews took its place.

200 EFL students answered the questionnaire questions; it was investigated that the facilitator teaching style is the most preferred out of the other four teaching styles. This topic was developed in depth within the qualitative, interview, part. Students of Humanitarian specialties, in general, can find such styles as facilitator or personal model more appropriate due to the peculiarities of their disciplines, while STEM students can be hypothesized to have more learning opportunities, in case they have a possibility to work autonomously, and their instructors provides them with the deadlines, accurate assessment rubrics, task description, and the materials STEM students will need during the work over the project. In this case, such a style as delegator may appear appropriate for STEM students, as it was investigated by Ahmed (2021), where STEM students as participants of the study have selected the delegator teaching style as the most beneficial. However, the logic of the students following the general patterns of teaching styles preferred most by the majority of the faculty, can have exclusions, and it is totally acceptable, standard situations, since, again, everybody is different. The research studied by Pineda-Carbonel (2021) confirms that exclusions exist, and STEM students can prefer the “interactive” teaching style more, as well. In the following study STEM students remarked that facilitator and personal model teaching styles were the most suitable for them. When implementing STEM education, facilitator teaching style can play an integral role within the teaching process (Drokina, 2024). It was highlighted by the researcher that just providing the students with the information is not enough; STEM students expect to be taught creativity, critical thinking, and a teacher is the main figure in this educational process, in whose priorities it is to direct the student, successfully combining science, technology, engineering and mathematics. Teacher-facilitator who cares about the engagement of students into learning can become one of the keys to academic success in STEM education. Teachers are expected to

manage the process, creating the STEM environment together with stimulating students to take a part in practical activities, taking into account STEM learners' individual needs and characteristics, motivating students and guiding to work in teams, direct them in solving real world problems connected to their specialization, and a number of other aspects. Furthermore, it was, in addition, mentioned that all the teaching styles suggested by Grasha (1994) were perceived positively, yet facilitator and personal model benefited. To conclude with, teaching styles is a significant phenomenon, which appears in every teacher without exclusions. Yet, it is recommended to remember that teaching style is not a factor which identifies a teacher. Vice versa, teachers identify what their teaching styles are. Consequently, teachers can have more than one teaching style during their delivering the lessons experience; moreover, teachers can shape them or change one teaching style to another one after some period of time, experiment with teaching styles, and it is totally a normal phenomenon. Thus, Glenn (2016) and Dickinson (2021) wrote the studies about motivating teachers to adapt their lessons in a way necessary for their students' direction, shaping the teaching style they have adopted to some extent; therefore, their learning audience will be able to satisfy their learning needs. In addition, again, it should be clarified that instructors' teaching styles are an integral part of a teacher's practice. Teaching styles can noticeably influence the motivation and success of students. The fact is that the teacher is the person who shapes the materials, and directs the flow of the lesson: despite the "interesting" consistency of the material, the material should be delivered in an appropriate, effective way. The teacher should help students to think independently, reflect, and analyze. However, often the lack of a method or a teaching style which does not suit some individual faces may prevent the process of deepening into the issue of the discipline; it can negatively

affect self-esteem, faith in potential, and, admittedly, even can discourage the desire to learn altogether.

## CHAPTER 3

### Methodology

#### 3.1. Research design

The research utilized the mixed method to deeply analyze students' perceptions of English Medium Instruction connected to various teaching styles, and establish the factors which can possibly influence students' perceptions of the EMI system. The research was conducted in one of the Universities where the EMI system was adopted, in Kazakhstan, Almaty region. The data collection consisted of two stages: the interview being conducted for the further detailed analysis, and survey implementation, where the data, which was collected from the interviews, can be processed again, and the results can appear to a greater extent concrete. For this purpose two cohorts of people participated within the research: students and teachers from STEM specialities. The mixed research method being selected for this study has the basis on other studies about the exploration of teaching styles, which adopted qualitative and quantitative stages. For instance, the research conducted by Soleimani (2020) also was concentrated on the deep consideration of the teaching styles suggested by Grasha (1994). Within the frames of this research, the impact of EFL teachers' epistemological beliefs on their teaching styles was observed. Thus, the study utilized both quantitative and qualitative methods within the research: firstly, the quantitative analysis was used, where the answers from 200 teachers were considered. This stage was necessary in order to understand what teaching styles out of five were predominant for EFL teachers. After this stage, the qualitative part has been started. The researcher conducted a row of semi-structured interviews. By the end of the research, it was established that a facilitator teaching style, student-centered approach would be relevant; teaching styles have a strong connection with teachers' beliefs about knowledge acquisition. This

study confirmed that the teaching styles phenomenon is complex, and plays a significant role in pedagogy. This current study about the perceptions of the EMI system by STEM students based on STEM teachers' teaching styles follows the approximately identical objectives. STEM teachers' most preferred teaching styles, firstly, were explored, after which STEM students answered the questionnaire questions about the teaching styles preferred for them, for this time, and answered whether they perceive the whole EMI system differently connected to their instructor's teaching styles. The existing nuance in the current study was in the order of the stages: firstly, the qualitative, interview part, was implemented; secondly, the quantitative stage with the questionnaire took its place. Such an order was selected, since it was considered to be to a greater extent relevant, if STEM teachers expressed their perceptions of their teaching styles in the context of EMI, firstly. The obtained data was aimed to have depth, and detailed information. STEM students identified the most preferred teaching styles, answering the close-ended questions about the EMI system, teaching styles, in general. As data collection tools, dictaphones and portable electronic devices were used: mobile phones and laptops.

**Table 2**

*Research Questions and Methods of Data Collection*

Research question	Methods of data collection
What are the STEM teachers' perceptions of teaching styles in EMI?	Interview
How do STEM students' perceptions of EMI differ across different teaching styles?	Questionnaire

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What are the specific aspects of different teaching styles that STEM students find most supportive or least supportive in EMI settings?

