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**MULTIDISCIPLINARY AND COLLABORATIVE RESEARCH
PROJECTS TO IMPROVE STUDENTS' WRITING SKILLS IN
ENGLISH FOR GRADE 9**

DIPLOMA PAPER

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**STARPPRIEKŠMETU UN SAVSTARPĒJĀS SADARBĪBAS PROJEKTI
ANĢĻU VALODAS RAKSTĪŠANAS PRASMJU PILNVEIDEI 9. KLASĒ**

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DECLARATION OF ACADEMIC INTEGRITY

I declare that this study is my own and does not contain any unacknowledged work from any source.

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ABSTRACT

With the beginning of a new school year, a gradual implementation of a new curriculum has become one of the most important topics that were talked about. The aim of the project Skola2030 was to develop in pupils several important 21st century skills, and to focus on a more in-depth understanding of school subjects rather than fragmental. During the year 2020, pupils were on distance learning; and it was challenging to develop writing skills in the English language lessons. Therefore, a multidisciplinary and collaborative approach was chosen to explore how multidisciplinary and collaborative research projects can help to improve students' writing skills in English for Grade 9.

A case study was conducted involving 14 pupils from Grade 9, 7 different subject teachers, and Grade 12 pupils. In order to gain an understanding on the topic, the following data collection methods were in use: a questionnaire to Grade 9 pupils, focus group discussions to the subject teachers, observations of the lessons, and analysis of the research project.

The results prove that pupils found the research project useful and with purposeful and thorough planning it is possible to implement it into the curriculum with the means to improve pupils' writing skills in the English language lessons.

Keywords: multidisciplinary, research project, writing skills, 21st century skills, collaboration.

ANOTĀCIJA

Sākoties jaunajam mācību gadam, pakāpeniska jaunā mācību satura ieviešana ir kļuvusi par vienu no svarīgākajām sarunu tēmām skolās. Projekta Skola2030 mērķis bija attīstīt skolēniem vairākas svarīgas 21. gadsimta prasmes, kā arī koncentrēt uzmanību uz mācību priekšmetu padziļinātu izpratni un padziļināti izprast mācību vielu nevis sadrumstaloti. 2020./2021. mācību gadu skolēni pavadīja attālināti, un tas sagādāja grūtības attīstīt rakstīšanas prasmes angļu valodas mācību stundās. Tāpēc tika izvēlēta daudznozaru un savstarpējās sadarbības pieeja, lai attīstītu visas nepieciešamās prasmes.

Tika veikts gadījuma pētījums, kurā piedalījās 14 skolēni no 9. klases, 7 dažādu mācību priekšmetu skolotāji un 12. klašu skolēni. Lai gūtu izpratni par šo tematu, tika izmantotas šādas datu vākšanas un analīzes metodes: anketa 9. klašu skolēniem, fokuss grupas diskusija mācību priekšmetu skolotājiem, mācību stundu novērošana, projekta analīze.

Rezultāti liecina, ka skolēni ir atzinuši sadarbības projektu par lietderīgu un jēgpilnu. Mērķtiecīgi un rūpīgi plānojot šāda veida projektus, tos ir iespējams veiksmīgi ieviest mācību saturā.

Atslēgas vārdi: starpnozares, pētnieciskais darbs, rakstīšanas prasmes, 21.gadsimta prasmes, sadarbība.

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INTRODUCTION

The theme of the Diploma Paper is “Multidisciplinary and Collaborative Research Projects to Improve Students' Writing Skills in English for Grade 9.” The importance of this topic lies in the development and acquisition of the new curriculum, according to the project “Skola2030”. Moreover, the project Skola2030 is trying to eliminate the overlapping of the themes being taught during the school year, focusing more on an in-depth understanding of the subject rather than fragmental. In order to achieve this goal, schools have to put emphasis on the development of learners’ research skills, which can be obtained in the regular school setting through purposeful multidisciplinary and collaborative cooperation between teachers, subjects, and pupils. Skola2030 states that their main purpose is to develop in students’ multiple skills such as critical thinking and problem-solving; creativity and entrepreneurship; self-directed learning; cooperation; civic participation; digital skills (*Par projektu*, 2021). In the author’s opinion, through thoroughly planned research projects in schools, all these skills could be acquired. Research projects at secondary schools are widely used, therefore prominence has to be put on the pupils in the elementary school setting by preparing them for the secondary school. Also, multidisciplinary and collaborative research projects can be useful for teachers when teaching the new curriculum, the reason that pupils could be engaged in more than one subject at a time.

With the distance learning taking place throughout the school year of 2020/2021, one of the most difficult skills to develop in the English language lessons were writing skills due to the fact that most of the English language lessons took part in an online environment and it was challenging for pupils to compile coherent texts without their teacher being able to monitor them during the writing process and guide them. This observation was made by the author of the Diploma Paper while being employed as a full-time English teacher in one of the Riga’s State schools. Furthermore, according to the new curriculum, pupils are meant to explore the learning journey of the foreign language on their own, and the more pupils will be exposed to that language, the sooner they learn it. Also, self-guided learning provides pupils with the opportunity to enrich their vocabulary and grammatical structures. The newly implemented curriculum draws attention to the development of written text – drafting, receiving feedback from teacher and classmates, enhancing the written text if necessary and submitting it for review. A process of learning by revealing more information on their own is a gradual process, however, that way a more in-depth learning takes place. The acquired knowledge therefore remains in memory for longer and is associated with its practical application (*Angļu valoda*

(*pirmā svešvaloda*), n.d.). Thus, while working on their research project, pupils are going to acquire multiple skills which are needed to be developed by the 9th grade, one of them being writing skills in the English language.

The **aim** of the Diploma Paper is to explore how multidisciplinary and collaborative research projects can help to improve students' writing skills in English for Grade 9.

The **objectives** of the Diploma Paper are as follows:

1. To study literature on multidisciplinary approach, the new curriculum and writing skills in the English language;
2. To explore the pupils' opinions and views on the multidisciplinary and collaborative research projects;
3. To engage other subject teachers in the development of multidisciplinary projects;
4. To help to develop students' writing skills in the English language lessons in Grade 9 and replicate the defense of the Scientific Research Paper (Zinātniskās pētniecības darbs).

The **research questions** of the Diploma Paper are as follows:

1. How to develop of students' writing skills in English;
2. What the multidisciplinary and collaborative skills are and what their role in school curriculum is;
3. How multidisciplinary and collaborative research projects have helped to improve students' writing skills in English for Grade 9.

The author of the Diploma Paper chose a case study as the **method of research** in order to gain empirical knowledge about the topic. The research was carried out in Grade 9 in one of state grammar schools in Riga, from January to February 2021.

Data collection methods are the following:

1. Questionnaire to Grade 9 and 12 pupils with the aim to reveal their opinion on the participation in the multidisciplinary and collaborative project;
2. Discussion with the teachers with the aim to engage the subject teachers in the multidisciplinary project;
3. Video recordings and analysis of mock- defense sessions in Grade 9 to understand how effective the research project was;
4. Questionnaire to Grade 9 pupils with the aim to gather their opinion on the pros and cons of the finished project;

5. Analysis of pupils' written research papers in the English language to gain an understanding whether pupils were able to follow the conventions and had improved their writing skills in English.

Outline of chapters:

Chapter 1 describes the development and importance of writing skills in the English language lessons.

Chapter 2 focuses on the role of research projects in schools, and how to establish the concept of multidisciplinary and collaborative skills.

Chapter 3 presents the gathered data from (1) questionnaire to the learners, (2) discussion with the subject teachers, (3) video recordings analysis of mock-defense of multidisciplinary and collaborative research project, (4) analysis of the pupils' written research papers.

In the appendices there are enclosed the samples of the used data collection methods: questionnaires, pupils' self-reflection sheet, example of pupil's completed research project and PowerPoint presentation, the evaluation rubric.

1. THE IMPORTANCE OF DEVELOPING WRITING SKILLS

Writing is an essential skill in the English language. Since Writing incorporates many different characteristics, it appears to be the most challenging skill for English language learners (ELLs) to master. ELLs have the easiest time with listening and reading, while the more productive speaking and writing skills are the most challenging. These two skills need a lot of practice, so students will have to put in a lot of work to perfect them. Teachers must devise new methods of teaching these skills as a result. In the last few decades, writing ability has evolved and changed considerably. According to Pratiwi (2020), "Writing is a relatively recent phenomenon in the evolution of both men and women." Over 5,500 years ago, some of the earliest writing knowledge was uncovered. "To express a message in the early ages, people employed numerous methods and artworks to depict many aspects of their daily lives. Because of this, they used images and figures to convey their messages.

According to Illemann (2011), "human people began writing about 20,000 to 25,000 years ago." According to Luka & Seniut (2019), ancient cultures used pictograms to represent a wide variety of symbols. As an example, the symbol depicts the sun. They have become ideograms, and they have had a significant impact on writing systems. Word-writing was the final stage of the writing process, which began with picture-writing (pictograms). Writing systems of the period were closely adhered to by the Sumerians. The alphabet was introduced into the Sinaitic language between 1700 and 1500 B.C., replacing pictographs. When Tien-Lcheu, a Chinese scholar, invented ink and paper in 2697, Writing became a lot more common.

The Meaning of the Word Writing

The ability to write in the English language is considered more challenging than the other three skills that need to be obtained, them being speaking, reading and listening skills. A clear and meaningful message is challenging to convey in Writing because of its complexity. Writing is a difficult task when it comes to spelling, vocabulary, grammar, meaning, sentence structure, and other factors. Because of this, English terminology's spelling and pronunciation do not always match. Written language is a visual depiction of symbols, such as letters. ELLs need to understand the English language's grammatical structure and how to use relevant terminology while writing in English. Writing is a way to record words with visual aids. It also says that "writing as a communication activity must be encouraged and nurtured during the language learning process", Rao (2019). It is important to remember that it is essential to keep

in mind. There are many complex operations that go into Writing. These operations include writing a draft, reviewing it, and then making changes accordingly.

Writing is the Most Challenging Skill in the World to Master

Writing is more difficult for pupils who learn the English language than the other skills they are working on. For reasons related to its morphological, semantic and syntactic complexity of the English language. Many academics have spoken out about how difficult it is for students to write. It appears that writing in a foreign language (F.L.) is the most challenging skill for students who are learning a second (L2) or first (L1) language, says (Kida, 1984). "Learning to write in a first or second language is one of the most difficult tasks that students face, and few can claim to have truly mastered it,(Defazio et al., 2013) argues. "Writing is a complex process for each language user that requires mastery of a variety of talents that contribute to the overall complexity of Writing," (Kroll, 2011) argues. As a result, mastering the art of Writing is both a difficult and a challenging endeavor. Regardless of whether the pupils are native English speakers, second-language or foreign language learners, writers have a daunting task: mastering the art of writing.

The Classification of Writing

To master writing skills, several sub-skills must be mastered. A distinction between utilitarian and creative writing was made by Asgary (2018). It is important to remember that functional writing includes everything from letters and reports to memos and book reviews. Moreover, the ability to generate information into new texts, such as argumentation or explanation, drives creative Writing. Creative Writing was the primary subject of Asgary's research because he wanted to discover how difficult it is for pupils to improve their writing skills in English.

Moochi et al. (2013) also separated the writing abilities needed for practical and creative purposes into two distinct categories: *basic* and *advanced*. Their definition of basic abilities is punctuation and precise spelling, while more advanced skills include flawless grammar, a well-structured cognitive process, and the ability to express oneself creatively. According to their findings, students in a foreign language classroom have the most difficulty mastering the skill of writing. As Hero & Lindfors (2019) note, "a well-written essay focuses on the topic and has an organizational pattern that helps a reader to follow the flow of ideas." Proper vocabulary and examples that strictly conform to the pacts of the standard English language, such as capitalization, accurate spelling, and sentence structure, are also included as supporting concepts.

It Is a Great Way to Learn New Things

Writing can also help pupils gain a greater depth of understanding. If pupils intend to write well, they must first read at a reasonable level. Also, Writing necessitates a significant amount of *research*, the vast majority of which is done on topics pupils have no prior knowledge of and may not even be aware of. As pupils continue writing and performing research, they are expanding their knowledge and developing incredible memory.

Academic English Writing: Its Importance

For pupils' personal development and academic success, Defazio et al., (2013) state that "writing is considered the most significant language skill." According to Rao (2019), "Writing enhances pupils' ability to study, think, and reflect on the English language." "Kids who are proficient writers do better in school" Luka & Seniut (2019) states. Additionally, pupils who excel in English writing will have an advantage over their peers when working as researchers or professionals in the future. For English learners of all levels, the most challenging part of the language is learning how to write well. Learning to write in a language such as English, which has a high level of complexity in spelling, pronunciation, sentence structure, and contextual meaning is extremely important for pupils at all educational levels. As a result, most pupils' grades are determined purely by their performance on tests and exams. English teachers must aid their students in mastering all of the skills essential to improve their writing talents the reason is that Writing is the most critical skill for ELLs to learn in their academic careers. Teachers must help their ELL pupils to express themselves in the classroom to write down their thoughts and ideas when doing any work.

Kroll (2011) argues that improving pupils' writing skills have both academic and social implications. English Language Learners that are guided by their teachers correctly are more likely to be successful in writing assignments. The teachers are most adept at encouraging their pupils to think creatively who can inspire their students to produce precise, logical, and coherent Writing. Because of their proficiency in Writing, English language learners (ELLs) are well-positioned for future professional success.

The Effects of the Internet on Writing Skills

The influence of the Internet is one of several dramatic shifts brought on by the period of globalization. To be a successful information gatherer, one needs to be fluent in English, the primary language on the Internet. Students can also learn how to compose various kinds of notes, phone calls, and business letters, all of which can be found online. Unfortunately, many

English language learners still fail to recognize the importance of good writing and cannot cope with the existing system of assessing writing abilities.

It is safe to admit that the Internet has had a significant impact on the English language. Students who struggle with English as a foreign language (EFL) no longer have to leave the comfort of their homes to look up definitions, synonyms, and antonyms. Many countries with a high literacy level have also been found to benefit from the Internet. Student's ability to write fluently in English improves when they become comfortable with the Internet. In addition, tens of thousands of new words have been coined due to the growth of the Internet. Terms like "selfie," "salty," "fleek," "catfish," "hashtag," "throwing shade," "rickrolling," and more are on top of the list. This means that a significant amount of online communication can be categorized as slang or jargon. The ability of English language learners (ELLs) to understand dialects from various geographical places and countries is another benefit of the Internet when it comes to enhancing their English proficiency. As an added benefit for English language learners (ELLs), the internet helps them learn new grammar instead of deteriorating their existing proficiency in the English language.

