FAKULTA
PŘÍRODOVĚDNĚ-HUMANITNÍ
A PEDAGOGICKÁ TUL

Diplomová práce

Technical Topics in English Language Teaching at the Secondary Technical School in Liberec

Studijní program: N0114A300106 Učitelství pro střední školy a 2. stupeň základních škol
Studijní obory: Anglický jazyk
Španělský jazyk

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Vedoucí práce: Mgr. Petra Peldová, Ph.D.
Katedra anglického jazyka

Liberec 2023

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Zadání diplomové práce

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Cíle: Vytvořit soubor doplňujících aktivit k vybraným odborným tématům v předmětu anglický jazyk pro SPŠSE a VOŠ v Liberci. Aktivity se budou primárně zaměřovat na procvičení odborné slovní zásoby, mluvený projev a/či skupinovou práci. Minimálně jedna aktivita bude zaměřena na výuku v online prostředí.
Metodologie: Obsahová analýza odborné literatury. Tvorba výukových aktivit a jejich aplikace ve výuce.
Požadavky: Orientace v odborné literatuře a znalost daných odborných témat, konzultace, tvorba didaktických aktivit.

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Bergh, Helen, et al. 2012. "Setting the Foundation for Working with English Language Learners in the Secondary Classroom". *American Secondary Education* 40(3): 34–44. Accessed November 1, 2021. https://www.jstor.org/stable/43694139.
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V Liberci dne 9. května 2022

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Abstract

The diploma thesis is engaged in the topic of teaching English for Specific Purposes (ESP) at upper-secondary level, and it focuses on specialized lexis related to the field of electrical engineering. The aim and the output of the thesis is the creation and methodological description of five classroom activities targeting technical topics for the English language subject. The activities are designed to practise specialized lexis via speaking and peer interaction, and one is intended for online use via Microsoft Teams. The target learners are the students of the *Electronic Systems, Automation, and Communication Technology* specialization at the Secondary Technical School in Liberec.

Key words:

English for Specific Purposes (ESP), secondary vocational education, electrical engineering, specialized lexis, interactive activities, activity plans.

Anotace

Diplomová práce se věnuje výuce angličtiny pro specifické účely (ESP) na středním vzdělávacím stupni se zaměřením na technickou slovní zásobu pro obor elektrotechnika. Cílem a výstupem práce je vytvoření a metodologický popis pěti výukových aktivit založených na technických tématech v anglickém jazyce. Aktivity jsou navrženy s důrazem na procvičování specifické slovní zásoby prostřednictvím mluveného projevu a vrstevnické interakce. Jedna z aktivit je určena pro online použití v Microsoft Teams. Cílovou skupinu tvoří studenti oboru *Elektronické systémy, automatizace a sdělovací technika* Střední průmyslové školy v Liberci.

Klíčová slova:

Angličtina pro specifické účely, střední odborné školství, elektrotechnika, odborná slovní zásoba, interaktivní aktivity, metodické listy.

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List of Abbreviations

CEFR – Common European Framework of Reference for Languages

CLIL – Content and Language Integrated Learning

EAP – English for Academic Purposes

ELP – European Language Portfolio

EOP – English for Occupational Purposes

EScP – English for Scientific Purposes

ESP – English for Specific Purposes

RVP – Framework Educational Programme

RVP G – Framework Educational Programme for Secondary General Education

RVP PV – Framework Educational Programme for Preschool Education

RVP SOV – Framework Educational Programme for Secondary Vocational Education

RVP SV – Framework Educational Programme for Special Education

RVP ZUV – Framework Educational Programme for Primary Art Schools

RVP ZV – Framework Educational Programme for Primary Education

ŠVP – School Educational Programme

INTRODUCTION

The diploma thesis addresses the topic of teaching English for Specific Purposes (ESP) at the Secondary Technical School in Liberec and it deals with specialized lexis related to the field of electrical engineering. The thesis aims to create and methodologically describe five classroom activities targeting technical topics taught in the English language subject. The activities are engaged in the practice of specialized lexis via speaking and peer interaction and they target the students of the *Electronic Systems, Automation, and Communication Technology* specialization. Furthermore, one of the activities is designed for online use via Microsoft Teams.

The reason for forming the aim is the lack of material suitable for the oral practice of specialized lexis and for its use in interactive communication. At the Secondary Technical School in Liberec, technical topics and specialized lexis are taught with the use of a recommended textbook, *Flash on English for Mechanics & Electronics* by Sabrina Richards Sopranzi (Richards Sopranzi 2016), which focuses primarily on reading comprehension and does not provide many activities for speaking practice. Furthermore, some technical topics set by the School Educational Programme are not included in the textbook. That is why this thesis intends to cover the topics omitted by the recommended textbook. Moreover, the created activities aim to practice oral use of specialized lexis in interactive communication, and therefore, they substitute the lack of speaking practice in the recommended textbook.

The theoretical part of the thesis analyzes the recommended technical textbook and, overall, the market offer of technical textbooks suitable for teaching at the Secondary Technical School in Liberec. It also deals with the Framework Education Programme for 26-41-M/01 Electrical Engineering regarding foreign languages and the technical topics determined by the School Educational Programme. In addition, the issue of ESP and technical topics in the English

Maturita examination are addressed. The methodological part is engaged in ESP and classroom methodology, analysis of learners' characteristics, and selection of technical topics.

The output of the thesis is the creation and methodological description of five classroom activities and their activity plans. Additionally, one activity is conducted in a real-time lesson; therefore, the thesis also contains evaluation of the executed activity.