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Questionnaire

### **3.2 Participants and sampling**

#### **3.2.1 Teachers**

At the first stage, the interview was adopted in the qualitative part. STEM teachers (N=5), who volunteered to participate in the study, were asked to provide their perspectives towards their teaching styles in the semi-structured interview. The purpose of this stage was to obtain data about the possible teaching styles of educators, with which they can associate their working process, and study the reasons why they find these specific styles appropriate for them, if the details in the interviews are provided. In order to implement the conveniences for the participants of the first stage, the teachers were provided with the nomenclature with the laconic explanation of each teaching style; therefore, it was easier for them to establish the understanding of what their teaching style is or what their teaching styles are, if there are multiple. In detail, teachers of the STEM specialties were introduced with the short descriptions of the teaching styles provided by Grasha (1994), since this particular study was observed as classics, if researched about teaching styles specifically. A number of researches dedicated to this very topic, reference the five styles suggested by Grasha (1994). The teaching styles were: Expert, Formal-authority, Personal model, Facilitator and Delegator. After STEM teachers established the parallels between their teaching styles and the explanations which were provided, associating their style with the closest variant, the semi-structured interview started. The questions which appeared

during the interview process were connected with the instructors' teaching styles, and were concentrated on teachers' perspectives towards their teaching styles, on how, according to their opinion, students may interact with them and follow the learning process, taking into account the nominated teaching style. In order to conduct the interview, the purposeful method was implemented within the study. This choice of the sampling can be explained by the objective of the study itself: teachers from STEM faculties exclusively, who experience conducting STEM lessons, were kindly asked to answer the questions. Admittedly, the comparatively narrow sampling in the interview stage can serve as one of the limitations of this study, since the wider range of participants, theoretically, could deliver to a greater extent diversified results; therefore, the preferable teaching styles of the larger quantity of instructors could be identified. It is significant to justify that this research followed the ethical considerations, thus, conducting the interviews exclusively with STEM teachers who agreed to provide their perspectives.

### ***3.2.2 Students***

After the data from the teachers as participants is collected, the obtained answers need to be analyzed, sorted out and categorized according to the possible specific teaching styles, which may appear during the interviewed STEM teachers' lessons. The second stage of the data collection is survey distribution. The survey is oriented to STEM students (N=40), particularly, sophomores or students of higher courses of studying. This choice can be explained by the amount of learning experience Engineering students could have. It is hypothesized that students of second or higher courses can have comparatively developed perspectives regarding studying within EMI context, since they had more time to form their opinion and preferences. The volunteering participants answer the closed-ended questions considering the revealed teaching styles. In the survey, the students from STEM faculties select the teaching styles which they

think are to a greater extent appropriate, and what their perceptions considering EMI are based on their lecturers' teaching styles. Within the survey, STEM students were provided with the questions which contained the laconic descriptions of the teaching styles, therefore, they could associate their learning preferences with the teaching styles; and the questions about whether instructors' teaching styles influenced students' learning in EMI context.

The participation of teachers and students in this research was totally voluntary. The consent letters were sent to all the participants, for both cohorts. The participants' names, gender, and other personal information was not revealed. Everything was confidential. After the collected data was analyzed, names of the participants were coded.

## CHAPTER 4

### Results

#### 4.1 Interview results

After conducting the interviews, the obtained data was deciphered from the audios and interpreted into the written format. The received transcripts were processed using thematic analysis. Specifically, the inductive thematic analysis appeared within this study. Thematic analysis of the rows of the interviews with the teachers of STEM specialties revealed the following topics within the study: teachers' support of students in EMI context; teachers' teaching styles; the impact of teaching styles on students' studying in English; possible future changes in instructors' teaching styles.

##### *Theme1: teachers' support of students in EMI context*

“Yes, I try to support my students. All the materials are available in written form, shared and discussed during the class as well. Active participation and discussion are encouraged both online (Telegram group) and in the classroom. Students can also contact me personally by email or direct messaging. I almost always speak only English, but can make some exceptions outside of class. All this is for them to cover and understand all the material well”. (Participant 1)

“I always help only those students, who need help, however, not all students require help, and sometimes this help may be even undesirable, since it narrows the scope of creative assimilation of the material. As a rule, help is required at the initial stage of training”.

(Participant 2)

“Yes, I assist my students. Mostly, I teach first-year and second-year science maths students. Even, they are required to have a certain language level to take courses, usually they are not well prepared to understand maths in a university-level context. Theoretical maths in our

department is much harder and different from maths in school. Here, reasoning skills, structure of sentences are very essential. For these reasons, students can have difficulties in adapting to this. And as they have been learning it in their language during school time, there may be a need for time to adapt to the EMI context. I think it is better to do a smooth transition to EMI”.

(Participant 3)

“Yes, definitely. I try to support them as much as I can because studying in English adds another layer of difficulty. Some students struggle with the language itself, so I usually explain things in a simpler way or give examples that help them connect with the topic. I also share useful resources and sometimes switch to easier terms if I see they’re confused. My goal is not to give them answers, but to guide them and make the process a bit easier”. (Participant 4)

“Yes, I support my students. During my lectures, I try to use simple and clear language, and I give explanations whenever necessary to help students understand. I also encourage students to ask questions at any time during the lecture, even if it means interrupting me. Additionally, I make myself available outside of class for further support”.(Participant 5)

As it was revealed, all the interviewed teachers expressed how they are motivated to assist their students in order to support their learning process within the EMI environment. All the participants shared that they try to support their students, and the second participant indicated about the appropriateness of support which can appear from the teacher’s side - sometimes the instructor’s help can have negative sides, since, according to the participant’s words, it even can prevent the creative assimilation of the material. Therefore, admittedly, teachers support students in EMI context, yet, it is also significant to remark on the appropriateness and purposefulness of the guidance. Furthermore, almost all participants mentioned that studying in the EMI system can complicate the learning process due to its peculiarities connected to language. According to

this fact, teachers take into account the context as well, thus, in addition, guiding students in terms of the complications regarding English language.

It is beneficial to add that the participants provided how they practically contribute to students' studying process in EMI classrooms. It was shared about transitions to the easier terms in language, utilization of to a greater extent clear and simple language, making exceptions out of the class. The listed factors connected to language could positively influence students' level of understanding the content. The third participant mentioned that a smooth transition to the EMI, since students can face this system for the first time, can support students to get adapted faster. To summarize, teachers, without exceptions, try to assist their students to learn in EMI classroom, providing the support not only in terms of content, yet also in terms of language; it is concluded that teacher's guidance is recommended to be appropriate, desirable; avoiding learners' fast deepening into studying in EMI context, hypothetically, can be supportive.