As a consequence of the use of the Internet, many pupils now use their smartphones to download and use apps. Because of this, children can use their phones on their own and get answers to their questions without the assistance of teachers. However, when it comes to writing tasks, they turn to tools like Grammarly to help them avoid common grammatical errors. Pupils can use Grammarly to verify their writing for errors and plagiarism for a bit of fee. Grammarly uses over 250 grammatical structures to proofread a Piece of Writing thoroughly. In addition to helping students improve their grammar, Grammarly can also check for and repair their own mistakes. By using the Grammarly app, ELLs can improve their English writing abilities.

Teachers' Contribution to the Growth of ELLs' Writing Skills Setting

In light of the preceding facts, pupils' evaluations of writing projects offer both teachers and pupils possibilities for teaching-learning information. The majority of children have difficulty getting started with writing, thus teachers must pay greater attention to their pupils' writing skills. First, teachers need to assess their students' abilities and then use relevant teaching methods to assist them to improve their writing. They also need to select assignments that are familiar to ELLs and that excite the learners' attention. When students are working in groups, teachers should also grade these projects on a scale of simple to complex and supervise their work to ensure it is done correctly.

For the reason, English is taught as a foreign or second language in non-native English-speaking nations, teachers play an essential role in applying various writing styles to ELL

students. As Writing is considered the most difficult of the four language skills, ELLs have a more complex challenge when writing. Learning these rules can be difficult for English language learners (ELLs) because they have to deal with phonological and syntactic features. It takes a lot of work and proficiency to become proficient in English writing. Therefore, ELLs must devote more time and effort to improving their writing abilities. The upshot is that Writing becomes more accessible for pupils, and they learn it more enthusiastically, which possibly could lead to higher academic achievements.

Teachers should be mindful of their pupils' writing issues, as it is the most challenging and complex skill for ELLs to learn. Moreover, writing to transmit a special message in time and place is an art form that requires purposeful effort and language diversity (Du Toit et al., 2012). Since Writing is a more difficult talent for children to master, teachers can encourage ELLs to participate in writing activities by providing intriguing topics. English as a second or foreign language teachers must stay current on the newest innovations in writing education to deliver the best possible training to their students. It is noticed that English language learners (ELLs) often struggle to overcome this obstacle due to the multiple components that contribute to the development of English writing skills. Due to its complexity, many students develop an aversion to it and spend only a short period learning about it. After going over the titles with them, the most excellent method to get children enthused about writing is to present fascinating and topical subjects.

Many ELLs do not have time to write, says Nemickienė (2015). As far as his research goes, adults spend 45 percent of their time listening and 30 percent of their time talking. They also spend 16 percent of their time reading and 9 percent writing. Adult learners spend only 9% of their time writing, according to a graph illustrating their time spent listening, reading, and speaking. It demonstrates the level of anxiety experienced by many persons while attempting to write in English. ELLs all experience the same level of stress, which impairs their concentration and makes them more prone to distraction. As a result, it is understandable why ELLs are required to acquire an extensive vocabulary and a variety of grammatical structures when their primary concentration is on Writing. As a result, students should spend more time and effort honing their writing skills to solve this issue. It is critical for English language teachers in ELL classrooms to place a premium on writing talents, which can be accomplished by selecting a variety of more engaging topics for students.

To make writing more understandable for students studying English as a second or foreign language, it is necessary to leverage recent advances in writing instruction. As a result, students studying English language learners (ELLs) should put in more time and effort to

improve their writing abilities. Furthermore, teachers may encourage English language learners (ELLs) to collaborate on writing assignments with their peers to feel more invested in their work.

According to the European Institutes for Research, more than half of two- and four-year college graduates lacked basic skills such as reading and following simple instructions or managing a checkbook (Du Toit et al., 2012). In addition, students are held responsible for their writing abilities, particularly in academic writing. There are many reasons for children's writing difficulties, but one thing is sure (Pham, 2021).

Students' worries about developing superior writing skills during undergraduate and graduate studies have been well documented. Furthermore, children with learning disabilities can benefit from using computers for purposes other than word processing (Ekundayo et al., 2021). Spell checkers, speech synthesis, word prediction, and grammar and style checks have all been shown to be practical tools for improving writing skills. According to Nasir et al., (2013), "Many writing problems can occur as a result of insufficient time spent on writing instruction or as a result of writing instruction that is not suited to the learning needs of a diverse set of pupils." There were ideas for teaching writing to a wide range of children, including learning disabilities. They show how significant concepts, approaches, scaffolding, and review are used in their research.

One of the most common issues in student writing is a lack of competency in executing and managing the procedures required for efficient authoring, planning, and editing. The ability to reflect on one's own and other people's work is critical to becoming a great writer. Pratiwi (2020), argues that reflective writing is critical in professional programs to teach problem-solving. "Effective communication has been identified as a requirement for participation in the examined professions" (Kalipa, 2011).

Another study found that there was a formal emphasis on writing practice in higher education that was unrelated to the subject matter being taught. The National Commission on Writing in European Colleges and Schools, chaired by (Troia 2014), backs up this claim. They emphasized, for example, how peer reviews could free up teachers' time to focus on other aspects of writing by relieving them of writing responsibilities (Cornelius-White, 2007).

Rather than needing to connect seemingly unrelated concepts, learning in a **multidisciplinary** context can assist pupils in better integrating new information. It enables pupils to recognize the actual connections between the issues rather than treating them independently. Experts from various professions collaborate with parents and children to deliver an evidence-based educational program that is personalized to each student's individual

needs while also providing access to the standard curriculum. This phrase can be applied in various ways, including curriculum integration approaches that emphasize the distinct perspectives of several disciplines on a given subject, theme, or problem. Multiple disciplines are brought together in a **multidisciplinary** curriculum to examine the same subject from various perspectives. One of the main goals of the newly implemented curriculum in Latvia is to focus on a multidisciplinary teaching approach, it is believed that pupils will benefit from it by eliminating the fragmentation of the information that pupils obtain in different subjects.

The key goals of this curriculum are to increase student knowledge and productivity. Children must be introduced to the connections between many disciplines throughout the curriculum.

2. MULTIDISCIPLINARY AND COLLABORATIVE APPROACH

In Latvia, the new curriculum and the new approach were gradually introduced starting 1st, September 2020. It started with grades 1, 4, 7, and 10. The aim of the changes to the curriculum was to teach the necessary skills of the 21st century to the pupils (Doe, 2017). Moreover, due to the pandemic most of the school year was spent on the distance learning which accelerated the implementation of the self-directed learning skill. Self-directed learning skills are important the reason that they develop a greater willingness and motivation for learning; These skills help to strengthen previously obtained knowledge. The pupil is aware of their strengths and weaknesses and of the fact that errors are an integral part of the learning process, which makes it possible to understand what can be done differently at the next time (Caurviju prasmes, 2019).

In-depth Knowledge of the Subject

Pupils gain a deeper grasp of the world around them through multidisciplinary education. Rather than examining different departments and their subject areas independently, a multidisciplinary approach integrates each department into the study curricula of the others. Moreover, a multidisciplinary approach to education could also include more collaboration among pupils such as working in groups. Firstly, it is important to note that when implementing group work in the classroom, it has to be justified. The teacher has to evaluate whether this method is necessary. Group work helps with development of such important skills as collaboration and communication, also an active exchange of opinions takes place when group work is supervised. However, it is important to remember while group work is a great tool when used accordingly, it also can cause problems the reason is that each pupil is an individual with their own personality (Purēns, 2019, p. 26)

A Prudent Approach

Learning in a multidisciplinary environment is more than an educational philosophy. When pupils graduate, they will be surrounded by people from all walks of life, so why should school be different? Moreover, connecting and interacting with people from diverse backgrounds will benefit their future careers.

Collaboration as the Necessary Skill

It is hoped that the educational path a pupil chooses emphasizes the value of collaboration. However, one of the most fundamental benefits of a multidisciplinary curriculum is the notion of collaboration to create a greater whole. The capacity for efficient interaction

with people from diverse backgrounds is a prerequisite for multidisciplinary learning. By developing the understanding in pupils about different backgrounds, pupils will be able to analyze why others do what they do, have comparable beliefs, and share an understanding of their reasons. These skillsets will aid pupils in making connections, resolving complex problems, and effectively cooperating with their future colleagues.

The benefits of educating children in a variety of topic areas are self-evident. By combining themes, some of the world's brightest minds could be attracted. Collaborating with diverse backgrounds enables pupils to learn more harmoniously and integrated. The rarity of transdisciplinary education programs is one of its distinguishing characteristics.

The Importance of Researching in the Classroom

The importance of research in our schools is a critical phenomenon. While research should be recognized by managers, practitioners, and legislators, it is often misinterpreted as an academic activity carried out by someone else. It is the belief that teachers are continuously learning, conducting research, altering their behavior in reaction to new information, and exploring new methods to improve. It does not matter if they call it research or not. However, everyone needs to think about what schooling might be like without the benefit of discoveries. What would education be like if it didn't rely on empirical evidence and research? A lack of research can lead to one or more of the following: dogma, ideology, convenience, or bias in education. Also, both teachers and pupils should be able to distinguish the quality of sources they see and use to justify their opinions.

Pupils should be enlightened via education, and education should promote democracy and opportunity for everyone. The same holds for sticking to a particular philosophy. Teachers have a moral obligation to instill a sense of social responsibility in their students. In the truest sense, education is all about expanding one's horizons, not restricting one's choices. To put it another way, relying solely on our own learning experiences puts education at risk of becoming obsolete and ineffectual. Theories come and go, and no one theory can be relied upon to stand alone. The relationship between students and learning is nuanced. Their progress is influenced by various factors, including their family and social backgrounds, age, gender, and even their geographic location. Theories must be combined, analyzed, and questioned to allow us to adapt to our local and personal circumstances. The author believes that a teacher's job is to keep their pupils occupied, under control, and even amused. Learning new concepts and ways of acting is difficult, thus teaching and learning should not be based solely on convenience. Before the

teacher can successfully teach about research projects at school to their pupils, they themselves need to be educated on the subject.

All of the above can be questioned through research, and morally sound decisions can be made. A study by Hine (2013), found that research can help teachers and pupils better understand what works, why, and how their decisions and actions would affect their activities' long and short-term consequences. Collaborative knowledge building aims to improve schools rather than the other way around. This is because some teachers believe that this is the only way to tell whether or not a change is genuine. In researching the topic, several measures must be taken: (Kapur, 2018a). Firstly, the teachers themselves need to collect data on various teaching methods, classroom conditions, and pupils' learning abilities. Discovering knowledge gaps is easier using this strategy. This knowledge is obtained by their own experience, observation, and *analysis of relevant literature*.

Developing Hypotheses – Then, when introducing pupils to multidisciplinary research projects, pupils need to be taught that the majority of research attempts begin with formulating hypotheses. If the researcher cannot create a hypothesis, they may suggest relevant research questions to investigate. Next, researchers collect and analyze data to elucidate a set of research questions or hypotheses. Finally, the researcher utilizes methods and procedures to assess anxiety and other variables and students' academic achievement. Pupils need to be taught that academic accomplishment and the factors affecting it can be quantified in various ways. Among the numerous resources accessible, printed works such as books and articles are included, as are electronic resources such as websites and in-person gatherings. On-field trips, data are collected from groups of children. Interviews or survey questionnaires can be used to collect data. After reviewing the data and conducting the hypothesis test, researchers must interpret their findings. Conclusions are drawn based on the data gathered. When presenting their findings to the audience, the researcher should thank everyone who helped during the research process, including those who built tools, collected data, analyzed it, or helped write the report. In addition, people who helped with the research should be thanked, especially those in charge of overseeing it.

Another point worth mentioning is that pupils need to be taught that in their role of being a researcher, they need to guarantee the confidentiality of the information they collect from participants. No individual data will be released; only statistics as a whole will be made public. When asked for their thoughts, respondents may be reluctant to divulge any personal information about themselves. Respondents are more inclined to participate in a study if they

know its background and purpose. The author of the Diploma Paper believes that pupils need to grasp the basic understanding of how to come up with an effective strategy.

2.1. STRATEGIES AND METHODS FOR THE DEVELOPMENT OF THE COMPETENCIES

With the implementation of the new curriculum, pupils need to be taught how to choose a correct strategy for their own academic success. With the correct guidance, pupils should be able to follow the structure of the important parts of their learning journey (see Table 2.2)

Table 2.2 Structure of the Successfully Chosen Strategy



1. Setting the aim. Pupils choose what is the aim of the task that needs to be completed, they have to try to understand why it is important to complete the said objective, and how to evaluate themselves to see whether they understood the task completely.

2. Analysis of the situation. During this step, pupils need to evaluate the available resources they might have, such as time and their ability to complete the task successfully.

3. Methods. With the understanding of the available resources to complete the task, pupils set on to find the best methods that would suit their learning style.

4. Action. Considering all the previous points, the pupil is ready to take action and participate in the task.

5. Self-evaluation. After completing the task, pupils are to evaluate themselves. Pupils need to reflect whether they were able to fulfill all of the objectives set in the first step of their chosen strategy and could be improved or worked on.

Another point worth mentioning is that with the implementation of the new curriculum and the new approach, the teacher should be able to understand that it is solely pupil's own responsibility to learn about their own ways of learning, while completion of each step of the

strategy can be guided with the help of the teacher, the teacher needs to allow their pupils work on their own. Only by allowing them to choose, pupils can learn about themselves as learners.

The main focus in the new curriculum is on the development of the following: 1. thinking and creativity skills, 2. digital literacy skills, 3. collaboration and participation skills, and 4. self-directed learning (Purēns, 2019, p. 46). As stated previously, due to the pandemic all the pupils were sent to work from home which made it challenging to acquire all of the necessary skills. However, in the author's opinion, these competencies can be developed even during the distance learning by introducing multidisciplinary and collaborative research projects to students with the aim to develop their writing skills in the English language.