1 THE SECONDARY TECHNICAL SCHOOL IN LIBEREC

1.1 Fields of Education and Specializations

Students at the Secondary Technical School in Liberec located on Masarykova Street[1], may be educated in one of the three fields of education that the school offers. After successful completion of their studies, all graduates obtain secondary education with a Maturita examination in their field, which may be:

- IT Engineering (18-20-M/01)
- Mechanical Engineering (23-41-M/01)
- Electrical Engineering (26-41-M/01)

(SPŠSE a VOŠ 2023a)

Students of the **IT Engineering field** are divided into two specializations determined by their interest, points achieved at the entrance exam, and class capacity. The division takes place before the students start their first year of studies. The specializations are:

- Desktop, Phone, and Web Applications, and Multimedia
- Cyber Security, Systems Administration, and the Internet of Things

(SPŠSE a VOŠ 2023d[2], my translation)

[1] The Secondary Technical School of Mechanical and Electrical Engineering in Liberec (located in Masarykova Street) merged with the Textile School (located in Tyršova Street) in Liberec on July 1, 2023. The new name of the merged school is the Secondary Technical School and Higher Vocational School in Liberec (Průmyslovka Liberec 2023). This thesis uses the shortened form of the name (the Secondary Technical School in Liberec) and it focuses merely on the workplace in Masarykova Street – the former Secondary Technical School of Mechanical and Electrical Engineering in Liberec. Therefore, when the Secondary Technical School is mentioned in this thesis, it refers only to the Masarykova Street workplace.

[2] Desktopové, mobilní a webové aplikace a multimédia

Kybernetická bezpečnost, administrace systémů a internet věcí

(SPŠSE a VOŠ 2023d)

The **Mechanical Engineering field** differs from the IT and Electrical Engineering fields in terms of the division of its students. There are also two classes of Mechanical Engineering, just like in IT; however, the Mechanical Engineering students are not divided into specializations from the beginning. The students choose their specialization in their third year, so the first- and second-year students receive the same education. The classes stay the same after the division, i.e., both classes are formed of these two specializations:

- Computer Technical Support
- Mechatronics

(SPŠSE a VOŠ 2023e[3], my translation)

The **Electrical Engineering field** is formed by three specializations set at the beginning of students' studies. The first-year students are divided into specializations according to points achieved at the entrance exam and class capacity. The three specializations are:

- Electronic Systems, Automation, and Communication Technology
- Industrial Electrical Engineering, Power Electronics, and Control Systems
- Robotics, the Internet of Things, and Industrial Control Systems

(SPŠSE a VOŠ 2023b[4], my translation)

[3] Počítačová podpora techniky

Mechatronika

(SPŠSE a VOŠ 2023e)

[4] Elektrotechnika se zaměřením na elektronické systémy, automatizaci a sdělovací techniku

Elektrotechnika se zaměřením na průmyslovou elektrotechniku, výkonovou elektroniku a řídící systémy

Elektrotechnika se zaměřením na robotiku, internet věcí a průmyslové řídící systémy

(SPŠSE a VOŠ 2023b)

This diploma thesis deals with the specialization of *Electronic Systems, Automation, and Communication Technology*. The graduate students of this specialization possess the knowledge of controlling technological processes in the electrical engineering field, programming robots used in industry, using automation in security systems and building management, programming of electronic devices, etc.

The students of this specialization are taught both general and specialized subjects. The list below names all subjects of this specialization and shows the number of lessons a week that the students undergo throughout their studies (= in four years) in the brackets.

General subjects:

- Czech language and literature – CJL (10)
- English language – ANJ (11)
- German language – NEJ (2)
- Mathematics – MAT (15)
- Humanities – ZSV (6)
- Physics – FYZ (4)
- Chemistry – CHE (2)
- Physical education – TEV (8)

Specialized subjects:

- Economics – EKO (3)
- Information and communication technologies – IKT (5/6)
- Basics of electrical engineering – ZAE (6)
- Technical documentation – TED (1/3)
- Electrical measurements – ELM (8/9)
- Mechanical engineering and CAD – SCA (1/2)

- Numerical technology – CIT (1/3)
- Electronics – ELT (6)
- Automation technology – AUT (3)
- Microprocessor technology – MIT (2/6)
- Computer networks – PTS (1/3)
- Strong current equipment – SIZ (1/3)
- Radio electronic devices – RAZ (6)
- Telecommunication devices – TEZ (6)
- Work experience – PRA (9)

(SPŠSE a VOŠ 2023c)

2 FRAMEWORK AND SCHOOL EDUCATIONAL PROGRAMMES

The main curricular documents in the Czech Republic, which determine the content of education for each educational stage, are the Framework Educational Programmes. The Framework Educational Programmes, RVPs in Czech, are a set of obligatory learning outcomes and other specifics of education (length, content, objectives, etc.). Moreover, they include information about the education of students with special educational needs (NÚV 2022a).

Each educational stage has its separate Framework Educational Programme; therefore, there is a Framework Educational Programme for Preschool Education (RVP PV), Primary Education (RVP ZV), Secondary General Education (RVP G), Secondary Vocational Education (RVP SOV), Special Education (RVP SV), and Primary Art Schools (RVP ZUV), (NÚV 2022b). However, these Framework Educational Programmes set only general regulations that do not determine other necessary details, such as means of evaluation and schedule. On that account, every school must create its School Educational Programme (ŠVP) reflecting the corresponding Framework Educational Programme (NÚV 2022a).