*Theme 2: teachers' teaching styles*

“Delegator teaching style. Making all the material and assignments available online. Weekly tasks. Fixed deadlines, no late policies. Practice-based learning. Project-based learning, a bit”. (Participant 1)

“I cannot claim that I have developed my own teaching style on my own. As a rule, I use the teaching methods that I liked from my school days, and at the same time enrich them with more modern methods that I borrow from my colleagues, which has already been probed and gives positive results, but I never conduct experiments”. (Participant 2)

“Facilitator. I use “translanguaging” in lessons, meaning the first aim is to adapt them to terminology and new math concepts in English. In some cases I use kazakh to explain complex concepts. It is both easier for me to explain it and easier for them to comprehend, to teach them

in kazakh. I also kind of train them to understand course textbooks in English. I project the book in the class, and teach directly from the book. This helps them to learn how to read and understand higher level math books in English”. (Participant 3)

“I’d say I’m more of a facilitator. I give students the space to work independently or in teams, especially when it comes to projects. I don’t stand in front of the class and lecture the whole time. Instead, I’m there to support them when needed, give feedback, and provide useful materials. I want them to take initiative and develop confidence in their own abilities”.

(Participant 4)

“My teaching style is based on being both an expert and a role model. I try to inspire students by showing them how exciting and meaningful it is to be a scientist. I believe that when students see their teacher passionate and confident about the subject, they become more curious and motivated to learn. I aim to create an atmosphere where science is not only understandable but also enjoyable”. (Participant 5)

The results of the interview demonstrated that 2 of the teachers associate their teaching style with facilitator teaching style; 1 teacher has delegator teaching style; 1 teacher expressed uncertainty regarding specific teaching style, explaining it with the methodics from the past experience of learning and facing the teaching styles of others; 1 teacher answered that there is the mix of two teaching styles: expert and role model. The teacher who selected delegator teaching style highlighted that the needed materials and tasks are accessible for the students in online format; the accurate deadline frames direct students in doing the assignments, and students are overall guided by weekly tasks. The participant number two did not select the teaching style from the five suggested, yet shared some details regarding shaping the teaching style from the past working experience. An interesting detail was mentioned: teachers can find

the teaching style which is appropriate for them by observing their STEM colleagues, in order to study how the positive outcome can be obtained. The third participant not only exclusively revealed the facilitator teaching style as working for one, yet also provided some specific recommendations. For instance, it was said, translanguaging can be implemented into the STEM lessons in order to ease students' deepening into the sphere, since studying in the EMI classroom, to repeat, is not easy. The teaching style of participant number four also was revealed to be actively engaged into the process by participating in STEM students' learning process. The facilitator-teacher motivates students to work, provides the feedback, and, moreover, takes attempts to build the confidence within the STEM students. All the listed characteristics are truthfully the characteristics inherent to teachers whose individual teaching style is facilitator. The participant number five has a case of combining two teaching styles, which appeared to be expert and personal model. The inspiration of students to work further, and be filled with the feeling how meaningful their profession is can be a motivating factor in studying in STEM specialization, EMI classroom. If students observe the level of the preparedness of their teacher to work in STEM in terms of motivation, it can motivate them to continue to study, as well. In addition, it is necessary to remember that science can also provide a sense of satisfaction to the students, not only knowledge.

It is noticeable that every teacher has their individual principles and reasons why they implement their teaching styles. The light shed on the sides four teaching styles, while the "formal authority" was not selected by the participants as their teaching style. Therefore, it can be interpreted that none of the participants considered the teaching style, where the teacher keeps a status with the help of the role of a faculty member, suitable for them. It can be hypothesized that STEM teachers do not indeed follow the aim to establish the standard regulations and norms,

somehow limiting STEM students' directions on how to work, and which methods to use. What is intriguing, after observing a number of literary sources, it should be concluded that it is a relatively rare case of STEM teachers to select the formal authority teaching style as the appropriate teaching style for them. Possibly, the issue is on the limited source dedicated to the exploration of teaching styles in terms of STEM education or, it can be summarized as STEM teachers' will to keep s status in the classroom other ways, not as a faculty member, and with not establishing the standard or 'normal'' paths how to study and work. Considering the participants' responses again, to generalize, participant number three reported on the significance of the linguistic strategies in the EMI classroom, which facilitates students' learning process in terms of math concepts and introducing some specific terms. The fifth participant, who selected the "personal model" teaching style and "expert" teaching style, remarked that it is believed how the inspiration to be a scientist can help students; therefore, inspired students can possibly become more curious about the subject, being more motivated to learn.

*Theme 3: the impact of teaching styles on students' studying in English*

"All the class material, presentations, discussion, even online, is exceptionally in English. Students have presentations when they demonstrate their project results". (Participant 1)

"When teaching students, who are not native speakers, I always try to: provide several options for explaining the material; include synonyms and antonyms for keywords (first time appeared) with examples of their use, and, whenever possible, students are encouraged to provide their own examples; hold weekly discussions to find out how well the material has been learned and how well all the terms have been understood. Judging by the results of the discussions, it is possible to estimate the correctness of the chosen teaching style. As a rule,

students not only learn the material, but also have a deeper understanding of the specifics of the language and use it more fluently”. (Participant 2)

“In teaching and practicing sessions we always use books in English. I think that above-mentioned teaching styles help students to adapt easily and at the same time they will not have to sacrifice understanding maths due to the language barrier”. (Participant 3)

“I think it helps them feel more comfortable using English in practice. When they work in groups, present, or solve problems together, they naturally start communicating more in English — and that builds their confidence. It’s not just about learning the subject; it’s also about getting used to expressing themselves in a second language, which I think is really valuable”.