2.2. COMPETENCY BASED APPROACH IN THE CURRICULUM

With the introduction of the new national curriculum, different aims to achieve have been set and schools countrywide need to adapt to those changes. Moreover, the teachers should understand not only the importance of these changes but also how to act accordingly. The significance of multidisciplinary, collaborative and transversal skills has been emphasized throughout the whole process of execution of Skola2030. As stated in educational materials that were provided by the creators of Skola2030 project, working on transversal skills includes important cognitive, convivial and social aspects of pupil activity, and by working on those skills in schools, all necessary human activities are being covered. These skills help pupils to acquire knowledge in various contexts, using different thinking and self-directed learning techniques or strategies. Also, the use of transversal skills in different areas of learning, strengthens the ability of pupils to use them independently and in a variety of situations, including complex and unpredictable ones. If a pupil has discovered how to cooperate successfully with others or, for example, to explore other pupils' opinions, the pupil will be able to do so not only in one of the subject; they are studying, but also in different areas of life and circumstances.

Furthermore, the development of transversal skills leads pupils to acquire competences, which involve knowledge of how to do something, personal qualities and attitudes, for example, with the correct attitudes from the teachers, pupils might learn the persistence of completing work. Again, these skills are interrelated, and by developing transversal skills in schools, pupils are being taught that people seldom use only one separate skill on a daily basis. An example was provided by the creators of the Skola2030, that when a pupil takes a decision to address a

daily problem that might occur, this pupil also analyses what is happening at the same time, plans their own actions, thinks about emotions, and cooperates in communicating with others. Let's imagine a schoolboy forgetting a gym outfit at home: he finds out the problem and wonders what the solutions might be, and finds out why it happened, and communicates with a teacher, classmates, or parents, to solve the situation in one way or another. Hence, both critical thinking and troubleshooting, self-directed learning, and collaborative skills are being worked together at the same time (*Kā attīstīt caurviju prasmes? Metodiskais līdzeklis skolotājiem*, n.d.).

The methodological materials that were provided by the creators of Skola2030 offer samples on how to implement these changes in schools. It was mentioned that when teaching and evaluating these transversal skills, the teachers ought to plan their lessons in the same way they would teach any other skills and attitudes.

The following instructions were provided:

- ***Explore what your pupils can already do.*** Assess the level at which your pupils' transversal skills currently are, develop the skills according to their age group and learning needs, set the next results to be achieved in your subject.

- ***Evaluate what you are already doing as a teacher to develop student skills.*** By using self-assessment tables for teachers – learn about your knowledge in each transversal skill department.

- ***Think and conclude what you can do as a teacher in the future to help to develop transversal skills in your classroom:***
 1. Creating an environment and creating learning situations that contribute to the use of these skills in your classroom;
 2. Targeting the development of the necessary skills, giving time practicing them by providing differentiated support and feedback corresponding to the needs of each individual pupil.
 3. Planning a specific learning situation and trying it in your lesson. Decide on the objectives and the results that need to be achieved.
 4. When pupils systematically practise and develop their transversal skills, their growth and achievements in a specific field are seen.

When taking all previously mentioned instructions into consideration, it is believed by the creators of the Skola2030 project that pupils will achieve great results during their learning

journey. Furthermore, by following the methodological materials provided by the creators of the Skola2030 project, the author of the Diploma Paper decided to put all of the necessary competencies to use and create a multidisciplinary and collaborative research project with the aim to improve students writing skills in the English language lessons in Grade 9.

3. CASE STUDY ON MULTIDISCIPLINARY AND COLLABORATIVE RESEARCH PROJECT TO IMPROVE STUDENTS' WRITING SKILLS IN ENGLISH IN GRADE 9

The final chapter of the Diploma Paper explores how the implementation of the multidisciplinary and collaborative research project improves students' writing skills in English for Grade 9. The outline for the project was taken from the official Scientific Research Paper (ZPD) guidelines and adapted according to the level of the language students were acquiring. Also, the guidelines of the research project were fitted to match and follow the standards of the new curriculum. Moreover, the author of the Diploma Paper was yearly involved in the defense of the Scientific Research Papers in Secondary school and by being the advisor of plentiful students it was concluded that students find the beginning stages of writing the paper challenging. Additionally, most of the observed students after graduation were planning on enrolling in the state gymnasiums, where writing a scientific research paper is mandatory, therefore, the decision was made to introduce the students to such project.

First, the author of the Diploma Paper sent out a questionnaire to the students of the ninth grade to find out about their willingness to participate in such a project (see Figure 3.1). It was important to encourage the students to participate without making it a mandatory assignment. It was explained to the students that they were going to obtain a mark for their project in more than one subject with the aim to reduce fragmentation of the learning content (*Par projektu*, 2021). Out of **17** students, **14** were eager to participate and only **3** students answered that they were not keen on partaking.

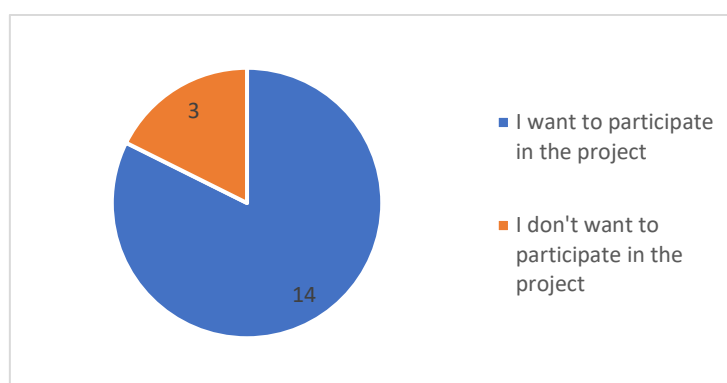


Figure 3.1 Students' Opinion on the Participation in the Project

Second, after gathering the opinions of the students, the author of the Diploma Paper set on to acknowledge which of the other subject teachers would be interested in taking a part in the multidisciplinary project. Out of 13 teachers, only 7 teachers responded. It being the biology, social studies, the Latvian language, the German language, Physical Education, the music and arts teachers.

Third, the author of the Diploma Paper, being an English language teacher, encouraged the twelfth-grade students to participate in the collaborative project, too. With the experience they had gained during their own scientific research paper defence, the students were invited to become the advisers of the ninth-grade pupils based on the field they had written their own scientific research paper in, or the field they felt informed about. Altogether, twelve pupils were keen on partaking. The role of the adviser was to help the 9th grade pupils with the questions that could arise during the research project, also to share their knowledge on how to write an academic paper, how to choose credible sources, and how to format a word document according to the provided guidelines.

Four, for a more realistic approach, the author of the Diploma Paper invited the school administration to participate in the mock-defence of the multidisciplinary and collaborative research project oral presentations, moreover, other subject teachers were also invited to ask vital questions to the students and give their own input on the finished project. Also, teachers who did not teach in this grade were invited to observe the mock-defence.

The case study research sample were 9th-grade students who at the time of the study were studying in one of the state gymnasiums in Riga. Moreover, the 7 subject teachers were invited to participate in the study together with the 12th-grade students. As stated previously, out of 17 students in the 9th-th grade, 14 were interested in the participation. The students had been learning the English language starting at the age of six as a foreign language. Thus, this was their 8th and 9th years of learning English. Taking into consideration the specialty of the State Gymnasium the students were studying in, by the 9th grade, students were supposed to be at level B1 in the English language, which was intermediate level. While, a number of students were above (total of 8 students) the average learning level, and few were below (total of 3 students). The most proficient skills were three primary language skills (reading, listening, and speaking), as for the writing skills, due to the distance learning, they were not as developed as the other three, thus the decision was made to use the multidisciplinary and collaborative research project as a tool to improve the writing skills.

According to the new curriculum, pupils by the end of the 9th grade in the English language, should be able to gather a number of texts and use them innovatively to create their

own text, respecting copyright and publishing the written text. Answering the questions based on the written text (*VS.9.2.1.7.*). Moreover, pupils should be able to use simple graphics and illustrations, headlines to get and sort the information they need by choosing safe sources of information. To be able to create digital text using graphical labels. To transform digital text from one type to another, such as tables, diagrams, sound records, or pictures. All of these competencies, including Digital Literacy, were covered during the production part of the Multidisciplinary and Collaborative Research Project.

3.1. PROCESS OF PREPARATION AND EXECUTION OF THE MULTIDISCIPLINARY AND COLLABORATIVE RESEARCH PROJECT

1. Due to the distance learning taking place, the author made a decision to use MS Teams platform as the main platform to communicate both with students from the 9th grade and 12th grades. With the positive decision of the 9th grade to participate in the project, the author carried out an *online lesson* with the students to introduce them to the project by gathering the answers as to why they thought it was important to have such projects, the aim was to let students see what the possible benefits of their active participation were. Students were asked to think of the topics that they would like to explore more and write their topic down in the *google.docs* sheet, so that the 12th grade students could find the topics they felt confident in and become the adviser of the said student (see Appendix 1). At this point, it was not necessary for the 9th grade students to be able to choose a very narrow topic. After the students had chosen the topic, they were instructed to communicate through MS Teams.

2. The next step was to find the twelfth-grade students who would like to participate in the project. Twelve students expressed their interest in the participation. The students were very helpful and eager which led to them quickly choosing the students from 9th grade to work with. Additional MS Teams group was created, so that the 12th grade students could easily communicate with the author of the Diploma Paper and ask questions in case they needed help or did not know the answers to the questions asked by the 9th grade students (see Appendix 2). Step-by-step instructions and requirements were uploaded onto the MS Teams group. Students were left to work with each other.

3. After two weeks in, the author decided to have an online lesson with the 9th grade students in order to answer the questions that could possibly have arisen while working on a

research project. The meeting was not mandatory, so it was students' own responsibility and willingness to join and participate. From 14 students, 12 students decided to join the meeting and ask questions about the unclear. After the meeting, students were asked to give brief feedback on how they found their collaboration with the 12th graders, six out of twelve pupils responded (see Table 3.1.1).

From the gathered feedback, most of the students found the collaboration with their advisers as successful and the topics had been worked on and adapted. Moreover, the author wanted to see if the students' chosen topics had changed and could fit under the OECD categories to follow the guidelines of the Scientific Research (see Appendix 3).

Table 3.1.1 Pupils' Feedback on the Collaboration and the Topic

List of Pupils	Topic name	Have you talked to your adviser? Have they been helpful? Please leave a short comment.	Put + if you will participate in the MS Teams lesson on Thursday, so I can answer the questions you might have about your project.
Student 1	<i>Inside the brain of a psychopath</i>	<i>My advisor has been very helpful. All my questions are being answered.</i>	+
Student 2	<i>Graphology as a method for selecting employees in organizations</i>	<i>My advisor has been very kind and helpful. All my questions are being answered.</i>	+
Student 3	<i>Sound of healing</i>	<i>My advisor is also super helpful, and I don't have any questions to be answered.</i>	-
Student 4	<i>Binge eating disorder and its impact on adolescent health</i>	<i>My advisor is very helpful. Everything is alright, but I have some more questions.</i>	+

Student 5	<i>How running affects your lifestyle</i>	<i>My advisor is very helpful, all the questions that I had were answered.</i>	+
Student 6	<i>What we should know about in vitro fertilization.</i>	<i>My adviser is kind and helpful. Everything is fine.</i>	+

4. The following step was to find among the teachers, willing to participate in this project, which of the topics that the students had chosen could be integrated in their subject. Considering that only half of the teachers expressed the willingness to participate, some of the topics had to be heavily adjusted. However, most of the students' chosen topics easily fit the category of the subjects. While students continued working on their collaborative research projects, every teacher was reminded about the formatting of the word documents that were to be handed in by the students. The criteria were taken from the official Research Paper formatting guidelines, the reason being that by using standardized formatting, students could apply this knowledge to the real life situations in the future (see Appendix 4). Together it was decided on the date for the projects' oral presentations, and the school's administration was asked to participate. As the school's official platform for communication with students while on the distance learning, a decision was made to organize the mock-defense on the *MS Teams* platform. The sequence of the presentations was chosen randomly. A more detailed analysis of the mock-defense is detailed in **Chapter 3.2**.

5. The author of the Diploma Paper provided the 9th grade students with criteria and with detailed explanations on what needed to be included in their research project, so that students did not feel overwhelmed by the amount of work they needed to complete, the aim of strict and clear guidelines was to give students a clearer understanding of what needed to be included, again the guidelines were adapted from the official Research Paper (ZPD). Another online lesson was conducted to revise the use of the passive voice, the reason that the research project had to be written in the academic style hence the use of the passive voice.

6. As the date of the handing in the project was approaching, the author decided to question the students whether they were ready to hand in the paper or if additional time was needed to complete the task. In the author's opinion, a set deadline is important for handing in the work, yet the teacher needs to be flexible and able to adapt if they notice that a given task is too difficult and their class needs additional time for its completion. A positive relationship

with the class should be one of the main focuses of the teacher if the teacher wishes for their students to succeed, also the emphasis should be put on students completing the task overall and learning from it rather than punishing students for not being able to follow the deadline. In the questionnaire, the students were asked to give their name, answer the question whether they were ready to hand their multidisciplinary and collaborative project in, and if not, explain why so (see Figure 3.1.1). As seen in the chart, only 3 out of 17 students needed additional time to finish their project.

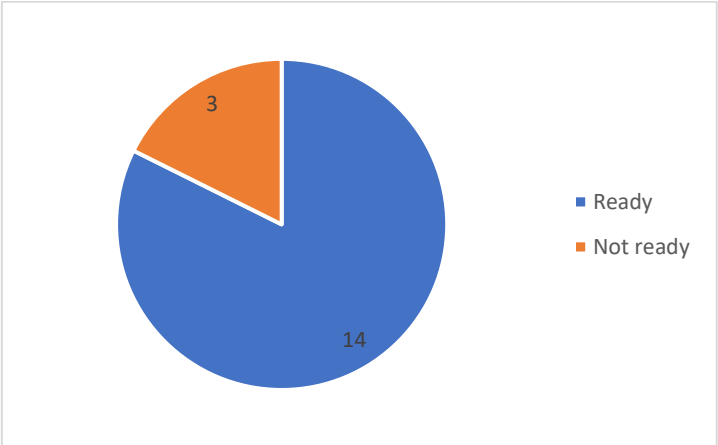


Figure 3.1.1 Students' Willingness on Submitting the Project

When analyzing the reasons for not being ready to submit the project, the most common answer was that students needed additional time to work on correcting some minor mistakes. Some students mentioned that the project was ready, however, they would feel more comfortable if some additional time was provided (see Appendix 5). In the author's opinion, the reason that students were honest with their answers was that the author had been teaching the English language in this class for three years, so the students felt comfortable sharing that they were not ready. After gathering all the responses, the author decided to prolong the deadline and provide the students with two more days to submit the project. These types of feedback could be beneficial and used throughout the school year as a standard practice in every subject being taught, which could possibly encourage pupils to reflect on their work more and be able to achieve higher results by thoroughly analyzing their work before handing it in.