Moreover, secondary vocational education does not have one general Framework Educational Programme that would define its content, but several of them, as there are many different fields of education and specializations that are part of vocational education. There are six big groups, later divided into specialized subgroups, that are part of the Framework Educational Programme for Secondary Vocational Education. The division of these 6 groups is based on the form of graduation or its form of study.

The groups are:

1. Conservatoires
2. Extension studies
3. Fields E (secondary education with apprenticeship certificate)

4. Fields J (secondary education)
5. Fields H (secondary education with apprenticeship certificate or Matura exam)
6. Fields L0 and M (secondary education with Matura exam)

(NÚV 2022c), (NÚV 2022d), (EDU 2022a[5], my translation)

The Framework Educational Programme that sets requirements for the field of Electrical Engineering is *26-41-M/01 Electrical Engineering* (SPŠSE a VOŠ 2023a); it is part of the *Fields L0 and M*, subgroup *26 – Electrical Engineering, Telecommunication and Computer Technology* (EDU 2022b).

2.1 Foreign Languages – Field of Education *26-41-M/01 Electrical Engineering*

Acquiring secondary school education in the Electrical Engineering field (26-41-M/01 Electrical Engineering) means studying at least one foreign language during the four-year studies. The Framework Educational Programme allocates a minimum of 320 lessons dedicated to learning a foreign language (or languages) in four years with a condition of at least ten lessons a week (Rámcový vzdělávací program pro obor vzdělání 26 – 41 – M/01 Elektrotechnika, 62).

[5]
a) Konzervatoře
b) Nástavbové studium
c) Obory E
d) Obory J
e) Obory H
f) Obory L0 a M

(EDU 2022a)

The lessons should lead to the following results:

- The minimum outcome language level of graduates must be B1 according to the Common European Framework of Reference for Languages (CEFR). If more than two foreign languages are taught, the minimum outcome of the first foreign language must be B1, and the minimum outcome of the other language(s) must be A2.
- The graduate students must acquire at least 2,300 lexicons at the end of their studies, 20% of which form professional terminology (15% for A2 level).
- The graduate students must be able to communicate, deal with written texts, and gain and seek new information in a foreign language, including general and professional/technical topics. Moreover, the students must be able to use effective methods and strategies to study foreign languages and they should understand and respect traditions, customs, and values of other nations and language areas.

(Rámcový vzdělávací program pro obor vzdělání 26 – 41 – M/01 Elektrotechnika, 20–21)

The Framework Educational Programme does not impose specific teaching methods or techniques that should be used to accomplish the required outcomes; nevertheless, it recommends several convenient ways that could be used. The first recommended method, which focuses on the development of professional language awareness, is the CLIL method (Rámcový vzdělávací program pro obor vzdělání 26 – 41 – M/01 Elektrotechnika, 20–21). CLIL, or the Content and Language Integrated Learning method, is based on integrating (foreign) language teaching with another subject (Baladová, et al. 2009). The Framework Educational Programme namely recommends including professional thematic units as a part of a foreign language subject. Since the students have to acquire professional terminology, it is not a mere recommendation. Other recommended methods are implementing multimedia

educational programmes, taking part in projects and competitions, cooperating with other schools, organizing professional language courses and international internships, and keeping a European Language Portfolio (ELP).

The Framework Educational Programme does not further specify the content of education. It states some general topics to be discussed (e.g., food, free time, shopping) and describes language competencies that are to be acquired, responding to B1 requirements according to CEFR. Addressing professional terminology and topics, students should be taught the lexis and topics given by the focus of their field/specialization. Therefore, the choice of appropriate topics is left in the hands of schools, and it gives them more freedom to create their School Educational Programmes, which deal with the subject content more in detail, according to their needs (Rámcový vzdělávací program pro obor vzdělání 26 – 41 – M/01 Elektrotechnika, 21–23).

2.2 Analysis of the School Educational Programmes at the Secondary Technical School in Liberec

Technical topics are taught in the English language subject every year throughout students' studies, starting with the easiest and proceeding with more complex topics. The School Educational Programmes define what topics are to be taught and when these topics are to be addressed (year). Each specialization within a field has its own School Educational Programme, yet the technical topics and set years are shared within the field.

Technical topics taught in the first and the second year are common to all fields of education (Electrical, Mechanical, and IT Engineering). The first-year students are introduced to technical fields and areas, numbers, materials, and their properties (proportions, colours, shapes, and others). The second-year students learn about significant inventions (considering

their field and specialization), modern scientific fields, the use of computers, and electronic communication.

The third and fourth years are more specialized than the previous years, and, therefore, technical topics addressed during these years vary from field to field (see Table 1). However, several technical topics are common to all fields taught in the third and fourth year of students' studies. All third-year students must master the topics of cars and engines, computers, input and output devices, electric circuit, measurement, and technical specifications. The common technical topics presented in the fourth year are: the impact of technology and industry on the environment, industrial production, robotics, automation, safety at work, and first aid.

The Electrical and IT Engineering fields share most technical topics in the two final years. Both fields embrace the topics of conductors, insulators, semiconductors, and superconductivity in the third year. All Electrical and IT Engineering students are presented the following topics in their fourth year: sources of energy, distribution of electrical energy, and safety and first aid regarding electrical shocks. The only topic that it different is the topics of ICT (networks, programming, multimedia, AI, and other), which is solely for IT Engineering students.

The field of Mechanical Engineering also has its exclusive topics introduced in the last two years of the students' studies. The technical topics taught in the third year are: reading instructions, troubleshooting, engineering materials, corrosion, tools, implements, and equipment. The fourth-year topics include CAD, CAM, CNC, safety at work, and first aid regarding various accidents.