(Participant 4)

“Since I teach mathematics, the language barrier is not as big as in other subjects. Once students learn the basic mathematical terms in English, they can follow the content quite well. My teaching style focuses on clarity and step-by-step explanation, which helps students concentrate on understanding the concepts rather than struggling with language. This approach supports their learning process in an EMI context”. (Participant 5)

To summarize, all the participants provided their detailed perspectives towards how their teaching styles can influence students’ learning process in English. Those teachers, who selected the “facilitator” teaching style, were mostly focused on the process of adaptability of their students to learn in English, remembering that there is a language barrier. The fifth participant’s teaching styles were role model and expert, and it was delivered about the importance of clarity and step-by-step explanations, after which it can be more possible for students to be focused on the concepts. The second participant provided a list of procedures which can assist STEM students in learning in the EMI classroom. For instance, providing keywords with their

synonyms and antonyms can be helpful, especially, in case the words were faced by the students for the first time. In addition, it was kindly shared about the effectiveness of the weekly discussions, on the outcomes of which teachers can receive some decisions regarding STEM students' knowledge. The delegator teaching style, as it was analyzed, can play an assistive role in terms of the materials. Students can observe their presentations, when they work over their projects. The participants expressed the perspective towards how complicated the EMI system may appear in the eyes of STEM learners; therefore, it was remarked that students need teachers' support in EMI classrooms, and some teaching strategies can ease the process of learning to some extent.

*Theme 4: possible future changes in instructors' teaching styles.*

“I would like to increase the amount of pair/group work among the students so that they get involved more and interact more with each other. I would also like to get myself involved in the study process by working together with the students. Another thing I would like to add is some research and scientific aspects engage and interest the students. All this requires more practice and a project-based learning approach”. (Participant 1)

“In the future, I will continue to supplement my style with emerging proven approaches, sharing experiences with my colleagues, and taking into account methods recommended and published by authoritative authors”. (Participant 2)

“I would like to try to facilitate EMI step by step. For example, in the first semester just 25 percent of lessons will be in English. But all terminology will be given in English. In fourth semester lessons will be fully delivered in English”. (Participant 3)

“I would love to try out more digital tools — things like collaborative platforms or interactive apps that keep students engaged and let them be more creative. Also, I'd like to bring

in more peer-feedback activities. When students learn to review and support each other, it builds a stronger learning environment and helps them see different perspectives”. (Participant 4)

“In the future, I would like to add self-assessment and peer feedback activities to my teaching. I believe these methods can help students become more aware of their own progress and improve their critical thinking skills. It can also create a more interactive learning environment, where students learn not only from me but also from each other”. (Participant 5)

Three out of five teachers would like to implement more interactive learning into their classrooms: have some focus on collaborative learning, and add other types of assessment, for instance, peer feedback or self-assessment. The participant number four also mentioned the effectiveness of digital tools, if the implementation of collaborations is needed. Students frequently request creative approaches, and would like to be engaged during the lessons. What is interesting, especially the teacher-facilitator and teacher, who is defined to be role-model and expert, provided their opinion on the larger amount of interactive learning among their students. The third participant, also a teacher-facilitator, delivered one strategy which can possibly facilitate students’ learning process of EMI. It was hypothesized that EMI implemented step-by-step could possibly contribute to the adaptation process of students positively: in the first semester the twenty five percent of lessons are in English, yet all terminology is in English; thus, constructing smooth transition to EMI context for the students who face the EMI system for the first time. To summarize, the main objective for STEM teachers is to remember that students would like to be interested in their sphere; almost all the participants reflected on the level of creativity expected from their field teaching. It is indeed beneficial to support STEM students in the EMI environment: with creating the educational atmosphere, with the number of interactions, if it is needed, with providing STEM students with the opportunity to improve their critical

thinking and creativity skills. There are a number of existing approaches, implementing which STEM teachers, who follow their teaching styles, can create a supportive environment within the EMI classroom.

To conclude, the aim of this study is to investigate STEM students' perceptions of English Medium Instruction (EMI) in relation to various teaching styles and identify the factors which can influence students' perceptions. In order to conduct this study, a mixed research method was utilized. Two cohorts: STEM teachers and STEM students participated within this study. In the first part of the research, five teachers from STEM specialties answered the interview questions about their teaching styles, how their teaching styles can influence students' learning process in EMI, and what they would like to implement to their lessons in future, in terms of their teaching styles. Thematic analysis, face-to-face interviews were conducted in this study. In the second, quantitative part of the research, students from STEM specialties answered the survey questions based on their teachers' teaching styles. The purpose of this stage is to find out whether teacher styles can affect students' perceptions of EMI system itself; whether there are some particular teaching styles which are more supportive or less supportive in this context; whether there is compliance between STEM teachers' teaching styles and STEM students' learning needs in terms of EMI system.

#### **4.2. Questionnaire results**

In the quantitative part of the research, students were asked to indicate their preferences regarding four teaching styles: delegator, facilitator, expert, and personal model, which had been identified during the qualitative part, interview stage with university professors. Each part of the survey is related to one of the listed teaching styles, and one part of the survey refers to the overall students' perceptions of EMI in relation to their teachers' teaching styles. In order to

analyse the obtained data about the teaching styles predominantly preferred by STEM students, the research, firstly, utilized a descriptive method of analysis. This method was implemented, since it can provide the general pattern: assists in answering the question about how many students prefer which style.

40 participants who were students from STEM specialities answered the questionnaire questions. 2 questions from the survey were related to Facilitator teaching style, 2 were related to Delegator, 2 to Expert, 2 to Personal Model, and in 2 questions students were asked to match the definitions of the studying and teaching styles with their preferences. All the questions were close-ended and contained the laconic information about the teaching styles; therefore, students had the opportunity to associate the appropriate teaching styles with their learning progress in EMI context in a more accessible manner. After the data was obtained, the formula  $(Q1+Q2+Q3)/3$  was utilized, in order to receive the average quantity of the students who find each of the four styles preferable in the EMI setting. After, the finalized data was converted to the pie chart format, where the percentage of the students who find the particular styles appropriate, can be visualized. Thus, it was calculated that 28,1% of STEM students perceive Facilitator style as the supportive teaching style; 27,6% find Personal Model effective, 25,4 % - Expert, 18,9% - Delegator.