7. After providing students with additional time to finish the project, the author of the Diploma Paper set on to create a self-assessment form on *mentimeter.com* (see Appendix 6) to gather the students' answers on what they learned while writing this project, what the students understood about themselves as the researchers while writing the paper and what the most difficult part of this project was. The feedback form was sent to the pupils before the mock-

defence of the project (see Table 3.1.2). As stated previously, almost every pupil was already finished with writing the Research Project but they needed additional time to work on some minor changes. Out of 14 pupils, 10 pupils completed the feedback form and provided the answers.

Table 3.1.2 Pupils' Thoughts on the Research Project

Student List	What did you learn while working on this Research Project?	What did you understand about yourself as a researcher?	What was the most difficult part of the Research Project for you?
1	Writing was not difficult, but working on small details was hard.	You can finish writing the Research Paper in two days.	Editing.
2	That a really simple activity can be complicated.	I have to like the topic that I chose because if I did not, I would not be interesting to write.	Finding some of the answers to the questions.
3	I learned how to correctly write a paper.	When I get bursts of motivation I can do almost anything.	Editing
4	I learned to discipline myself and plan my time, and how to do this type of Research Paper.	I think I am a precise researcher.	Editing
5	I learned a lot about the topic I researched and for me it was really interesting and meaningful.	I like to research information.	Not to write too much, writing an abstract.
6	I learned a lot about my topic.	I thought it was going to be easy because of the time limit but I needed motivation.	To gather all of the information.
7	I learned how to properly do research.	I found it was very hard to focus.	Writing it correctly according to the guidelines.
8	I learned how to find more qualitative information.	If I am really interested in the topic, I can discipline myself and push myself to do well.	To write an abstract and conclusion.
9	I learned a lot about my topic.	That I am a bit lazy, sometimes I would sit down and leave work for later.	Putting everything together so it would make sense.
10	I learned to work with the text better.	That I can do everything.	Editing

As shown in Table 3.1.2, one of the most common answers was that students learned how to discipline themselves and that they now had an in-depth understanding about the topic of their choice, the second most popular answer was that students found the editing process of the research project the most difficult task to complete. In the author's opinion, one of the solutions to this problem could be that the whole school sets the same evaluation criteria for the electronically written works; it could possibly help students automatically use the correct formatting. Also, it can be seen that pupils had difficulties with writing conclusions and abstract, which indicated that the teachers should pay more attention to summarizing the writing during their English language lessons.

8. In preparation for the mock-defense of the multidisciplinary and collaborative project, the peer evaluation assessment for the oral presentations was created by the author (see Appendix 7). The aim was to engage all of the students so that they could compare their own project to others, and to raise their interest in listening to other students present. Additionally, another online lesson was held to inform the students about the necessity of the mock-defense of the project, to answer the questions from the students and to provide the assessment criteria for the PowerPoint presentations, the criteria was taken from the official Scientific Research conventions (see Appendix 8). The goal was to provide the students with an authentic material and experience that not only would improve their writing skills in the English language but also, would prepare them for the secondary school and ease their way into writing a research paper.

9. On the set date, the 9th grade students handed in their research projects, next the author asked the 12th grade students, who were the advisers of the 9th grade students, to analyze their individual student's research project, provide the commentary on what needed to be improved according to the guidelines, and whether all of the conventions were followed at all. 12th grade pupils were to provide the feedback during the mock-defence. Also, prior to the mock-defence, the 12th grade students were asked to think of two questions they could ask their advisees based on the topic that was researched. Moreover, they were invited to summarize their experience with their advisees. After thorough preparation for the mock-defense, the date for the oral presentations of the multidisciplinary and collaborative research projects was set, it was to take place during the author's English lessons on Tuesday and Thursday, two days were chosen because of the large number of students who were to present.

3.2. MOCK-DEFENSE OF MULTIDISCIPLINARY AND COLLABORATIVE RESEARCH PROJECT

As the final stage of the project, pupils were to participate in the Mock-defense of the project. The aim of the defense simulation was to introduce the pupils to the official outline of the Scientific Research (ZPD) defense and give them an insight into what to expect in the future when enrolling into secondary school. During the preparation stage, the pupils were introduced to the conventions on how to make a PowerPoint presentation according to the conventions of the Scientific Research (see Appendix 9), and were asked to follow it in order to receive a good evaluation on their presentations from the committee that consisted of school's administration, subject teachers who participated in the multidisciplinary and collaborative research project and 12th grade pupils as observers and advisers. The decision for the invitation was to make this experience more realistic, to observe and eventually ask questions based on the given presentations. As mentioned previously, 12th grade pupils were assigned the role as advisers for the 9th grade pupils, and prior to mock-defense of their project, 12th grade pupils had to go through their advisees' research project and give commentary, and feedback on what could have been improved or done differently.

One of the most challenging parts of the preparation for the Mock-defense was to find an appropriate time for everyone to be able to join the meeting, the reason was that many people were involved, and everyone had different lesson schedules. However, the school's administration was supportive of the idea and found empty slots to arrange the mock-defense. Altogether, in the two-day long process of the presentations on the multidisciplinary and collaborative research projects, **7** subject teachers were involved and additional **6** teachers who did not teach in that particular class, nevertheless they had expressed their willingness to watch the mock-defense as they wanted to see how such projects could be beneficial for their pupils in the future. Moreover, 2 of the teachers, who decided to participate as the observers of the mock-defense, were involved in the Scientific Research paper (ZPD) as advisers for the first time, so they wanted to observe the oral presentation procedure with the aim to learn and apply the obtained knowledge in the real-life situation. Also, the teachers were informed that the presentations were going to be in the English language as the aim of this project was to improve pupils' writing skills, however, pupils were instructed to include titles of their research project both in English and Latvian. Prior to the Mock-defense, the 9th grade pupils were sent a peer evaluation form on *e-klase.lv*, pupils were instructed to go over the criteria and fill in the empty spaces with their and their classmates' names. Each pupil and their adviser received a schedule

with the time at what they would have to present. Each pupil was given 10 minutes for the oral presentation, 5 – 7 minutes were for the presentation of their research project and additional 3 minutes were for answering the questions and receiving feedback on their work from both 12th grade pupils, and teachers (see Appendix 10).

Analysis of the Mock-defense

1. The author thanked everyone for joining, pupils were reminded that the peer evaluation form was to be completed, pupils were asked to have their phones nearby for the reason that at the end of the lesson, pupils would have to fill in a questionnaire. Peer evaluation had to be uploaded onto MS Teams, together with their presentations by the end of the day. The author reminded everyone about the timing of their speeches and asked whether everyone was able to join and present at the specific time, in case of any difficulties the presenting time could be moved.

2. Prior to the presentations of the 9th grade pupils, the author turned to the 12th grade pupils and asked about the difficulties they faced when they had to start working on their own Research Project (ZPD). Two pupils responded that it was hard to understand where to start from and what needed to be done, even when the conventions were provided with what needed to be included it was confusing. Moreover, pupils mentioned that if they had an opportunity to work with experienced pupils who had already written their scientific research papers, it would have helped them tremendously. Also, the present teachers responded that it would make their jobs easier if they had helping hands, as in some fields such as science or health – there are always a lot of pupils who want to write their ZPD, however, the number of teachers in these areas of expertise is limited.

3. With the introduction part being done, the first pupil was to present their research project. Pupil's topic was `Binge Eating Disorder and its Impact on Adolescent Health` (see Appendix 11), the pupil chose to write their Research Project in the Medical and Health Sciences and this pupil's adviser was a 12th grade pupil, whose ZPD was written in the same field. At the beginning, it could be heard that the pupil was quite nervous, however, after the first two slides they seemed to calm down and continued presenting. After successfully presenting about the topic, the author proceeded with letting this pupil's adviser ask the pupil a question based on the research project, after answering the questions, the adviser gave brief feedback on how it was working in tandem. Only positive feedback was heard.

Then, it was time for the subject teacher to ask questions, in this case, it was a biology teacher as it was the closest field to relate to. After hearing the questions, the teacher also gave brief feedback on the project as this pupil was going to receive an additional grade in biology,

too. Also, the biology teacher was fluent in English, so they were able to provide feedback in English, the same goes for the questions. Teachers who were not confident in their English speaking skills, asked the questions in Latvian and asked to clarify some of the information they did not understand fully while listening to the presentations. The teachers had the chance to activate their foreign language skills.

4. For the rest of the session, the outline for the presentations of the project stayed the same as for the first pupil (see Figure 3.2.1). Also, it was noticed that after the presentation given by the first pupil, the rest of the session was less stressful as pupils exactly knew what to expect from the defense simulation. Because of the time limit, some of the questions were not fully answered, however, none of the pupils exceeded their PowerPoint presentation time, thus the problem was the complexity of the questions asked and the amount of them asked by the teachers. One of the advisers was not able to join the Mock-defense, so they left written feedback that the author of the Diploma read after the presentation.



Figure 3.2.1 **Outline for Oral Presentations**

5. As the final step of the Mock-defense of the Multidisciplinary and Collaborative Research Project, the author of the Diploma Paper wanted to collect feedback from the 9th grade pupils with the aim for self-reflection (see Table 3.2.1). The platform where the questions were asked was *mentimeter.com*, it was chosen for the reason that pupils had been using this website during many of their English lessons, so the author made a decision to use a familiar tool not to waste any more of the time that was left at the end of the session.

Reflections from the second day of the Mock-defense can be seen in Appendix 12. As the final question, pupils were asked to describe with an emoji or one word how they were feeling at the moment after the oral presentations of the Research Project were finished (see Figure 3.2.1).

Table 3.2.1 9th Grade Pupils' Self-Reflection on the Project

Pupil	What do you think you've gained/learnt from this experience?	What helped you the most to complete this project successfully?
1	I learnt that I need to start big projects right away	My family, adviser, the Internet
2	I learned to be a researcher	My friends, adviser
3	I gained knowledge and learnt how to work with information	My adviser, a lot of research
4	Experience on how to correctly write research paper and will be ready for next year	My adviser, my own motivation
5	I learnt about my specific topic. I had a lot of motivation.	-
6	I realized what I want my future job to be	My adviser
7	That a good adviser can be very helpful. I learnt a little bit of Dutch	It was 100% my adviser

The first question was about pupils' opinion on what they gained or learned from this experience. Answers were constructive and it can be assumed that every pupil was able to understand and draw conclusions about the completed work and recognize the benefits of such projects.

The second question was about pupils' opinion on who/what helped them the most to complete this project successfully. As seen in the Table 3.2.1 almost every pupil answered that their advisers were the driving force for the completion of the research project, thus it can be concluded that both 12th grade pupils and the 9th grade pupils find collaborations as such – important and necessary.

In the third question, the author asked pupils to express how they were feeling after their projects had been handed in and oral presentations were given (see Figure 3.2.2)



Figure 3.2.2 Pupils' Emotions After the Oral Presentations

As seen in Figure 3.2.2 the most common answers were that pupils felt relieved, good, and less stressed. Also, during self-reflection time, pupils admitted that they did not expect that they would feel stressed or anxious during the oral presentations because they had presented before in other subjects and English, however, the amount of people who were observing them present was overwhelming.

After the session was over, the author of the Diploma Paper and other teachers stayed to decide and agree on the evaluation of the research projects. Out of all the subject teachers that participated in the research project, 5 of the teachers, together with the author, had been advisers of the Scientific Research in Secondary school, and all came to the conclusion that some of the 9th grade pupils completed the research project better than pupils in secondary school. School's administration took notes and made a decision to incorporate such research projects in elementary school in the near future, hoping that Scientific Research projects could gain popularity in grades 7 – 9, and possibly sending the best projects to the National Scientific Research conference. Whereas it sounded like a promising idea, the author thinks that these types of projects could be successful only if the whole school's staff would work together.

The final stage of the Multidisciplinary and Collaborative Research Project was to evaluate the written part of it and draw conclusions on pupils' achievements. The author of the Diploma Paper being the English language teacher of this class participated in the evaluation alone.

3.3. EVALUATION OF THE WRITTEN PART OF THE PROJECT

The author set on to evaluate each individual Research Project paper with the evaluation chart that was provided to pupils during the beginning phase of the project (see Appendix 13). After grading each Research Project, the author noticed that almost every pupil followed the evaluation chart and was able to receive high marks. However, it was noticed that some of the pupils, who were not at the top of the class when it came to grammar, struggled with the use of passive voice and made mistakes on using short forms of words such as – **It's, don't, won't**. Another point worth mentioning is that pupils did not use the pronoun I while writing the research project, however, pronouns **he/she/it** were applied in the writing.

Also, it was noticed that some of the pupils did not follow the formation conventions, moreover, during the first two weeks of the Research Project, the same pupils filled in the questionnaire where they gave an answer that editing was the hardest part of the project.

Considering that the correct formation of the written project was worth only 6 points, the author concludes that pupils did not mind losing those points in order to get higher results. Again, in the author's opinion, if the school as a whole decided to set the same evaluation requirements for the computer-written files, in the future situations like these could be eliminated.

When analyzing the written part of the research project, it was noticed that one of the pupils did not follow the conventions at all, when asking this pupil's adviser about clarification of the situation, the adviser mentioned that this particular pupil did not cooperate nor tried to contact the adviser in any way. When the research project was handed-in then it was already too late to work on it to improve, so the adviser left commentary and feedback on the project. When evaluating this pupil's project, the mark they had received for the oral presentation was higher than the written part, the reason is that during the oral presentation this pupil followed the guidelines and the layout of the presentation, and their level of spoken English had been excellent prior to this project. The pupil's response to completing the project so poorly was that they did not feel motivated and were dealing with their own problems, so they did not mind receiving a lower mark, and they were understanding about why the mark that they had received was lower than the class's overall score.