Technical topics in the School Educational Programme – the differences between fields		
Electrical Engineering	***IT Engineering***	***Mechanical Engineering***
1st year		
- numbers - proportions, colours, shapes, materials, and other properties - technical fields and areas	- numbers - proportions, colours, shapes, materials, and other properties - technical fields and areas	- numbers - proportions, colours, shapes, materials, and other properties - technical fields and areas
2nd year		
- inventions - modern scientific fields, the use of computers - electronic communication (email and internet)	- inventions - modern scientific fields, the use of computers - electronic communication (email and internet)	- inventions - modern scientific fields, the use of computers - electronic communication (email and internet)
3rd year		
- computers (basic structure) - input and output devices - car and its parts, engine - conductors, insulators, semiconductors, superconductivity - electric circuit and its parts - measurement and technical specification	- computers (basic structure) - input and output devices - car and its parts, engine - conductors, insulators, semiconductors, superconductivity - electric circuit and its parts - measurement and technical specification	- computers (basic structure) - input and output devices - car and its parts, engine - electric circuit and its parts - reading instructions, troubleshooting - engineering materials, corrosion - tools, implements, equipment - measurement and technical specification
4th year		
- sources of energy (conventional and renewable), the impact of technology and industry on the environment - distribution of electrical energy - industrial production, robotics, automation - safety at work, first aid (electrical shock and other injuries) - revision of previous topics	- sources of energy (conventional and renewable), the impact of technology and industry on the environment - distribution of electrical energy - industrial production, robotics, automation - safety at work, first aid (electrical shock and other injuries) - ICT: networks, programming, multimedia, AI, and other - revision of previous topics	- the impact of technology and industry on the environment - CAD, CAM, CNC - industrial production, robotics, automation - safety at work, first aid (accidents and injuries) - revision of previous topics

Table 1: Technical topics in the School Educational Programme – the differences between fields

To conclude, technical topics are shared between the fields of education in the first and the second year and they begin to specialize in the third year. The technical topics for the field of Mechanical Engineering differentiate from the fields of Electrical and IT Engineering, which are nearly identical (Školní vzdělávací program elektrotechnika se zaměřením průmyslová elektrotechnika, výkonová elektronika a řídící systémy, 25–28), (Školní vzdělávací program elektrotechnika se zaměřením robotika, internet věcí a průmyslové řídící systémy, 29–32), (Školní vzdělávací program elektrotechnika se zaměřením elektronické systémy, automatizace a sdělovací technika, 23–29), (Školní vzdělávací program informační technologie se zaměřením desktopové, mobilní a webové aplikace a multimedia, 34–39), (Školní vzdělávací program informační technologie se zaměřením kybernetická bezpečnost, administrace systémů a internet věcí, 32–36), (Školní vzdělávací program strojírenství se zaměřením mechtronika, 27–31) (Školní vzdělávací program strojírenství se zaměřením počítačová podpora techniky, 26–29).

2.3 Technical Topics in the Oral English Maturita Examination

The oral English Maturita examination (school leaving examination) is managed by schools in accordance with the Decree No. 177/2009 Coll.[6], as amended, which states that the fields L0 and M mandatorily include a part dedicated to testing specialized lexis. Since the *Electronic Systems, Automation, and Communication Technology* specialization comes under the 26-41-M/01 Electrical Engineering field (SPŠSE a VOŠ 2023a), which is part of the Fields L0 and M (EDU 2022b), its oral English Maturita examination must contain specialized lexis. However, no official documents that would delineate the structure and content of the oral English Maturita examination at the Secondary Technical School in Liberec are available.

[6] Vyhláška č. 177/2009 Sb., § 14d, odst. 2

Owing to this fact, the description presented in the following paragraph is based on an unofficial school document (see the Appendices).

The examination lasts 15 minutes, and it is divided into four parts. The first two parts deal with general topics, the third part is based on a cultural topic, and the fourth part focuses on a technical topic. The fourth part is approximately four minutes long and the students are bound to speak independently on a given technical topic or they answer set questions and carry on a conversation on the given topic with the examiner. Pictures, diagrams, or a gapped text may be incorporated for students to describe or complete. The technical topics tested in the oral examination reflect the School Educational Programme. Thus, the requirement to include specialized lexis stated in the Decree No. 177/2009 Coll., as amended, is fulfilled in the last part of the oral examination.

3 ENGLISH FOR SPECIFIC PURPOSES

The English language is used worldwide in all areas of human life, not only in everyday communication, but also in workplace and other environments. Therefore, alongside General English, English for Specific Purposes (ESP) has arisen and become significant (Sekhar Rao 2020, 1).

English for Specific Purposes has developed to take student's individual needs into consideration, focusing on the usability and relevance of the target language. ESP means adjusting the language taught to specific needs (specific purpose) of students and their field of specialization. In other words, ESP focuses on specific language used in various jobs, professions, fields, and other specific areas and environments. Hence, there are many specific ESP "Englishes", such as, Business English, English for electrical engineers, and English for nuclear engineers (Sekhar Rao 2020, 1–2), (Scrivener 2009, 324).

As the area covered by ESP is wide, two main subgroups of ESP have emerged: English for Academic Purposes (EAP) and English for Occupational Purposes (EOP) (Belcher 2006, 134). English for Academic Purposes (EAP) aims to provide students with the language used in academic environment and disciplines. According to Liu et al. (2014, 827–828), it embraces English for Management, Finance, and Economics; English for Technology Purposes; English for Scientific Purposes (EScP); English for Medical Purposes; and English for Legal Purposes.