Students' preferences of teaching styles

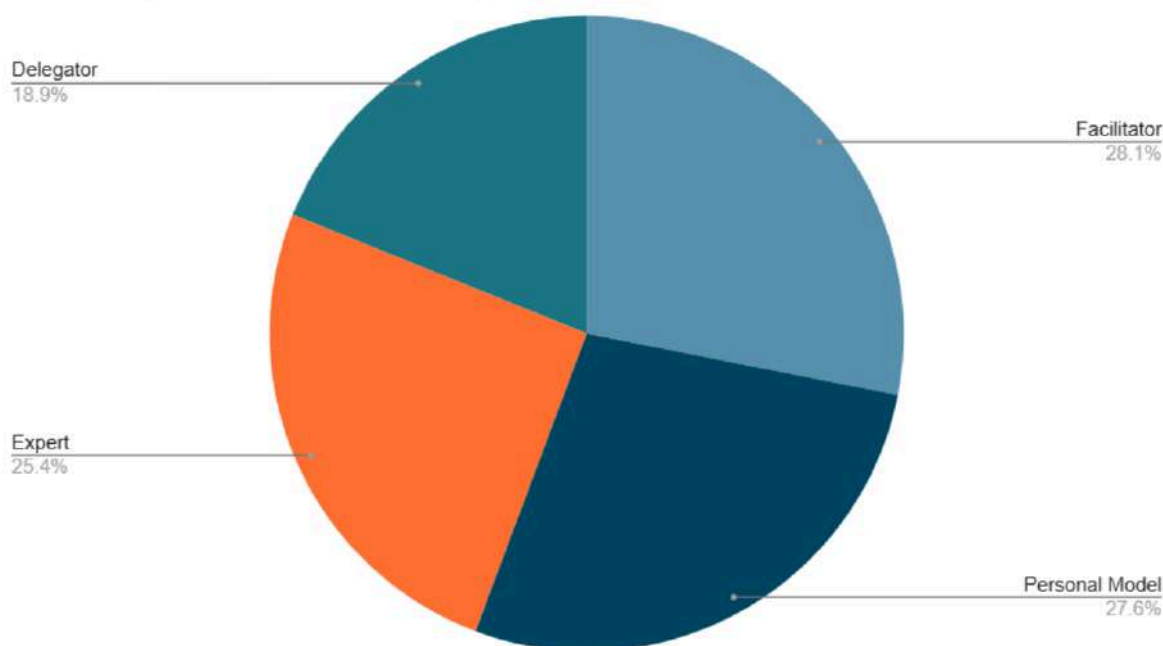


Figure 1. Students' preferences of teaching styles.

The descriptive analysis of the students' responses reveals that Facilitator style, which can be characterized as by high levels of teacher-students interactions, in-class guidance, discussions during the lessons, and other factors, is the most preferred style of teaching among STEM students in EMI classes. Specifically, 28,1% (about 11 students) answered that Facilitator is the supportive teaching style for them. The answers connected to the communication between teacher and students, in-class activities were chosen in predominance. The high level of the teacher's role in students' classroom activity is appreciated, in this case.

Personal model was investigated to be the second supportive teaching style after Facilitator, since 25,4% (about 10 students) of STEM students answered that motivating teachers who inspire their lessons to improve is one of the most appropriate variants for them. The indicator for Personal Model is lower than for Facilitator for 2,7%. Almost the same quantity of

the participants responded that being motivated by their teacher is the key moment in the learning process. Students who prefer teachers who implement Personal Model teaching style into their lesson conducting, find the instructors' personal experience stories supportive, and like to be taught by a "a personal example".

The expert style, which refers to the teachers maintaining status among students, demonstrating the knowledge in the taught sphere, and providing clear structure and feedback, has been chosen by 25,4% of the participants as the most supportive style. There can be remarked that the indicator is lower than facilitator teaching style for 2,7%. Which means, about 10 students out of 40 prefer the teachers who challenge students to increase their competence, and cares about their level of preparedness.

The Delegator style, which refers to minimal in-class interactions, yet providing more materials and encouraging students' autonomy, appeared to be the least supportive teaching style, if compared with other three teaching styles. It reached 18,9%, and thus result is lower than for Facilitator teaching style (most preferred one) for 9,2%. Approximately 7 students answered that independent work or work in groups, where a teacher is to a greater extent the source of materials and consultant in some cases, is the supportive strategy. Admittedly, taking into consideration the general number of participants (N=40), it is complicated enough to conclude that the contrast between results is noticeable. However, the difference can be revealed between facilitator and delegator teaching styles. Based on the received results, the specific outcome can be drawn.

To summarize, the gradation from the least supportive to most supportive would be: Delegator, Expert, Personal Model, Facilitator. Furthermore, it is significant to add that all the teaching styles were observed to be appropriate, since there were minimal cases of students

responding to some teaching styles as totally not supportive in the EMI context. It is important to repeat that everything is subjective, every student has their own learning preferences and needs, yet the facilitator teaching style, in this current study, benefited.

The part of the questionnaire was related to students' perceptions of the EMI system itself based on their lecturers' teaching styles. Therefore, basically, the participants answered the questions about teaching styles influencing their learning process in the EMI classroom. As shown in Figure 2, the participants demonstrated that they indeed can perceive the EMI system differently based on their instructors' teaching styles. They responded that the impression of the EMI can vary depending on how STEM instructors direct the flow of their lessons. Teachers who are facilitators can build one perception, and teachers who are delegators, for example, can build other associations with the STEM subjects or the whole EMI system within STEM students.

Thus, three questions dedicated to students' perceptions of EMI based on their teachers' teaching styles were calculated by the average meaning, saving the answers "certainly yes", "rather yes", "maybe yes", "maybe no", "rather no", "certainly no". The average numbers for each variant from all the three questions was calculated using the formula  $(V1+V2+V3+V4+V5+V6)/6$ . After, the obtained results were interpreted in the format of the pie-chart in percentage. Thus, the results were: 54% certainly yes, 20% rather yes, 14,1% maybe yes, 3,3% maybe no, 5,8% rather no, 5% certainly no. The final results were visualized using the diagram.