For the rest of the class, the average score in the English language for the written part of the Multidisciplinary and Collaborative Research Project was **81,93 %** (see Figure 3.3.1). In the author's opinion, the average score was higher than they expected it to be at the beginning of the project as this type of project was newly introduced to pupils and they had never had a similar experience before, moreover, the average Research Project consisted of 14 – 17 pages, and this was the first time when pupils had to write such lengthy piece of this subject. Although, it needs to be taken into consideration that this particular class had to be at the level Intermediate at the end of the school year which meant that they had to know more than the average 9th grade pupil in any other elementary school in Latvia, however, during distance learning it was more challenging to achieve such results, especially with the writing skill.

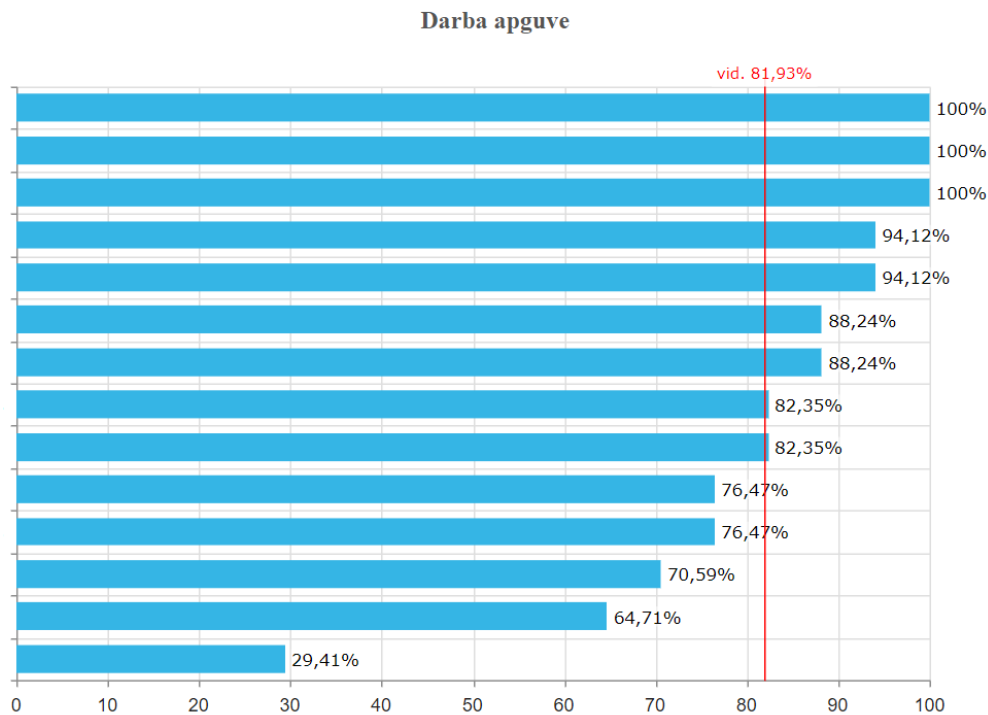


Figure 3.3.1 Results of the Written Part of the Research Project

As seen in Figure 3.3.1 **five** pupils out of **14** were below the average score, however, prior to this project, it was noticed by the author, that these particular pupils were not as strong in the writing assignments as their other classmates. Furthermore, at the beginning of the project the author was predicting lower results for these particular pupils and comparing their results from **e-klase** on different types of written assignments, **3** of these pupils received a higher score than they usually would.

Out of **14** pupils, **3** pupils received the highest results it being **100%** which meant that there were no crucial mistakes made. The author was pleasantly surprised about one of the pupil's achievements the reason is that usually, they were not as focused on the task as they were during this project, also this pupil's adviser mentioned that they were very involved, asked a lot of insightful questions and wanted to do well. During self-reflection time, this particular pupil provided an answer that their adviser had been one of the reasons they succeeded in this project (see Appendix 14).

Moreover, this pupil had seemed to be quite shy during the regular English lessons and when speaking exercises took place in the classroom, they were not eager to participate, however, not only did they receive the highest score on the written part of the project, they also succeeded with the oral presentation of multidisciplinary and collaborative research project, receiving the highest score, too.

Evaluation of the Oral Presentations

As stated previously, pupils received higher results during their oral presentations, the reason being that this class's Speaking skills were always strong, and it was one of the skills that did not need to be worked on as much as Writing. Compared to the written part of the Project, where the average score was **81.93%** the average score for the Oral Presentation was **92,61%** (see Figure 3.3.2) which makes it higher by almost **11%**.

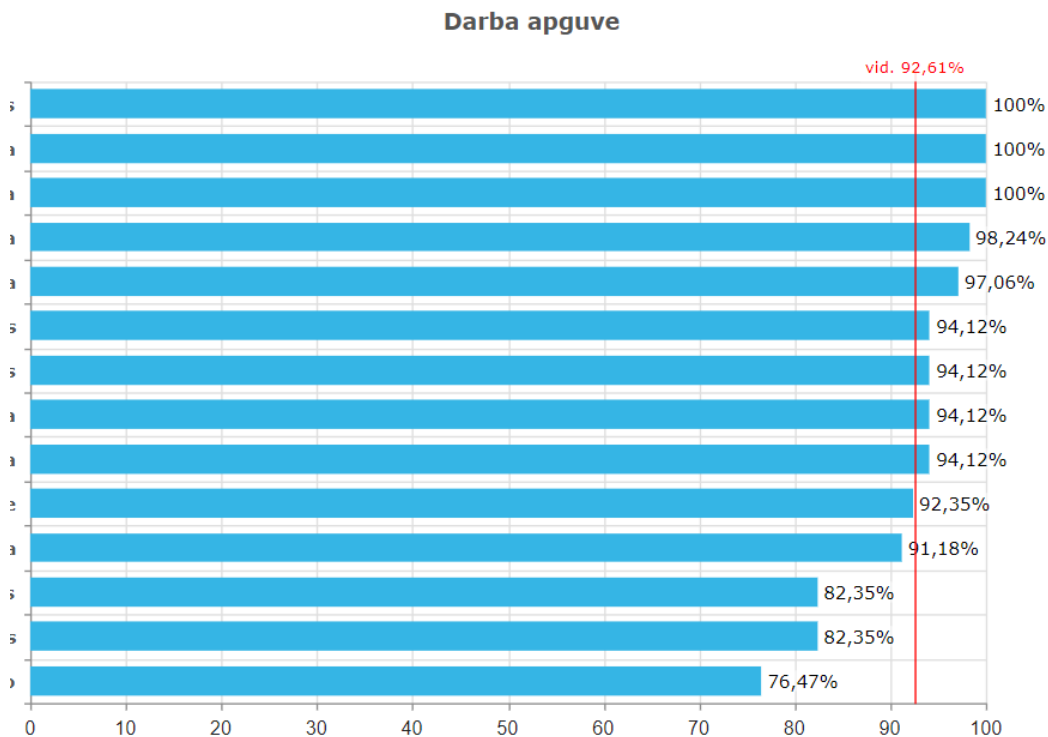


Figure 3.3.2 Results for the Oral Presentation of the Research Project

Moreover, it can be seen in Figure 3.3.1 that the pupil who received **29.41%** on the written part of the Research Project, scored **76,47%** for their oral presentation of the same material. When analyzing entries from the observation of the Mock-defense, one of the most common mistakes was that pupils misspelled some of the words on their slides, and minor mispronunciation mistakes were made that did not impede the meaning of the speech that was being conveyed.

Multidisciplinary Aspect and Evaluation

The author of the Diploma Paper being an English language teacher was responsible for the evaluation of the written part of the Research Project and oral presentations in English. As for the other subject teachers that were participating, it was their own evaluation criteria that they graded the pupils on, the author had no say in it. Each pupil's Multidisciplinary and Collaborative Research Project was tied to a specific subject, so that they could receive marks

both in English and the other subject they chose to write their Research Project in. Other subject teachers were only evaluating the Oral Presentations given during the Mock-defense. As mentioned before, there were 7 teachers involved, them being the **biology**, **social studies**, the **Latvian language**, the **German language**, **Physical Education**, the **music** and **arts** teachers (see Table 3.3.1).

Table 3.3.1 Received Marks in Different Subjects

Research Project Title	Subject	Mark
Inside of the Brain of a Psychopath	<i>Biology</i>	10
In Vitro Fertilization and What Should We Know About It	<i>Biology</i>	10
How Running Affects Your Lifestyle	<i>Biology, PE</i>	10, 10
Binge Eating Disorder and Its Effects on Adolescent Health	<i>Biology</i>	10
Mental and Physical Effects of Nicotine to Adolescent's Health	<i>Biology</i>	9
Graphology as a Method for Selecting Employees in Organizations	<i>Social studies, Latvian</i>	10, 10
Body Language and the Importance of it in Everyday Life : The Psychology Behind Non-Verbal Communication	<i>Social studies, PE</i>	9, 10
Sound of Healing: How Different Frequencies Affect Our Mental State	<i>Music, Social studies</i>	10, 9
Luck is Not the Only Factor for Guessing Another's Mind	<i>Social studies</i>	10
Various Dog Breeds, Their Classification and Differences	<i>Social studies, Arts</i>	7, 8
The Necessary Tools of Brining a Product to Market	<i>Social studies, Arts, Latvian</i>	10, 10, 8
History and Traditions of the English Tea	<i>Social studies</i>	8
Serial Killers and Their Similarities During Childhood and Adolescence	<i>Social studies</i>	9

Differences Between West Germanic Languages	<i>Social studies, Latvian, German</i>	10, 10, 10
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As it can be seen in Table 3.3.1 **6** out of **14** pupils were able to receive a mark for their Research Project in **one** subject, however, there were **2** pupils who received marks in three different subjects, and **4** pupils received marks in two additional subjects. The marks varied from 8 – 10, moreover, the pupil who had the lowest mark in English for their Research Project, received **10** in music and **9** in social studies.

Also, in the author's opinion, if more subject teachers participated in this project, more pupils would be able to tie their chosen topics to a specific subject, such as History, Geography, and other subjects. It possibly could raise more interest in pupils to research a specific topic in various fields rather than being limited in their choice.

CONCLUSION

During the development of the present research, based on the analysis of the pupils' questionnaires, observations of the English language lessons during which the mock-defense of the multidisciplinary and collaborative research project took place, in the course of the pedagogical study, the author of the Diploma Paper has come to several conclusions.

There are many benefits of Multidisciplinary and Collaborative Research Projects. The most crucial parts when implementing these types of projects in schools is thorough planning of each step of the project and creating detailed instructions that would be provided to pupils for use. Moreover, seeing how difficult it was to engage all of the subject teachers to participate, the collaboration in such projects should be made mandatory on the whole school's level, which would mean that every subject teacher could see themselves as experts in their fields, and they should be willing to allow their pupils to explore the field on their own by providing strict and clear rules to follow. It is particularly time-consuming to lead such projects with only one teacher being in charge, furthermore, if the responsibility of the succession of the research project lies only on one teacher, in the author's opinion there will not be any volunteers to do this. If the school wants to implement multidisciplinary aspects of education into their routine, each teacher in-service needs to agree upon the assessment, criteria and conventions that would be clear to pupils and teachers, so that the evaluation process would be fair.

Additionally, for the collaboration aspect schools could try to engage pupils from the secondary school, so that they could provide the younger pupils with assistance and play the role of an adviser. As stated in the research, secondary school pupils revealed that if they had had this type of opportunity to have an adviser to turn to during their Scientific Research Paper (ZPD), they might have felt securer and written their papers more successfully because specific subject teachers are numbered and could not provide the needed attention to each pupil, they were responsible for. Moreover, these types of Research Projects could be helpful to the secondary school pupils not to forget the knowledge that they had obtained while writing their own Scientific Research Papers, and it could be beneficial for them in terms that they would refresh their writing skills, and possibly ease their first year in the university, where writing papers by following conventions is not a rare occurrence.

As the pupils have been on distance learning for almost two full school years, it is important for the subject teachers to understand what are the areas of enhancement that need to

be worked on, the reason is that pupils could not develop all the necessary skills on their own nor obtain all of the information from the curriculum. Granted that the new curriculum places a great role on self-directed learning as a skill of the 21st century, not many teachers have the means in terms of methodology to have developed this skill in time, as the distance learning happened unexpectedly. However, participation in Multidisciplinary and Collaborative Research Projects could help pupils to develop this skill gradually, as for the most part all of the decisions were made by pupils themselves, as seen in the questionnaires, many were able to tell more about themselves as time-planners after completion of the project.

Another skill that is greatly impacted and acquired through participation in such projects is digital literacy. Skola2030 mentions that pupils should be able to rely responsibly on digital technologies, create, share and use their and other pupil-generated content, and securely collaborate with others in the digital environment. While participating in this project, pupils learned to use *MS Teams* platform to virtually interact with their advisers and if the school makes this platform as their main source of communication, pupils could feel safe there. Moreover, used sources and references should be included in the evaluation rubric, so that pupils could learn what is a quality source, how to format it and how to use experts' opinions when supplementing an argument.

Writing skills are one of the most difficult skills to master in the English language. The impact of the distance learning is going to be noticed greatly during the following school years. According to the new curriculum, by the end of the 9th grade, pupils should be able to collect a number of texts and use them innovatively in creating their own text, respecting copyright, and should make it public. Also, pupils should be able to answer the questions based on their generated text. Moreover, pupils should learn how to create different types of sentences using creative patterns of sentence structure, appropriate words in simple and complex sentences. All of these objectives could be achieved by writing a Multidisciplinary and Collaborative Research Project.

For pupils to complete this type of project, teachers need to learn to be flexible and be able to move the deadline of turning the project in, if necessary. Communication with pupils should be kept throughout the research project and the aim for the teacher should be that pupils complete it and learn about their chosen topic in-depth.

Considering that many of the 9th grade pupils, who participated in the research, continue their studies in the same school, now in the 10th grade, it could be beneficial to gather their

opinion on this project and how valuable it was in terms that they have to start working on their own Scientific Research Papers. As the newly formed 10th grades are mixed with pupils from different schools, it would be interesting to see if pupils who participated in the Multidisciplinary and Collaborative Research Project feel more secure and have an understanding of what is expected from them.

THESES

1. Writing skills are one of the hardest skills to master for English language learners and the Internet has made an impact on pupils' writing skills.