English for Occupational Purposes (EOP) deals with the specific language used in workplace and it focuses on aspects related with job needs and professional development (Rico, et al. 2019, 12). According to Liu et al. (2014, 828), it can be divided into English for Professional Purposes (e.g., English for Medicine, English for Business) and English for Vocational Purposes (e.g., Prevocational English, Vocational English).

Although ESP can be divided into multiple groups and subgroups, all these groups share common characteristic of ESP. Dudley-Evans et al. (2012, 4) claim that the general purpose of ESP is to address specific needs of students using appropriate methodology and activities. Other features of ESP may be more variable and not common to all its areas. ESP is generally intended to serve specific disciplines and specializations; consequently, its teaching methods, approaches and techniques may differ from methodology commonly used to teach General English. Moreover, it is often assumed that ESP students tend to be adults with intermediate to advanced knowledge of General English, yet it is also taught at secondary schools (Dudley-Evans, et al. 2012, 4–5).

3.1 ESP Textbooks Issues

Pešková et al. (2021, 70) study how languages for specific purposes are taught at secondary vocational schools specialized in civil engineering in the Czech Republic. The research shows that many problems arise from the fact that foreign language teachers are generally not experts in the specialized field, and teachers of specialized subjects often have insufficient knowledge of foreign languages. Thus, language teachers cannot rely on their colleagues' expertise when creating their own teaching material (Pešková, et al. 2021, 70).

For this purpose, a textbook may appear as an ideal option for teachers without specialized expertise (Almagro Esteban 2002, 45). Using an ESP textbook may offer many benefits to teachers, such as providing a course framework and saving preparation time, as Almagro Esteban (2002, 41) mentions in her article *How Useful Are ESP Textbooks?*.

Despite these positives, the problem of ESP textbooks may lie in the fact that they often turn out to be General English textbooks instead (Almagro Esteban 2002, 40–45). Pešková et al. (2021, 63) add that specialized textbooks are incapable of keeping up with constant changes in technical fields due to rapid technology development. Moreover, the textbooks tend

to be international, i.e., there are no special publications for different countries. As a result, the content may be inappropriate in geographical terms, the textbooks do not provide learners with translations into their mother tongue, and additionally, the textbooks do not reflect Framework Educational Programmes and school curricula (Pešková, et al. 2021, 63).

All in all, using an ESP textbook brings both benefits and drawback. Almargo Esteban (2002, 45) suggests using an ESP textbook in a flexible way and combining it with other resources rather than having it as a solo material in an ESP course.

3.2 Choosing an ESP Textbooks for Electrical Engineering – Market Offer and Other

There are several ESP textbooks suitable for the field of Electrical Engineering available on the book market in the Czech Republic. The booklist below lists some of the books available in online shops.

- *An Introduction to Electrical Science* by Adrian Waygood (2013)
- *Basics of Electrical Engineering for Diploma Engineer*s (2020)
- *Basic Transforms for Electrical Engineering* by Carl Patton, David Sawicki, and Jennifer Clark (2023)
- *Career Paths: Electrical Engineering* by Denise Paulsen and Jenny Dooley (Polish edition) (2018)
- *Electrical Engineering* by Horst Bumiller, Monika Burgmaier, Walter Eichler, Bernd Feustel, Thomas Käppel, and Werner Klee (2016)
- *English for Electrical Engineering in Higher Education Studies* by Roger H. C. Smith and Terry Phillips (2014)
- *Electrical Engineering: Know It All* by Clive Maxfield, John Bird, Tim Williams, Walt Kester, and Dan Bensky (2008)

- *Flash on English for Mechanics & Electronics* by Sabrina Richards Sopranzi (2016)
- *Oxford English for Electrical and Mechanical Engineering* by Eric Glendinning (1995)
- *The Textbook on Mechanical and Electrical Engineering* (2022)

These textbooks would be suitable for teaching purely electrical engineering, some of them also for mechanical engineering. Since the technical topics in the School Educational Programmes for the Secondary Technical School in Liberec are of a more general character for all specializations (i.e., all specializations deal with topics from the Electrical, Mechanical, and IT Engineering fields), only the last three books from the list above could be considered (Školní vzdělávací program elektrotechnika se zaměřením elektronické systémy, automatizace a sdělovací technika, 23–29), (Školní vzdělávací program informační technologie se zaměřením desktopové, mobilní a webové aplikace a multimedia, 34–39), (Školní vzdělávací program strojírenství se zaměřením mechtronika, 27–31).

Textbooks focusing on teaching technical topics and engineering in general are listed below. More details can be found in Table 2.

- *Cambridge English for Engineering* by Mark Ibbotson (2008)
- *Oxford English for Careers: Engineering* by Peter Astley and Lewis Lansford (2013)
- *Oxford English for Careers: Technology* by Eric Glendinning (2007)
- *Oxford English for Careers: Technology for Engineering and Applied Sciences* by Lewis Lansford, Eric Glendinning, and Alison Pohl (2013)
- *Professional English: English for Science & Engineering* by Ivor Williams (2006)
- *Professional English in Use: Engineering* by Mark Ibbotson (2009)

- *Technical English* by David Bonamy (2008)
- *Tech talk* by Vicki Hollett and John Sydes (2005)

There are several issues a teacher needs to take into consideration before selecting a course textbook. First, the teacher should specify what type of textbook they are looking for. It may be a core textbook used for General English teaching, supplemental textbook, grammar textbook, dictionary, or content-based textbook used for ESP. The textbook type determines the main content and layout of the textbook (Weddel 2009, 4–5).