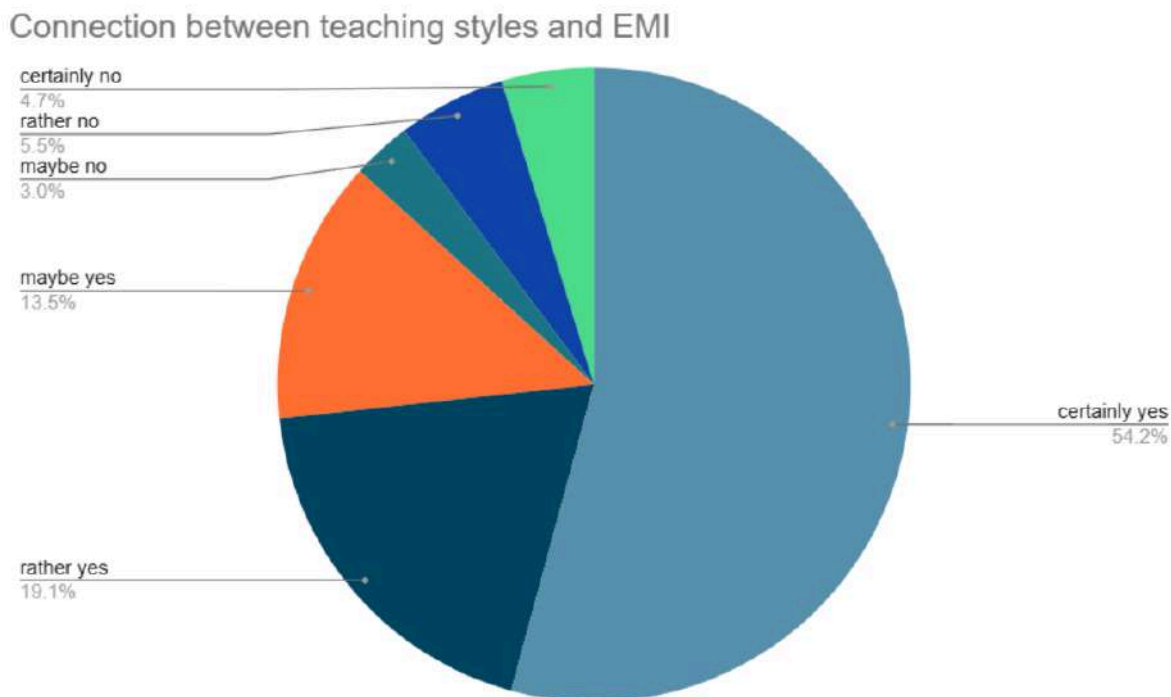


Figure 2. A diagram “Connection between teaching styles and EMI”.

To summarize, the correlation of the nomination shows that the majority of the participants find the strong impact of teaching styles to their learning process within the EMI system. Furthermore, it was established that the specific teaching styles can influence students’ level of understanding the subject. Students, hypothetically, can perceive the EMI system differently, depending on their teachers’ teaching styles. The percentage of positive answers to the questions dedicated to the influence of STEM teachers’ teaching styles to STEM students’ perceptions of their subjects and the EMI system itself was dramatically high. As it was mentioned before, the larger quantity of students perceive the Facilitator teaching style positive. Nevertheless, the four teaching styles, which were derived from the previous part of the research, were observed to be supportive for students, since the preferences of the individuals are different, yet, it is significant to remark on some teaching styles, such as Facilitator and Personal Model,

benefiting relatively more, for STEM audience. STEM students may find it effective, if their teacher interacts with the class, shares motivational stories, and implements into the practical some elements, which can inspire students to ask questions, and continue studying and working process. In addition, to interpret, taking into account the fact that STEM students perceive teachers' teaching styles as the important factor in an EMI classroom, the difference between students' preferences of teaching styles was not crucial; to greater extent, the contrast was with the Facilitator teaching style. The similar results were observed in the study delivered by Pineda-Carbonel (2021), where STEM students selected the facilitator and personal model teaching styles as the most supportive for them. However, what is intriguing, in the research conducted by Ahmed et. al (2021) STEM students nominated delegator teaching style as one of the most appropriate, which means, in their context, a teacher as a provider of the opportunity to work independently (alone or in groups) was appreciated more. Regarding this current study, the participants found the strong alignment between teaching styles and their perceptions of the EMI system, and confirmed the fact that instructors' teaching styles is the important aspect for them which cannot be ignored together with nominating all four teaching styles relatively on the identical level - it became obvious that, yes, the teaching styles have the strong meaning; however, the perspectives towards the most supportive one can to some extent vary. While somebody identifies a facilitator as the most supportive teaching style among the others, somebody may disagree, and establish, for example, a delegator in the position of one of the most effective teaching styles. Therefore, it can be hypothesized that it is an individual case, and STEM students would prefer to experience personal approach, if it was possible in their context. Nevertheless, the level between teaching styles and students' perceptions of the EMI system was critically high. Students can perceive the EMI system negatively or positively, based on their

instructors' teaching styles. Yet, it is complicated enough to conclude which teaching style is the most supportive in universal meaning, since the context of this current study was considered.

## **CHAPTER 5**

### **Conclusion**

The research aimed to explore the perceptions of the STEM students of English Medium Instructions based on lecturers' teaching styles. The EMI system is the educational system which can deliver both opportunities and obstacles to the learners due to its particular peculiarities. For instance, the EMI system can provide access to a wider range of academic vocabulary, new work opportunities, international mobility, and other positive factors. Regarding the challenges, admittedly, students who study within the EMI system, can have issues connected to the knowledge of English language, which is the language of the taught discipline; together with this type of issue, it is not excluded that students may find the terminology of the academic subjects complicated or may have the range of obstacles connected to the interaction within the EMI classroom. Taking into account these aspects, it can be summarized that some negative peculiarities of the EMI system, admittedly, may serve as the separate problem for the students of STEM specialties. Students of STEM have a specific vocabulary dedicated to the technical range of words, which indeed can represent the challenge in their studying progress. Furthermore, it was considered that STEM teachers who use not appropriate teaching techniques, or "teaching styles", may not only slow down the progress of studying, yet also deliver a new concrete obstacle. STEM teachers, as any other teachers, follow their own teaching styles. Teachers' individual manner to teach, solve the problems, provide tasks, interact with students, and assess can be called "teaching styles". It was reviewed, there are five teaching styles: expert, formal-authority, personal model, facilitator and delegator. Each style has its own function, and it can support students' learning or, oppositely, it can challenge the process. For instance the facilitator teaching style refers to the teacher-student interactions, guiding students by asking