2. Pupils gain a deeper perception of the world around them through multidisciplinary aspects. Group work is an important tool; however, it should be used according to the needs of a class and each individual pupil.

3. With the set guidelines by the teacher, pupils should be able to discover their own strategies on how to motivate themselves, and how to learn by revealing information by themselves with the subject teacher only being a guide.

4. Pupils should be introduced to such projects gradually, with letting them discover on their own what could be the possible benefits of participating in Multidisciplinary and Collaborative Research Projects.

5. For the collaborative approach, pupils with previous experience in writing Scientific Research Papers could be invited to participate as advisers and guide Elementary school pupils.

6. Clear evaluation criteria should be developed by the teacher; each step of the Research Project should be explained and provided with examples.

7. Other subject teachers could be invited to participate. If more teachers participate, more pupils could find the field they are keen on exploring.

8. Multidisciplinary and Collaborative Research Projects help to develop digital literacy skills and correspond with objectives set by Skola2030.

9. By understanding the importance of the Research Project, pupils learn about time management, and themselves as researchers.

10. Pupils achieve higher results in the other subjects for oral presentations than in English class's

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APPENDICES

Appendix No. 1

Sign-up Table for the Research Project

Topics of the Research Project		Add your adviser on MS Teams by the email and use the chat option!
Name, Surname	Topic	Advisor's name, e-mail (MS TEAMS)
Paula	psychopathy	Helge, @edu.riga.lv
Lelde	Mind reading	Līva, @edu.riga.lv
Enīa	graphology	Andris, @edu.riga.lv
Grieta	body language	Andželika, @edu.riga.lv
Sofija	food psychology	Megija, @edu.riga.lv
Olivers	History of English tea	Ieva, @edu.riga.lv
Daniels	Differences between west germanic languages	Laura, @edu.riga.lv
Leo	How music or sounds can affect us?	Margarita, @edu.riga.lv
Paula	How physical activities affect your lifestyle	Elīna, @edu.riga.lv
Elīza	In vitro fertilisation	Madara, @edu.riga.lv
Brendons	The effects of nicotine physically and mentally	Ieva, @edu.riga.lv
Mārcis	Different dog types	Mikus, @edu.riga.lv
Māris	Necessary tools and methods to bring your product on the market	Paula, @edu.riga.lv

Appendix No. 2

MS Teams Chat with 12th Grade Pupils

otrdiena, 2021. gada 26. janvāris

HP Helge [redacted] 26.01 14:28
Man ir jautājums, man jautāja par to ka referātā ir jābūt priekšmetam par ko rakstīti, tad tā ir angļu valoda, vai bioloģija(tā meitene raksta par smadzeņu darbību)?

2 replies from you and Helge

↩ Reply

pirmdiena, 2021. gada 1. februāris

LG Līva [redacted] 28.01 16:54
Skolotāj, vai viņiem darbs ir jāraksta tikai angļu valodā vai gan angļu valodā, gan latviešu valodā?

2 replies from you and Līva Anna

↩ Reply

LR Laura [redacted] 01.02 20:40
Manam 9.klasniekam jautājums - cik lpp vajag būt?

2 replies from you and Laura

↩ Reply

Appendix No. 3

OECD Categories of Research Fields

OECD zinātņu nozaru un apakšnozaru nosaukumi	
Angļu valodā	Latviešu valodā
<p>1. Natural sciences</p> <p>1.1 Mathematics</p> <p>1.2 Computer and information sciences</p> <p>1.3 Physical sciences</p> <p>1.4 Chemical sciences</p> <p>1.5 Earth and related Environmental sciences</p> <p>1.6 Biological sciences</p> <p>1.7 Other natural sciences</p> <p>2. Engineering and technology</p> <p>2.1 Civil engineering</p> <p>2.2 Electrical engineering, Electronic engineering, Information engineering</p> <p>2.3 Mechanical engineering</p> <p>2.4 Chemical engineering</p> <p>2.5 Materials engineering</p> <p>2.6 Medical engineering</p> <p>2.7 Environmental engineering</p> <p>2.8 Environmental biotechnology</p> <p>2.9 Industrial biotechnology</p> <p>2.10 Nano-technology</p> <p>2.11 Other engineering and technologies</p> <p>3. Medical and Health sciences</p> <p>3.1 Basic medicine</p> <p>3.2 Clinical medicine</p> <p>3.3 Health sciences</p> <p>3.4 Medical biotechnology</p> <p>3.5 Other medical sciences</p> <p>4. Agricultural sciences</p> <p>4.1 Agriculture, Forestry, and Fisheries</p>	<p>1. Dabaszinātnes</p> <p>1.1. Matemātika</p> <p>1.2. Datorzinātne un informācijas zinātne</p> <p>1.3. Fizika un astronomija</p> <p>1.4. Ķīmija</p> <p>1.5. Zemes un vides zinātnes</p> <p>1.6. Bioloģija</p> <p>1.7. Citas dabaszinātnes</p> <p>2. Inženierzinātnes un tehnoloģijas</p> <p>2.1. Civilā inženierija</p> <p>2.2. Elektrotehnika, elektronika, informācijas tehnoloģijas</p> <p>2.3. Mašīnbūve un mehānika</p> <p>2.4. Ķīmijas tehnoloģija</p> <p>2.5. Materiālzinātne</p> <p>2.6. Medicīnas inženierija</p> <p>2.7. Vides inženierija</p> <p>2.8. Vides biotehnoloģijas</p> <p>2.9. Rūpnieciskās biotehnoloģijas</p> <p>2.10. Nanotehnoloģijas</p> <p>2.11. Citas inženierzinātnes un tehnoloģijas</p> <p>3. Medicīna un veselības zinātnes</p> <p>3.1. Fundamentālā medicīnas zinātne</p> <p>3.2. Klīniskā medicīna</p> <p>3.3. Veselības zinātnes</p> <p>3.4. Medicīniskās biotehnoloģijas</p> <p>3.5. Citas medicīnas zinātnes</p> <p>4. Lauksaimniecības zinātnes</p> <p>4.1. Lauksaimniecība, mežsaimniecība, zivsaimniecība</p>
<p>4.2 Animal and Dairy science</p> <p>4.3 Veterinary science</p> <p>4.4 Agricultural biotechnology</p> <p>4.5 Other agricultural sciences</p> <p>5. Social sciences</p> <p>5.1 Psychology</p> <p>5.2 Economics and Business</p> <p>5.3 Educational sciences</p> <p>5.4 Sociology</p> <p>5.5 Law</p> <p>5.6 Political science</p> <p>5.7 Social and economic geography</p> <p>5.8 Media and communications</p> <p>5.9 Other social sciences</p> <p>6. Humanities</p> <p>6.1 History and Archaeology</p> <p>6.2 Languages and Literature</p> <p>6.3 Philosophy, Ethics and Religion</p> <p>6.4 Arts and music</p> <p>6.5 Other humanities</p>	<p>4.2. Lopkopība un piena pārstrāde</p> <p>4.3. Veterinārija</p> <p>4.4. Lauksaimniecības biotehnoloģijas</p> <p>4.5. Citas lauksaimniecības zinātnes</p> <p>5. Sociālās zinātnes</p> <p>5.1. Psiholoģija</p> <p>5.2. Ekonomika un uzņēmējdarbība</p> <p>5.3. Izglītības zinātnes</p> <p>5.4. Socioloģija</p> <p>5.5. Juridiskās zinātnes</p> <p>5.6. Politikas zinātne</p> <p>5.7. Sociālā un ekonomiskā ģeogrāfija</p> <p>5.8. Mediji un komunikācijas zinātne</p> <p>5.9. Citas sociālās zinātnes</p> <p>6. Humanitārās zinātnes</p> <p>6.1. Vēsture un arheoloģija</p> <p>6.2. Valodas un literatūra</p> <p>6.3. Filozofija, ētika un reliģija</p> <p>6.4. Mūzika un māksla</p> <p>6.5. Citas humanitārās zinātnes</p>

Appendix No. 4

Formation Requirements of the Written Text

Darba noformēšanas pamatprasības:

- lapas formāts – A4 (210 × 297 mm), lapas (fona) krāsa – balta;
- teksta attālums no visām četrām lapas malām – 2,5 cm;
- rindstarpas intervāls – 1.0;
- fonts – *Times New Roman*;
- burtu lielums tekstam – 12; virsrakstiem – 14 vai 16 (Bold / treknraksts);
- burtu krāsa – melna;
- teksta rindkopas sāk ar atkāpi;
- lappuses ir jānumurē, numerāciju norāda, sākot no Ievada lappuses;
- teksta abas malas izlīdzina, izņemot tekstu tabulās un Literatūras un informācijas avotu sarakstā.

Appendix No. 5

Pupils' Responses on the Willingness to Hand in the Project

11 responses

Most of the work is done, I've found all the information, that's needed, written the main part. But I have a lot of other urgent projects in art and regular school and more time could give me the chance to finish the work more carefully and focus more on the writing/ending part of the paper.

I am correcting my mistakes and was stuck in some parts of it. My advisor is helping me, but I still have some stuff to write and I think it would be less stressful if the date is prolonged.

Because I think my presentation does not have enough topics and I want it to be better

Yes and no because I just need to make my conclusion and fix minor mistakes.

It's almost ready, I need to do one last social experiment to get more precise information and I'm not sure if the people I had planned to do it with have time this evening.

I need more time to finish some things.

Well it is ready, although Thursday would be awesome

Appendix No. 6

Pupils' Feedback

What did you learn while writing this paper? What did you understand about yourself as a researcher? What was the most difficult part for you?



Editing is very annoying. You can finish the paper in 2 days, but then there are so many tiny things that are hard to do. That was also the most difficult thing for me.

1. That a really simple activity can be really complicated. 2. That I have to like the topic I chose because if I don't like it, it won't be interesting to write about it. 3. Finding some of the answers.

I learned how to write papers, about myself. I learned that when I get bursts of motivation I can do anything. The most difficult part for me was the editing.

I learned to discipline myself and to plan my time, also how to do this kind of research paper. As a researcher, I like to think that I am a precise researcher. Editing was the most difficult.

I learned a lot about the specific topic I researched and for me it was really interesting and meaningful. I understood that I like to research information. Difficult was not to put and write too much as well as writing abstract.

I learned a lot about my topic, and that was kinda the point of me doing the paper. I thought that it was going easy because of the time limit, but I didn't have no motivation at the beginning. The most difficult part was to gather all the info.

I learned how to properly do research. I found that it was really hard to focus. The most difficult part was writing it correctly.

The hardest part for me was to write abstract and conclusion. I learned how to find more qualitative information. I realized that if I am interested in the subject, I can really discipline myself and push to achieve the best.

I learnt a lot about my theme. I am a little bit lazy but sometimes I am going to sit down and do some work and then leave it. The most difficult I think for me it was putting everything so that it makes sense.

Appendix No. 7

Peer Evaluation Form

PEER EVALUATION FORM

Your name:

Date:

Points:

1	2	3	4	N/A
Strongly disagree	Disagree	More or less	Agree	Can't rate

Pt.	CONTENT AND INFORMATION
	1. Clearly stated the topic of the presentation.
	2. Student was able to explain the topicality and why they chose the particular topic.
	3. In my opinion, content of presentation was appropriate and the topic was researched well enough.
	PRESENTATION STYLE
	1. Visual aids clearly improved and supported the presentation.
	2. Student sounded enthusiastic about their research.
	3. Time distribution provided sufficient attention to the most important information; did not feel rushed or overly extended.
	4. Reflected creativity.
	5. I learnt something new by listening to this presentation.

	xxx	xxx	xxx	xxx	xxx	xxx	xxx
Overall points:							
Things that I liked:							
Areas for Improvement:							

Appendix No. 8

Evaluation Criteria of the Oral Presentation

8. Zinātniskās pētnieciskā darba prezentēšana – 20 punkti (šos kritērijus vērtē, ja darbs izvirzīts aizstāvēšanai reģionālajā konferencē)			
8.1. Saturs	0-5 punkti Saturā iekļautā informācija atklāj pētījuma būtību un aktualitāti; stāstījums ir secīgs un loģisks.		
8.2. Datorprezentācijas noformējums	0-4 punkti Datorprezentācija ir vizuāli estētiski noformēta un viegli uztverama.		
8.3. Uzstāšanās	0-4 punkti Uzstāšanās ilgums atbilst laika limitam; uzstāšanās ir loģiska, pārliecinoša, ievērots zinātniskās valodas stils.		
8.4. Atbildes uz recenzenta un komisijas jautājumiem	0-7 punkti Uzstāšanās laikā ir iekļautas atbildes uz recenzenta jautājumiem; Skolēns spēj loģiski un pārliecinoši atbildēt uz recenzenta un komisijas visiem jautājumiem; Atbildes ir labi argumentētas; Atbildes liecina par kompetenci un erudīciju izvēlētajā pētījuma tematā.		

Appendix No. 9

Contents of the PowerPoint Presentations

1. slaidis Darba nosaukums, autors, darba vadītājs	2. slaidis Darba aktualitāte	3. slaidis Darba mērķis
4. slaidis Darba uzdevumi	5. slaidis Pētījuma jautājums vai hipotēze	6. slaidis Īsa darba teorija (svarīgākie jēdzieni, zinātnieku atziņas, maksimums trīs slaidi)
7. slaidis Pētījuma metode. Pētījuma norise	8. slaidis Pētījuma rezultāti	9. slaidis Secinājumi
10. slaidis Priekšlikumi	11. slaidis Darba pielietojamība	12. slaidis Noslēguma slaidis

Appendix No. 10

Example of the Oral Presentation Schedule

Lelde D.	13:45	Līva
Grieta B.	13:55	Andželika
Leo D.	14:05	Margarita
Aleksandra K.	14:15	Laura
Olivers J.	14:25	Ieva
Mārcis G.	14:35	Mikus
<u>Brendons B.</u>	14:45	Ieva

Appendix No. 11

Example of Pupils' PPT presentation

Rīga State German Grammar
School

Paper

BINGE EATING
DISORDER AND ITS
IMPACT ON
ADOLESCENT HEALTH

KOMPULSĪVĀS
ĒŠANAS TRAUCĒJUMI
UN TĀ IETEKME UZ
PUSAUDŽU VESELĪBU

Author: Sofija Krampe
Advisor: Megija Luīze Pudāne

Rīga, 2021

1

Topicality

2

Table of Contents

- The aim of the Paper, objectives; 4
- What is binge-eating disorder; 5
- Criteria for binge-eating disorder; 6
- Causes of binge-eating disorder in adolescence; 7
- Treatment for binge eating disorder for adolescents; 8
- Conclusions 10

Ex

The aim of the work, objectives


The aim of the Paper is to examine why binge eating disorder is common in adolescence.