Both Wen-Cheng (2011, 94) and Weddel (2009, 8) introduce the following selection criteria: the textbook ought to be modern with contemporary and relevant content; it should take students' previous experience, cultural and language background into consideration; its layout and design should be appropriate; and it should contain variable and authentic material addressing different learning styles. Besides these criteria, Weddel (2009, 7) adds a few more: the textbook ought to be learner-centred and teacher-friendly, the content should address all language skills, and the price should be reasonable.

Tanner et al. (2009, 121) summarize Wen-Cheng's (2011, 94) and Weddel's (2009, 4–7) criteria with a MATERIALS mnemonic applicable to selecting all English teaching materials. The mnemonic stands for: method (Does it use suitable teaching methods?), appearance (Is the design appropriate?), teacher-friendly (Is it easy to work with?), extras (Does it contain additional material?), realistic (Is the language authentic?), interesting (Would it appeal to the learners?), affordable (Is the price reasonable?), level (Is the level suitable for the learners?), and skills (Does it include all language skills that are to be developed in the course?) (Tanner, et al. 2009, 121).

Table 2 compares ESP engineering textbooks according to different aspects. As seen in the table, engineering textbooks tend to be of an Intermediate language level according to CEFR

and they target adult learners or pre-work students (secondary or tertiary level) and working professionals. None of the textbooks covers all technical topics from the School Educational Programmes for the Secondary Technical School in Liberec. As shown in Table 2, almost all textbooks consist of one volume, except for two of them. Only two textbooks cost less than 400 Czech crowns: *Flash on English for Mechanics & Electronics* by Sabrina Richards Sopranzi (Richards Sopranzi 2016) and *Tech talk* by Vicki Hollett and John Sydes (Hollett, et al. 2005). Online support via online textbook version is a rare accessory for ESP textbook, only one textbook provides online support: *Technical English* by David Bonamy (Bonamy 2008), (Pearson 2023).

All things considered, the recommended textbook for the Secondary Technical School in Liberec, *Flash on English for Mechanics & Electronics* by Sabrina Richards Sopranzi (Richards Sopranzi 2016), meets several aspects, which make it suitable for the use at the given school. It covers most topics set by the School Educational Programmes, the target learners are pre-work students, and its price is lower compared with the other textbooks. Moreover, it consists of only one volume, which makes it convenient for use. On the other hand, its language level is B1–B2 according to CEFR, which is the expected output language level of students, and therefore, the level may be too high for some students. Furthermore, it does not provide online support (Školní vzdělávací program elektrotechnika se zaměřením elektronické systémy, automatizace a sdělovací technika, 23–29), (ELI 2023), (Ajshop 2023f).

Name	Author(s)	CEFR	Topics	Target learners	Volume(s)	Price	Online support
Cambridge English for Engineering	Mark Ibbotson	B1–B2 (Cambridge 2023a)	Some topics (Cambridge 2023a)	Adults, both for school use and self-study (Cambridge 2023a)	1 (Knihy Dobrovský 2023a)	400–600 Czech crowns (Knihy Dobrovský 2023a)	No (Cambridge 2023a)
Flash on English for Mechanics & Electronics	Sabrina Richards Sopranzi	B1–B2 (ELI 2023)	Some topics (ELI 2023)	Pre-work students (ELI 2023)	1 (Ajshop 2023f)	200–300 Czech crowns (Ajshop 2023f)	No (ELI 2023)
Oxford English for Careers: Engineering	Peter Astley and Lewis Lansford	A2 (Englishbooks 2023)	Some topics (Englishbooks 2023)	Pre-work students (Englishbooks 2023)	1 (Englishbooks 2023)	600–800 Czech crowns (Englishbooks 2023)	No (Englishbooks 2023)
Oxford English for Electrical and Mechanical Engineering	by Eric Glendinning	B1 (Ajshop 2023a)	Some topics (Ajshop 2023a)	Both students and workers (Ajshop 2023a)	1 (Ajshop 2023a)	600–800 Czech crowns (Ajshop 2023a)	No (Ajshop 2023a)
Oxford English for Careers: Technology	by Eric Glendinning	A2 (Knihy Dobrovský 2023b)	Some topics (Knihy Dobrovský 2023b)	Pre-work students (Knihy Dobrovský 2023b)	1 (Knihy Dobrovský 2023b)	600–800 Czech crowns (Knihy Dobrovský 2023b)	No (Knihy Dobrovský 2023b)
Oxford English for Careers: Technology for Engineering and Applied Sciences	Lewis Lansford, Eric Glendinning, and Alison Pohl	A2–B1 (Ajshop 2023b)	Some topics (Ajshop 2023b)	Pre-work students (Ajshop 2023b)	1 (Ajshop 2023b)	More than 1,000 Czech crowns (Ajshop 2023b)	No (Ajshop 2023b)
Professional English: English for Science & Engineering	Ivor Williams	B1 (Ajshop 2023c)	Different topics (Ajshop 2023c)	University students and professionals (Ajshop 2023c)	1 (Ajshop 2023c)	400–600 Czech crowns (Ajshop 2023c)	No (Ajshop 2023c)
Professional English in Use: Engineering	Mark Ibbotson	B1–B2 (Ajshop 2023d)	Some topics (Ajshop 2023d)	Both workers and students, suitable for self-study and one-to-one classroom (Ajshop 2023d)	1 (Ajshop 2023d)	600–800 Czech crowns (Ajshop 2023d)	No (Ajshop 2023d)
Technical English	David Bonamy	A1–C1 (Pearson 2023)	Some topics (Pearson 2023)	Both students and workers (Pearson 2023)	4 (Pearson 2023)	400–600 Czech crowns (Luxor 2023)	Yes (Pearson 2023)
Tech talk	Vicki Hollett and John Sydes	A1–B1 (Oxford 2023)	Some topics (Oxford 2023)	Adult learners (Oxford 2023)	3 (Oxford 2023)	300–400 Czech crowns (Ajshop 2023e)	No (Ajshop 2023e)
The Textbook on Mechanical and Electrical Engineering	LEGARE STREET PR publishing	-	-	-	1 (Nejlevnější knihy 2023)	800–1,000 Czech crowns (Nejlevnější knihy 2023)	No (Nejlevnější knihy 2023)