questions, exploring options, suggesting alternatives, encouraging students to develop criteria to make informed choices. The teachers who are facilitators seek the opportunity to help students to work independently and with responsibility. Expert teachers are teachers who try to keep status of an expert among students by showing detailed knowledge and by challenging students to increase their competence. They think about providing information to students and ensure that students are well-prepared. Formal authority means that a teacher keeps status because of knowledge and role of a faculty member. In addition, a teacher to a greater extent cares about providing positive and negative feedback, establishing learning goals, expectations and rules. These kinds of teachers think about "correct, acceptable, standard ways" to do things. Personal model refers to the teachers who believe in teaching by personal example, and establish a prototype for how to think and behave; this particular type of teacher guides and encourages their students. Finally, the teachers who are delegators do not put a large amount of effort into interactions with students within the classroom, yet they serve as true information providers, share the educational materials with the students, caring about their possibility to work to a greater extent independently, meet the deadlines, and work autonomously. All the mentioned teaching styles were utilized within this research as the basis. Taking into consideration the meaning of the presented teaching styles, the main objective of this research was to identify the teaching styles which have the supportive role for STEM students in the EMI educational setting.

The research questions of this study were about what the STEM teachers' perceptions of teaching styles in EMI are; how STEM students' perceptions of EMI differ across different teaching styles; what specific aspects of different teaching styles that STEM students find most supportive or least supportive in EMI settings. In order to answer these questions, the study used a mixed methods approach with the row of semi-structured interviews and the questionnaire. The

first stage of the study was the interview part, where STEM teachers were the participants. The objective of the qualitative part of this research was to establish what STEM teachers' teaching styles are - from this concrete context, presented in the study, - and what are the teachers' perceptions, after which the second part, the quantitative part, has been started. Within the quantitative part, the questionnaires were sent to the STEM students. STEM students answered the questions about the teaching styles preferred by them in the EMI context, and answered whether they think that EMI system can influence their progress of studying. To summarize, after the first part of the research it was revealed that the most preferred teaching styles by STEM teachers were facilitator, expert, personal model and delegator. After the analysis of the answers received from the questionnaire, which was answered by 40 participants, all the teachers' four teaching styles were found to be to some extent appropriate, yet facilitator style was explored to be the most supportive teaching style, according to the results; while delegator teaching style was observed to be the least supportive one. Furthermore, it is significant to remark that the digital nominations of the STEM students who support the mentioned teaching styles, were relatively close to each other, which means that all the four suggested teaching styles - facilitator, delegator, expert, personal model - can appear appropriate in EMI context, STEM disciplines. Yet, comparing two opposite varying teaching styles, it can be concluded that the difference between the facilitator and delegator teaching styles is dramatic. The obtained results have some similarities with the results of previous studies: Ahmed et al. (2021) delivered that Formal Authority, Personal model, Delegator and Facilitator teachers' style were the most preferred teaching styles. The formal authority style, which is about teacher's perspectives about being holding the status as a faculty member, was not selected by any of five STEM teachers within the qualitative part of this research, which means, in the context which was considered in this

particular study, STEM teachers do not find it suitable for them to keep the status in their classroom using the role of faculty member, and implementing some regulations. Appropriate, STEM instructors from the current EMI context do not appreciate, when the “standard” ways how to do the things are taught to their learning audience. Secondly, also, in contrast with the study conducted by Ahmed et. al (2021), in this research delegator style did not benefit, demonstrating relatively low ratings. The result was opposite - the facilitator teaching style benefited; STEM students showed their positive attitudes towards being in contact with their instructors during the lessons, and receiving the oral guidance, directing questions, and other rather student-oriented tasks. Therefore, it can be concluded that STEM students find it supportive, if teachers include more interactions within the class, increase the amount of guidance by questions and discussions, and, admittedly, if the lessons are more student-centered. Such styles as expert and facilitator can enable teachers to scaffold content while addressing the linguistic challenges. Since expert teaching style refers to the teacher's motives to promote the knowledge together with assessing students' level of knowing the theory well, it can also be summarized that a share of students is prepared to be demonstrated with the high level of teacher's experiences; it can be perceived totally positively. STEM teachers can build lessons according to their students' will to learn by their knowledge and guidings. It also can be theorized that, taking into account the fact that the majority of STEM students confirmed with their answers that EMI system can be perceived differently, depending on their teachers' teaching styles, yet parallely remarking on not a high contrast considering the choice of the appropriate teaching style within EMI context, STEM students would like to, to some extent, experience the individual approach from the teacher's side, if it was possible. Everybody is individual, and every learner has their own learning needs. It is complicated enough to establish

one teaching style which will support the dominant share of students in one particular context. Therefore, by the qualitative part of the study it was concluded that a teacher's teaching style indeed can influence STEM students' perceptions of the discipline, and, furthermore, it is not excluded, of the EMI system itself. It can be recommended for the teachers to experiment with their teaching styles, searching for the teaching style which is appropriate for both sides: students and themselves. In addition, since the facilitator teaching style was found to be preferred by two STEM teachers (out of five) and the majority of STEM students in this particular case, it can be recommended for STEM teachers to interact with the learning audience more during the lesson, direct them by guiding questions and discussions, thus building the connection with STEM students. By some STEM teachers it was also recommended to consider students' learning needs, the fact that technical terminology can be complicated in EMI context, and, possibly, introduce the EMI system to students step by step, thus establishing to a greater extent smooth transition. Moreover, besides the teaching styles playing an integral role in teaching, some additional recommendations towards the teaching strategies were provided by the STEM teachers. Since studying in an EMI classroom is a complicated process, students may request teachers to take into account their language possibilities, as well. Admittedly, studying STEM subjects in English, when English is not the first language of the majority, can add more challenges, yet some teachers mentioned about the translanguaging using, the utilization of keywords with their synonyms and antonyms, and other strategies which may support in EMI classroom in terms of language knowledge. STEM students have their own individual needs, and STEM teachers have their particular teaching styles, not importantly, whether the teaching styles were classified or accurately named. Support in EMI setting for STEM students should be predominant. Using some creative ways to teach, using the digital platforms, collaborations - if needed, - can appear

effective for them. Every teaching style can be effective; the main objective is to remember that the preferences of the students can, additionally, be different; therefore, it is recommended for STEM teachers to take into consideration what learning needs their concrete learning audience has, meet the expectations, if it is possible, and demonstrate the level of support.