The objectives:

- Understand what is binge eating disorder,
- Explore causes for eating disorders for adolescents,
- Find out what are the criteria for binge-eating disorder,
- Find out treatments for binge eating disorder for adolescents.

Causes of binge-eating disorder for adolescents

- Low self-esteem, depression and bad feelings.
- Stress and anxiety.
- Dopamine levels in brain.
- Weight teasing.
- Diet/ binge cycle. (See figure 1.)



(Figure 1. The Diet/Binge Cycle by Think Bodywhys Ltd.)

7

Self-help treatments for binge-eating disorder for adolescents

- Supportive family and friends.
- Food diary.
- Exercise.
- Devising a meal plan. (See Figure 2.)

Time	Meal	Description
8:00	Breakfast	Steel of cereal, milk, piece of fresh fruit and tea
11:00	Snack	Crunchy granola with cottage cheese
13:00	Lunch	Baked potato with low sodium soybean coffee
15:00	Snack	Carrot bar or packet of nuts
18:00	Dinner	Grilled chicken breast, rice, vegetables
	Bedtime	One of fresh apples or milk

(Figure 2. The meal plan example by Think Bodywhys Ltd.)

8

Professional help treatment for binge-eating disorder for adolescents

- Family therapy.
- Individual psychotherapy and counselling.
- Cognitive Behavioural Therapy (CBT).

Conclusions

- BED can affect anyone no matter their age, gender, race, ethnicity, economic status or education, but adolescence has a higher risk of developing BED, because it is a developmental stage.
- Professional help treatments are more effective than self-help treatments.

Appendix No. 12

Feedback After Oral Presentations

1. What do you think you gained/learned from this experience? 2. What helped you the most to do this project successfully?

Mentimeter

I learned how to make this type of work and I got help from the advisor.

I learned about our human minds. My intuition for this topic helped me keep going forward.

1. experience for the future in writing papers 2. advisors and presentations on how to write

1. I learned how to write a paper and how to research correctly. 2. my advisor and google

I learned how to find information. Good experience. 2. My advisor

5

Appendix No.13

Research Project Written Part's Evaluation

Research Project evaluation	Points
Working on the project	6
Following the deadline	2
Correct formatting of the file	4
Structure of the project: <ul style="list-style-type: none">• Cover page• Table of contents;• Introduction;• Literature review of the topic (page 6 -...)• Conclusions;• List of sources used;• Attachments	6
Content evaluation <ul style="list-style-type: none">• Introduction• Theme Discussion• Conclusions• Quality of the used sources	11
Organization Grammar Spelling	9

Appendix No. 14

Example of Pupil's Research Project

Riga State German Grammar School

**BINGE EATING DISORDER AND ITS IMPACT ON
ADOLESCENT HEALTH**

**KOMPULSĪVĀS ĒŠANAS TRAUCĒJUMI UN TĀ IETEKME UZ
PUSAUDŽU VESELĪBU**

Medical and Health sciences

Paper

AUTHOR: Sofija xxxx

ADVISER: Megija xxxx

RIGA 2021

ABSTRACT

Binge eating disorder is a common health problem among adolescents. Many studies have shown that adolescence is a critical stage in an eating disorder and, if left untreated, can disrupt daily life and cause other problems like mental health disorders.

This Paper examines binge eating disorder and its impact on adolescent health. Specifically, what is binge eating disorder, risks, consequences of it, what kind of eating disorders are common among adolescents, the causes of binge eating disorder in adolescence and treatment options for binge eating disorder.

Main and the most common abbreviations mentioned in this Paper: binge eating disorder (BED), eating disorder (ED), Cognitive Behavioural Therapy (CBT), loss of control (LOC).

This Paper consists of the theoretical part. The theoretical part of the Paper examined eating disorders among adolescents and what were the main causes for it. Information about treatments was found and examined as well in this Paper.

The Paper can be used as a source of information to understand binge eating disorder, its consequences and treatment for adolescents.

Keywords: Binge eating disorder, treatment, adolescence, adolescent health, eating disorders.

ANOTĀCIJA

Kompulsīvās ēšanas traucējumi ir bieži sastopama veselības problēma starp pusaudžiem. Dažādi pētījumi parāda to, ka pusaudžu vecums ir kritisks ēšanas traucējumu posms, un, ja netiks ārstēts, var ietekmēt ikdienas dzīvi un radīt citas veselības problēmas, kā garīgās veselības traucējumus.

Šajā darbā tiek aplūkoti kompulsīvās ēšanas traucējumi un to ietekme uz pusaudžu veselību. Precīzāk, tiek apskatīts par to, kas ir kompulsīvās ēšanas traucējumi, to riski un sekas, kādi ēšanas traucējumi ir izplatītā pusaudžu gados, kompulsīvās ēšanas traucējumu cēloņi pusaudžu gados un ēšanas traucējumu ārstēšanas iespējas.

Galvenie un visbiežāk pieminētie saistījumi šajā darbā ir: kompulsīvās ēšanas traucējumi (BED), ēšanas traucējumi (ED), kognitīvās uzvedības terapija (CBT), kontroles zaudēšana (LOC).

Šis darbs satur teorētisko daļu. Šī darba teorētiskajā daļā tiek apskatīts par ēšanas traucējumu pusaudžu vidi un to galvenie cēloņi. Tika atrasta un apskatīta arī informācija par ēšanas traucējumu ārstēšanu pusaudžiem.

Šis darbs var tikt izmantots kā informācijas avots, lai saprastu kas ir kompulsīvie ēšanas traucējumi, kādas tam ir sekas uz jauniešiem, un kā to var ārstēt.

Atslēgas vārdi: Kompulsīvās ēšanas traucējumi, ārstēšana, pusaudžu gadi, pusaudžu veselība, ēšanas traucējumi.

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Introduction

Over the past 40 years, the worldwide prevalence of childhood obesity has increased^[1]. Binge eating disorder (BED) is a common health disorder among adolescents. Several studies have shown that the developmental stage of adolescence is a critical stage for the onset of eating disorders (EDs), with a peak prevalence of BED at the age of 16–17 years^[2]. Adolescence is a transitional developmental stage characterized by rapid and deep physical, psychological, and neural development changes, and it represents a critical period for the onset of EDs, including BED.

Previous studies have suggested that childhood eating and weight problems may be risk factors for eating disorders^[3]. Learning about it and understanding what causes it, can help reduce binge eating disorder among adolescents. It is important to learn about it because nowadays more and more adolescents suffer from BED and the consequences of it can lead to mental and physical disabilities.

The aim of the Paper is to examine eating disorders among adolescents and why binge eating disorder is common in adolescence.

To achieve the aim, the following objectives have been set:

1. To explore what is binge eating disorder and what are its origins;
2. To find out how binge eating disorder can affect an adolescent's health;
3. To explore and find out what causes eating disorders for adolescents;
4. To understand what are the risks and factors of binge eating disorder;
5. To find out treatments that can help to treat binge eating disorder for adolescents if they are already suffering or developing binge eating disorder.

The research questions are as follows:

1. What is binge eating disorder, what are the origins of it, what are the risks and consequences of it, what criteria and what symptoms were involved in binge eating disorder?
2. What are the most common eating disorders for adolescents, what are the causes of binge eating disorder and what types of treatment can help adolescents from suffering or developing binge eating disorder?

1. BINGE EATING DISORDER AND WHAT IT IS

Many people overeat from time to time, and many people often feel they have eaten more than they should have. They feel out of control and binge on food to manage their negative mood or other feelings. There is a powerful craving for food which is experienced as overwhelming^[1]. Disturbances in mental health such as depression, anxiety or unhappiness, may cause people to eat unhealthy amounts or types of food. Binge eating disorder (BED) affects an estimated 1–3% of the general population, making it the most common eating disorder^[4], and making it one of the primary chronic illnesses among adolescents.

BED is a provisional new diagnosis, introduced in May 2013 in the Diagnostic and Statistical Manual of Disorders, Fifth Edition (DSM-5). Although weight is not a diagnostic criterion of BED, the majority of patients with BED are overweight. Binge eating is defined as the consumption of an objectively large amount of food (larger than what most people would consume under similar circumstances) coupled with a sense of loss of control (LOC)^[1] during the binge; experiencing shame, distress or guilt afterwards; and not regularly using unhealthy compensatory measures (e.g., purging) to get rid of the bad feeling of overeating. Binge eating disorder is a medical condition and is characterized by recurrent episodes of binge eating, in addition to associated features such as distress about the eating, secrecy of eating or eating in the absence of hunger. Emotional overeating, or eating in excess to soothe negative emotions, is a high-risk behaviour for the future development of the BED.

Characteristics of binge eating disorder include:

- Continuous weight gain;
- Eating in secret and feeling of shame when a friend or loved one finds their food cache;
- Intense satisfaction when eating, followed by remorse and mood swings^[9].

Binge eating involves more than just eating a lot. People with this problem don't want to be overweight. They wish they could be slim and healthy. Many times people who binge eat feel misunderstood. It's not as easy as others might think to just stop eating. With bingeing, a person feels out of control and powerless to stop eating while doing it. That's why binge eating is also called compulsive overeating. It's hard to know just how many teens may have a binge eating problem. Both guys and girls can have BED. But because people often feel guilty or embarrassed about out-of-control eating, many don't talk about it or seek help. People can also be overweight without having a binge eating problem.

1.1. THE ORIGINS OF BINGE EATING DISORDER, TIMELINE

BED was first noted back in 1959 by psychiatrist Albert Stunkard. In his paper titled "Eating patterns and obesity", Stunkard describes an eating pattern marked by consuming large amounts of food at irregular intervals. He observed that some of these episodes were linked to night eating. The term binge eating eventually caught on. It was used to describe eating episodes that were not connected with sleep or the overnight hours. Before the 1950s, binge eating would not have been something the average person could easily engage in even if they had a tendency or a desire to do so. Eating large quantities of food at one time meant having the money or means to obtain what would equate to several meals at one time. Most people were not able to obtain enough food to engage in this particular disorder. As the standard of living increased in Western societies and the availability of large amounts of food produced cheaply increased, so did the incidence of bulimia nervosa and BED^[3].

Cognitive Behaviour Therapy (CBT) was started by Dr Aaron T. Beck in the 1960s. CBT has since become a type of therapy used to treat a variety of conditions including eating disorders. CBT is still considered one of the primary binge eating disorder treatment methods. CBT is also one of the best treatment options for BED for adolescents. Even though binge eating disorder was not officially classified at this time, many physicians had begun to prescribe stimulants to help individuals who were obese^[3].

The American Psychiatric Association (APA) mentioned binge eating in its Diagnostic and Statistical Manual of Mental Disorders (DSM) in 1987. At the time, the condition was listed in the criteria and features of bulimia. Bulimia is an eating disorder that takes on a cycle of bingeing and purging. Inclusion in the DSM is important because it increases disease awareness and gives mental disorders legitimacy. Before being included in the DSM, it was difficult for people to receive appropriate treatment for binge eating. Health insurance coverage for treatment of the disorder was also limited.

In 1994, the APA listed binge eating in the DSM-4. At this point, it was still not known as its disorder, though. Instead, binge eating was included in an appendix as a feature of "eating disorder not otherwise specified," (EDNOS).

BED continued to gain more attention. By 2008, a nonprofit called the Binge Eating Disorder Association (BEDA) was started. This group's mission is all about help, support, and advocacy for the BED community.

In 2013, the APA released a revised edition of the DSM. This time, the DSM-5 declared BED as its disorder. This is significant because it finally allowed people to get treatment under their insurance plans. It also added legitimacy to the disorder. Before this many health professionals only recognized binge eating as something that was specifically associated with obesity, and not a separate and distinct disorder.



(Figure 1. The Diet/Binge Cycle by Think Bodywhys Ltd.). The figure shows the cycle that people with BED are often stuck in. To be able to break this cycle, it is important to understand why and how it happened, to understand what made an individual vulnerable to start or continue this cycle. This leads vulnerable people to be extremely concerned about their shape and weight, about how they are viewed by others and can drive them to go on strict diets. The dieting then encourages overeating through both physiological and psychological mechanisms. The bingeing causes guilt and to compensate, people diet again. The only way to break this cycle is to stop dieting. (Think Bodywhys Ltd. 2015).

1.3. CRITERIA AND SYMPTOMS OF BINGE EATING DISORDER

The following criteria and symptoms are made to acknowledge and understand binge eating disorder, but not to self-diagnose. The criteria were made more for adults, as it may be difficult for children and adolescents to understand it. Diagnostic criteria made by the National Eating Disorder Association of binge eating disorder include:

- Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:
 1. Eating, in a discrete period (e.g., within the 2 hours), an amount of food that is larger than what most people would eat in a similar period under similar circumstances;
 2. A sense of loss of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating).
- The binge-eating episodes are associated with three (or more) of the following:
 1. Eating much more rapidly than normal;
 2. Eating until feeling uncomfortably full;
 3. Eating large amounts of food when not physically hungry;
 4. Eating alone because of feeling embarrassed by how much one is eating;
 5. Feeling disgusted with oneself, depressed, or very guilty afterwards.
- Marked distress regarding binge eating is present;
- The binge eating occurs, on average, at least once a week for 3 months;

1.2. RISK AND CONSEQUENCES OF BINGE EATING DISORDER

Binge eating disorder can affect anyone no matter their age, gender, race and ethnicity, economic status and education. People with BED may face many and different risks and consequences. Many people assume, that people with BED have weight problems and that that is the main risk of having the disorder. Weight is not a risk factor for BED in and of itself. People with BED can be overweight, obese, or a healthy weight.

Poor nutrition can lead to poor mental health. Studies that focused on the possible impact that BED may have on physical, psychological, and social functioning showed that adolescents with BED have an increased risk of developing various adverse consequences, including obesity, social problems, substance use, suicidality, and other psychological difficulties, especially in the internalizing area.