Table 2: ESP textbooks – comparison of language level, topics, target learners, volumes, price, and online support

4 ANALYSIS OF FLASH ON ENGLISH FOR MECHANICS & ELECTRONICS

The textbook recommended for teaching ESP at the Secondary Technical School in Liberec is the second edition of *Flash on English for Mechanics & Electronics* by Sabrina Richards Sopranzi (Richards Sopranzi 2016). The language level of the textbook according to CEFR is Intermediate to Upper Intermediate (B1–B2) (ELI 2023), which is higher than the minimum target level stated by the Framework Educational Programme and School Educational Programme for the educational field *26-41-M/01 Electrical Engineering,* specialization *Electronic Systems, Automation, and Communication Technology* (Rámcový vzdělávací program pro obor vzdělání 26 – 41 – M/01 Elektrotechnika, 20), (Školní vzdělávací program elektrotechnika se zaměřením elektronické systémy, automatizace a sdělovací technika, 23). Since the diploma thesis targets the students of the *Electronic Systems, Automation, and Communication Technology* specialization, the recommended textbook is compared and analyzed regarding the corresponding School Educational Programme.

The textbook is divided into 12 units when one unit covers one technical topic. The topics are listed below:

- Materials and properties of materials
- Technical drawing
- Machine tools
- Electricity
- Electric circuits
- Production and distribution of electricity
- Electronics
- Telecommunication and networks

- Computers
- Automation and robotics
- Technical assistance
- Safety at work

(Richards Sopranzi 2016, 2–3)

Table 3 shows the topics covered by the textbook and their corresponding technical topics from the School Educational Programme (Školní vzdělávací program elektrotechnika se zaměřením elektronické systémy, automatizace a sdělovací technika, 23–29). The textbook includes three topics that are not prescribed for the given specialization – technical drawing, machine tools, and telecommunication and networks. However, these topics are part of the School Educational Programmes for IT and Mechanical Engineering (Richards Sopranzi 2016), (Školní vzdělávací program informační technologie se zaměřením desktopové, mobilní a webové aplikace a multimedia, 34–39), (Školní vzdělávací program strojírenství se zaměřením mechtronika, 27–31).

On the other hand, there are eight technical topics that are not part of the textbook (see Table 4). The topics are numbers, proportions, colours, and shapes; technical fields and areas; inventions; modern scientific fields; superconductivity; measurement and technical specification; and first aid (electrical shock and other injuries) (Richards Sopranzi 2016), (Školní vzdělávací program elektrotechnika se zaměřením elektronické systémy, automatizace a sdělovací technika, 23–29).

Textbook chapters	Corresponding technical topics from the School Educational Programme for *Electronic Systems, Automation, and Communication Technology* specialization
Materials and properties of materials	shapes, materials, and other properties
Technical drawing	x
Machine tools	x
Electricity	conductors, insulators, semiconductors
Electric circuits	electric circuit and its parts
Production and distribution of electricity	sources of energy (conventional and renewable) distribution of electrical energy
Electronics	electronic communication (email and internet)
Telecommunication and networks	x
Computers	use of computers computers (basic structure) input and output devices
Automation and robotics	industrial production, robotics, automation
Technical assistance	car and its parts, engine
Safety at work	safety at work reading instructions

Table 3: Textbook content and corresponding technical topics from the School Educational Programme for the Electronic Systems, Automation, and Communication Technology specialization

Technical topics in the School Educational Programme for *Electronic Systems, Automation, and Communication Technology* specialization
1st year
- numbers - proportions, colours, shapes, materials, and other properties - technical fields and areas
2nd year
- inventions - modern scientific fields, use of computers - electronic communication (email and internet)
3rd year
- computers (basic structure) - input and output devices - car and its parts, engine - conductors, insulators, semiconductors, superconductivity - electric circuit and its parts - measurement and technical specification
4th year
- sources of energy (conventional and renewable), impact of technology on the environment - distribution of electrical energy - industrial production, robotics, automation - safety at work, first aid (electrical shock and other injuries) - revision of previous topics

Table 4: Technical topics in the School Educational Programme – Electrical Engineering

The textbook' topics are covered mainly through articles followed by gap-filling or true-false exercises. Some shorter articles are recorded and used as a gap-filling exercise. The topics are generally not discussed in detail, yet this may be both an advantage and a disadvantage. On one hand, some students may consider the content insufficient and not motivating enough. On the other hand, it does not discourage weaker (or not so aspiring) students as it offers only basics.