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## Appendix A

### Interview questions

- 1) Do you assist your students, in order to ease their studying process in the EMI context?
- 2) What teaching styles do you know?
- 3) Do you have your specific teaching style?

(Choose the teaching style, which is the closest to you, please). The teaching styles were taken from Grasha (1994).

—Expert. You try to keep status as an expert among students by showing detailed knowledge and by challenging students to increase their competence. You care much about providing information to students and ensure that your students are well-prepared.

—Formal authority. You keep status because of knowledge and the role of a faculty member. You care much about providing positive and negative feedback, establishing learning goals, expectations and rules. You think about "correct, acceptable, standard ways" to do things.

—Personal model. You believe in "teaching by personal example" and establish a prototype for how to think and behave. You guide, encourage your students, and try to inspire them.

—Facilitator. You see yourself in teacher-student interactions, guiding students by asking questions, exploring options, suggesting alternatives, encouraging students to develop criteria to make informed choices. Your goal is to help your students to work independently and with responsibility.

—Delegator. You develop students' possibilities to work themselves. Students work independently on their projects or as a part of their teams. You, as a teacher, consult them sometimes and share the resources.

- 4) How can your teaching style influence students' study in the EMI setting?
- 5) What teaching styles would you like to try in your further teaching process?

## Appendix B

### Questionnaire questions

Do you think certain teaching styles can affect your success in learning your disciplines in English?

yes, definitely

rather yes

maybe yes

maybe no

rather no

certainly no

Do you believe that a teacher's style can make your learning easier or more difficult in EMI?

yes, definitely

rather yes

maybe yes

maybe no

rather no

certainly no

What characterizes you more, as a student in EMI?

I like to work independently. I like to work alone or in teams, and like my teachers to consult with us and share the resources.

I like, when my teacher interacts with us, guides us by asking questions, suggests alternatives, and directs us to work independently this way.

I like when my teacher shows us detailed knowledge in our area, and challenges us to become better in this competence. I like my teacher to care more about the information we are given.

I like to be inspired by my teacher to work and study in this area. I like, when my teacher is the "example" of how to improve the skills, teaches by personal example, and motivates us.

Do you believe that being motivated by your teacher is a key moment in your studying progress?

yes, definitely

rather yes

maybe yes

maybe no

rather no

certainly no

Do you like, when your teacher keeps a status in the classroom by showing the level of knowledge?

yes, definitely

rather yes

maybe yes

maybe no

rather no

certainly no

How would you like your teacher to help you to overcome difficulties in learning in English?

(select all that apply)

by encouraging us to work further, showing the alive prototype how to think and make things better

by in-class interactions and on-time instructions

by providing the resources, consultations and space to work alone or in teams

by guiding us by discussions or exploring options

by checking how prepared we are; whether we have enough knowledge

by telling some personal stories connected to work

by giving us the information, instructions, deadlines, so we can learn ourselves

by being and expert in our sphere, and we get knowledge from the professional

Is it supportive, when your teacher assists you less but provides more needed materials on the platform? (books, slides, sites, etc)

yes, definitely

rather yes

maybe yes

maybe no

rather no

certainly no

Do you think that it is helpful, when your teacher interacts with the class much during the lessons?

yes, definitely

rather yes

maybe yes

maybe no

rather no

certainly no

Do you feel the difference in understanding the subjects because of the teachers using different teaching styles?

yes, definitely

rather yes

maybe yes

maybe no

rather no

certainly no

## **Appendix C**

### **Consent letter**

Consent Form for volunteers' participation in a research study entitled as **“Perceptions of the STEM students of English Medium Instructions based on lecturers' teaching styles”**.

This study is being conducted as a part of a mixed research study for SDU University.

#### **Dear Participant,**

You are invited to contribute to this study. Thank you in advance for taking the time to read this information leaflet. Please, answer some interview questions in the format which is convenient for you.

**Purpose:** The purpose of this study is to investigate STEM students' perceptions of English Medium Instruction (EMI) in relation to various teaching styles and identify the factors which can influence students' perceptions. It aims to answer the questions, whether STEM students' perceptions of EMI differ across different teaching styles, and what are the specific aspects of different teaching styles that STEM students find most supportive or least supportive in EMI settings. The study can possibly provide some new recommendations for both teachers and students.

**Participant Selection:** You were selected as a possible participant in this study because of your studying experience facing English-Medium Instructions. The interview will be completed by the master degree student. Your participation would be greatly appreciated.

Please note that there are no right or wrong answers. I am interested in your personal opinion, and would like to request that you answer honestly.

**Confidentiality:** Any information obtained for this study through which you might be identified will remain confidential and will be disclosed only with your permission. Your answers will be anonymized in the reporting of the results. Raw data will be maintained in a secure location and no identifying information will be used in the final dissertation or subsequent publications. No one, other than my supervisor, will have access to the raw data. All audio recordings, video recordings, and other documents, with the exception of the consent forms, will not be shared with any third party at the conclusion of this study.

**Refusal/Withdrawal:** Participation in this study is entirely voluntary. If you decide to participate, it will not affect your future relations with SDU University. Furthermore, you are free to withdraw from the study at any time without any further commitments.

**Contact:** If you have any questions about this study, you can contact me, Primary Researcher:  
Nam Yekaterina.

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