Those who are suffering from BED most likely are not as outgoing as other people, they like to hide in themselves and are scared to show their emotions because of insecurities. Certain foods may be comforting or help to alleviate negative moods. While eating the food, an individual may feel happy, but the happiness doesn't last for long. According to study (International Journal of Eating Disorders 40), individuals who participated in that research showed that negative mood and hunger were significantly higher at pre-binge than at non-binge times, but the negative mood was even higher at post-binge. Negative emotions, in their turn, can make us overeat in an attempt to feel better. That concludes, that one of the BED consequences is negative moods.

Binge eating disorder may result in many of the same health risks commonly associated with obesity. The risks are as follows:

- Diabetes;
- High cholesterol;
- High blood pressure;
- Heart disease;
- Osteoarthritis;
- Sleep apnea^[3].

People with BED can also suffer from many different mental health disorders, which are very common for BED patients. The most common consequences for mental health are anxiety, depression, low self-esteem, or other issues that can greatly affect the quality of life. The consequences of BED on mental health may reinforce healthy or unhealthy eating patterns. It is possible that eating healthily makes people feel better psychologically, but it is also possible that eating in an unhealthy way makes people feel better emotionally^[7].

People with BED are often stuck in a vicious cycle of dieting and bingeing. Underlying this is a profound lack of self-esteem^[3]. The cycle of dieting and bingeing is a high risk for adolescents to be stuck in it and getting out of it may be very hard (see figure 1).

- The binge eating is not associated with the recurrent use of inappropriate compensatory behaviours (e.g., purging) as in bulimia nervosa and does not occur exclusively during bulimia nervosa or anorexia nervosa.

Symptoms of binge eating disorder can show emotionally and physically. These are the main emotional and physical symptoms of binge eating disorder:

- Appears uncomfortable eating around others;
- Withdraws from usual friends and activities;
- Frequently diets and does not practise with food or fad diets, including cutting out entire food groups (no sugar, no carbs, no dairy, vegetarianism/veganism);
- Feelings of low self-esteem;
- Eating alone out of embarrassment at the quantity of food being eaten;
- Difficulties concentrating^[5].

As already mentioned at the beginning of the page, the definition of an objectively large amount of food during development can be difficult and uncertain for children and adolescents. Indeed, a child's caloric intake may vary due to growth spurts and changes in activity. Report on food intake, as well as the ability to articulate loss of control, can be challenging in children and adolescents. For this reason, clinician-expert interviews are necessary rather than reliance on self-report to better characterize an eating episode as a binge^[10]. Main factors for binge eating disorder for adolescents are as follows:

- eating much more rapidly than normal;
- eating until feeling uncomfortably full;
- eating large amounts of food when not physically hungry;
- eating alone because of being embarrassed by how much one is eating;
- feeling disgusted with oneself, depressed, or very guilty after overeating.

Although challenging to assess, the inclusion of LOC in the measurement of binge eating is vital, as it is associated with more psychosocial impairment than overeating alone. Marsha D. Marcus and Melissa A. Kalarchian (Western Psychiatric Institute and Clinic, University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania) proposed alternative BED criteria for children that highlights the LOC feature and eliminates the objectively large amount of food^[14]. Their criteria are as follows:

- recurrent episodes of binge eating, defined by both of the following:
 - food-seeking in the absence of hunger (e.g., after a full meal);
 - a sense of lack of control over eating (e.g., endorse that "When I start to eat, I just can't stop")^[14];

Binge episodes are associated with one or more of the following:

- food-seeking in response to negative affect (e.g., sadness, boredom, restlessness);
- food-seeking as a reward;
- sneaking or hiding food^[14]

2. ADOLESCENTS EATING DISORDERS

During this period, youths experience fast neurobiological and body modifications, which may be accompanied by increased concern and attention for body size and shape, as the awareness of societal pressures for thinness and relationships with peers becomes increasingly important, leading to a higher concern about peer acceptance. For these reasons, although EDs can affect individuals of all ages, adolescence represents a peak lifetime period of increased vulnerability for the onset of EDs. In particular, an increased prevalence of ED symptoms among youths aged 14–16 years has been evidenced, with two peaks of onset of BED, the first immediately after puberty, at a mean age of 14 years^[2].

The 3 most common types of EDs among adolescents are as follows:

- Binge eating disorder
- Anorexia nervosa
- Bulimia nervosa

Binge eating disorder was already explained on page Nr.6.

Anorexia nervosa – often simply called anorexia – is an eating disorder characterized by abnormally low body weight, an intense fear of gaining weight and a distorted perception of weight.

Characteristics of anorexia nervosa include:

- Constantly expressing disdain for their body or how unsatisfied they are with the way they look, even if they are fit and toned;
- Maintaining a body weight that is at least 15 per cent below the national average for their age and height;
- Missing at least three menstrual cycles consecutively;
- Intense fear of gaining weight or appearing fat^[9].

Bulimia nervosa, commonly called bulimia, is a serious, potentially life-threatening eating disorder. It is related to binge eating disorder, because people with bulimia may secretly binge – eating large amounts of food with a loss of control over the eating – and then purge, trying to get rid of the extra calories in an unhealthy way.

Characteristics of bulimia nervosa include:

- Over-thinking of self-image, body shape and/or weight;
- Episodes of uncontrolled eating that occur at least two times a week for up to three months or longer^[9].

Anorexia nervosa and bulimia nervosa typically develop in the adolescent years. About 0.3 per cent of adolescents will develop anorexia nervosa, 0.9 per cent will develop bulimia nervosa, and 1.9 per cent will develop binge eating disorder in their lifetime. In addition to eating disorders, up to 27 per cent of adolescent girls between the ages of 12 and 18 engage in disordered eating attitudes and behaviours.

2.1. THE CAUSES OF BINGE EATING DISORDER FOR ADOLESCENTS

Researchers do not yet know the exact cause of binge eating disorder. According to a study published, dopamine levels in the brain could be a factor (Gene-Jack Wang, 2011). Dopamine can affect a person's food intake by the criteria that follow:

- Interfering with a person's ability to regulate food cravings;
- Creating cravings or a desire for certain foods;
- Increasing how much someone enjoys eating certain foods^[6].

Binge eating disorder can develop from different factors. Psychological, physical, socio-cultural and familial factors all play a part in the establishment of disordered eating. It is important to remember that the causes of eating disorders are many and can vary considerably from one individual to another. There are several explanatory causes of binge eating disorder. Some of them are listed down below.

Weight and shape concerns. One of the first theories of binge eating disorder explains it as originating from the shape and weight concerns. Individuals who are not happy with themselves, their appearance, most likely binge eat to gain comforting feeling from the food. Low self-esteem, depression and feelings of ineffectiveness or powerlessness often precede the onset of eating problems. These feelings can be related to, although not always, traumatic experiences. Difficulty expressing emotions and feelings may lead people to turn to food to deal with this.

Dieting. The single and most important factor in binge eating is dieting. A combination of physical and psychological factors might be involved. When a body is in starvation, it will show strong cravings for food because it is not getting enough nutrition. Psychologically, dieting and preoccupations with food may raise the risk of LOC. This happens when a minor slip from a person's rigid diet causes them to abandon the diet completely and to overeat instead^[13].

Weight teasing. Another cause for binge eating disorder in adolescents is weight teasing and that is more likely to internalize weight bias. A history of being teased about a person's body or appearance, saying that they don't fit in, can provoke disturbed eating habits as a way of coping with negative comments. Weight teasing is associated with body dissatisfaction, low self-esteem. Weight teasing by friends, family or other teenagers leaves a strong impact on adolescents self-image, self-worth. That may lead to mental health issues and BED, which would make adolescents overeat because the food feels comforting, when they may not have someone to talk to or are too scared and embarrassed to open up. Research about the effects of weight teasing and gender (Body Image, *Ebevier*, 2019) showed that weight teasing from boys was more strongly related to lower appearance esteem for girls than boys^[16].

Stress. Stress is also one of the BED causes. Food can be used to procrastinate during stressful times in school, college or any other situation. Food can also be used to cover up anger and/or anxiety. Almost any difficulty that causes self-doubt or concern can manifest itself as a feeling of anxiety which a person may then attempt to alleviate with food.

2.2. TREATMENT FOR BINGE EATING DISORDER FOR ADOLESCENTS

The importance of good nutritional intake at an early age is explored in multiple studies, including a systematic review in 2014 (*Am J Public Health*), which found that poor diet (with high levels of saturated fat, refined carbohydrates and processed food products) is linked to poorer mental health in children and adolescents, which can also lead to eating disorders such as BED^[7]. BED is relatively close to mental health, so, to reduce BED, it is also important to take care of mental health to balance it out. "A healthy diet is protective and an unhealthy diet is a risk factor for depression and anxiety." (Felice Jacka). Several credible systematic reviews have shown that a diet rich in fruits and vegetables, whole grains and lean proteins can help to improve overall mood and general feelings of happiness. It can also help those with BED, as there are better nutrients and they can help boost mental health. There are some self-help treatments, but with problems like BED, it is best to see a professional.

Supportive family and friends. People with binge eating disorder may find it helpful to surround themselves with supportive family members and friends. It's best to avoid people who make negative comments about eating or weight because they can add to someone's feelings of self-criticism, making matters worse. Some adolescents may feel better to express their emotions to family and friends rather than a psychotherapist or counsellor.

Food diary. A good self-help treatment way for adolescents to manage their eating and nutritional intake is to make a food diary. This is the best thing to do when starting a change in eating habits. At first, it might be hard to keep a food diary. There would be a tempting feeling to stop when a binge episode has occurred. However, it is important to write everything that is consumed, as it can help change those eating habits. A food diary can help see the amount of food and what nutrients are consumed. It helps see the overall and lets the adolescent understand the details and how it happened, whether it was out of control, whether the food intake was excessive, and other details that can help make a change. A food diary is a private diary and lets adolescent feel comfortable writing about their food intake.

Devising a Meal plan. This self-help method can have a significant effect if done correctly. The most important task to reduce cravings and tackle binges is to eat regularly and not go far more than 3 hours without eating something. When a meal or snack is finished, it is best to look at the clock and count forward two and a half hours. This will ensure that an individual knows when their next meal is scheduled.

Exercise. Another self-help treatment is exercising. Taking care of physical health is as important as mental health. Moving the body, being active can help with the feelings about body and self-esteem. It is also an important part of maintaining an efficient metabolism. Exercise is also a good way of dealing with stress and can help decrease the urge to binge. It is important to choose a type of exercise that fits an individual's life and can become an enjoyable habit. A simple and effective form of exercise is walking. Joining a gym isn't a priority. It is just important to start and later on, it will make changes in eating habits. It's better to start somewhere small. Even a little change is change and can make a greater mindset.

Self-help treatments are good for understanding the binge episodes when they occur, and creating healthier habits in everyday life but, adolescents with EDs need professional help because problems like binge eating can be caused by brain chemistry and other things that seem beyond someone's control. Doctors, counsellors, and nutrition experts often work together to

help those with Eds manage their eating, weight and emotions. Below are some options which could be helpful for adolescents.

Family therapy. An eating disorder not only affects the individual with an eating disorder but also has a significant impact on other family members or partners. If the relationship between the adolescent and family is close and they are supportive towards each other, then a good option for treatment is family therapy. If the relationship is not the best, then this can also help communicate more and find out new things about the family, and of course, help treat an eating disorder. Family therapy can be very helpful in encouraging members to communicate, learn to support each other and express emotions more openly and appropriately^[11]. This therapy also provides an opportunity for the family members to look at their family dynamics and to explore how these might be maintaining the eating disorder. They can be guided to make helpful changes that will benefit the entire family^[11].

Individual Psychotherapy and Counselling. Some people affected by an eating disorder choose to seek the support of a trained psychotherapist or counsellor^[12]. These therapies are often referred to as the 'talking therapies', or 'talking treatment'. Counselling is a process in which a person is supported to explore their difficulties and to work towards change. Working with a therapist can help adolescents talk about their feelings and develop new strategies for coping. Psychotherapy can involve identifying the interpersonal problems that have led to the development and maintenance of binge eating disorder^[11]. Psychotherapy and counselling are not about giving advice or prescribing solutions to problems. It is about empowering an individual to make choices that are in line with their needs and that will allow them to achieve their goals and a greater sense of well being.

Cognitive Behavioural Therapy (CBT). Cognitive Behavioural Therapy for BED focuses on analyzing the relationship between emotions, negative thoughts, behaviour and feelings. CBT is often used with adolescents^[12]. CBT aims to break the cycle of negative thoughts by changing the way a teen thinks or behaves. A psychotherapist may help the teen challenge negative assumptions with a behavioural experiment. Changing their thoughts can reduce the anxiety they experience^[12].

Listed above were different self-help and professional help treatments for adolescents. As already mentioned above, self-help treatments are not as effective as professional help therapies and treatments, because we can't control something that is beyond our control. Other people help is needed in a situation like that.

CONCLUSION

After exploring articles and literature about binge eating disorder and its impact on adolescent health, the author of the Paper has come to several conclusions.

BED can affect anyone no matter their age, gender, race, ethnicity, economic status and education. Moreover, although it is common in all age groups, adolescence has a higher risk of developing BED as it is a developmental stage. More research is focusing on female adolescents as they have a higher prevalence of BED. As already mentioned in this Paper, BED is a new disorder and it is included in the DSM-5 which is a significant change. It permitted people to access treatment for it. Adolescents who suffer from BED can have physical and mental health disturbances, and nowadays, there are various treatments to help cope with it and treat it. Symptoms and warning signs of binge eating disorder can be physical, emotional, and behavioural, but the important thing is to not self-diagnose but see a professionalist.

BED is not the only common ED among adolescents. It is proven, that bulimia nervosa and anorexia nervosa also have an increased prevalence in adolescence. Binge eating can be caused by different situations. The impact might be family, friends, social media, but it is hard to come to one exact cause because it is not possible. The causes can vary considerably from one individual to another. To treat BED, nowadays, there are many different available treatments for adolescents. BED can be treated by 2 main methods included in this Paper– self-help and professional help. Different studies have shown, that CBT is the best and the most effective treatment option for adolescents. It is always better to seek professional help because it is not possible for us to cure something that is out of our control.

The Author of the Paper suggests, that in the future more researches should focus on both genders of adolescents equally who suffer from BED and other types of EDs because now, most studies pay more attention to female adolescents.

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Ar savu parakstu apliecinu, ka pētījums veikts patstāvīgi un izmantoti tikai tajā norādītie informācijas avoti.

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