In general, the textbook is systematic, and the layout of each unit is simple and well-arranged. It also contains useful diagrams and charts, and it provides students with a short glossary at the end of every unit. Nevertheless, the structure of the units is monotonous and repetitive, and there is no space for speaking and interactive exercises. Furthermore, the only online support available is free downloadable textbook recordings. It does not have any further online support, for instance, an online textbook version (Richards Sopranzi 2016), (ELI 2023).

Table 5 evaluates the textbook according to the material evaluation criteria stated by Tanner et al. (2009, 121). The answers are filled in by the author.

M = method	Does it use suitable teaching methods?	It mainly uses traditional teaching methods and exercises.
A = appearance	Is the design appropriate?	Yes. Although it is not very modern, the design is simple and clear.
T = teacher-friendly	Is it easy to work with?	Yes. The layout is clear and well organised.
E = extras	Does it contain additional material?	No. Only a glossary at the end of every unit.
R = realistic	Is the language authentic?	No. The language and content are adjusted to classroom use.
I = interesting	Would it appeal to the learners?	Partially. The topics are interesting, yet the content is outdated.
A = affordable	Is the price reasonable?	Yes, it costs less than 200 Czech crowns with the school discount.
L = level	Is the level suitable for the learners?	Yes, the level is B1–B2 according to CEFR.
S = skills	Does it include all language skills that are to be developed in the course?	Mostly yes. However, it mainly focuses on reading and sidelines the other skills.

Table 5: MATERIALS

6 METHODOLOGY

6.1 Aim and Target Group

The aim of the diploma thesis is to create and methodologically describe five classroom activities on technical topics for the English language subject. The activities practise specialized lexis via speaking and peer interaction and one of the activities is designed for online use via Microsoft Teams. The target group are the students of the Electrical Engineering field, the *Electronic Systems, Automation, and Communication Technology* specialization, at the Secondary Technical School in Liberec.

6.2 Stages

1. Description of the target group (learners' characteristics)
2. Selection of technical topics
3. Study and description of methodology of classroom activities
4. Conduct of one activity in a real-time lesson
5. Gain of feedback and reflection

6.3 Learners' Characteristics

6.3.1 Secondary School Learners

Each age group possesses its unique characteristics regarding language learning, and consequentially, it requires different approaches and methods. Adolescent students attending upper-secondary schools are no exception (Lightbown, et al. 2017, 92–93). Ur (2009, 290) describes adolescent learners as learners of high learning potential yet with worsened motivation and manageability. Moreover, Harmer (2006, 39) mentions that the effort to capture teacher's attention, which is typical for young learners, is replaced by interest in peer approval.

For this reason, the activities presented in this diploma thesis focus on peer interaction and cooperation.

Although adolescent students may be undisciplined and challenging to work with, this age group shares positive traits. For instance, Harmer (2006, 39) highlights the ability to handle abstract phenomena and to work with learning issues directly, which may be an imperative ability when dealing with abstract technical lexis. Besides, Lightbown et al. (2017, 93) emphasize their ability to use learning strategies and metalanguage intentionally.

The activities in the thesis are arranged from less demanding to more demanding in terms of discipline and organization. Therefore, the activities targeting younger students are more restricted than those for older students.

6.3.2 Gender Homogeneous Class

The classes of the *Electronic Systems, Automation, and Communication Technology* specialization, as well as other classes at the Secondary Technical School in Liberec, mostly form a homogeneous group in terms of gender. Solely-boys classes possess different characteristic and dynamism than coeducated classes. Boys tend to be less self-critical (Pomerantz, et al. 2002[7] in Zormanová 2013) and do not favour memorizing learning strategies as much as the girls do (Fontana 1997[8] in Zormanová 2013). They interact more with the teacher and their classmates, favouring discussions, projects, and circle class arrangement, which helps them focus their attention. Moreover, they are more competitive than girls (Zormanová 2013). Due to these reasons, the thesis implements discussion activities, cooperative activities, and some activities which might be executed in the form of a competition.

[7] Pomeranzt, Eva, Altermatt, Ellen, Saxon, Jill. 2002. Making the Grade but Feeling Distressed: Gender Differences in Academic Performance and Internal Distress. *Journal of Educational Psychology* 94(2): 396–404. Availale at: https://psycnet.apa.org/doiLanding?doi=10.1037%2F0022-0663.94.2.396.

[8] Fontana, David. 1997. *Psychologie ve školní praxi*. Praha: Portál.

On the contrary, Baker's research (2002, 1–23) shows that single-sex classes are less popular with boys than with girls, as they feel a high degree of competitiveness and even arrogance in solely-boy classes. Furthermore, Baker's research in a single-sex classroom showed that boys helped each other less, cooperated less, and forgot learning aids more often (Baker 2002, 1–23). Hence, the competitive feature of the activities in this thesis is meant to be optional and the teacher might use it only with classes demonstrating healthy competitiveness.

6.3.3 Class Size

At the beginning of the first year, each class at the Secondary Technical School in Liberec is divided into two groups/classes for the English language subject according to their English level. The maximum number of students in a foreign language class may be 23, which is given by the Decree 13/2005 Coll.[9], as amended. Still, the number of students in English classes at the Secondary Technical School in Liberec tends to be between 11 and 16.

Unlike larger classes, smaller classes may demonstrate lesser teaching issues regarding the unwanted behaviour (discipline), lack of individual approach, passivity of students, insufficient amount of teacher's feedback, and students' tendency to lose interest (Ur 2009, 303). Having a smaller class allows better employment of group work, speaking activities, different/uncommon seating arrangements, and extensive peer interaction (Scrivener 2009, 331), which is an essential condition for conducting the activities created in the diploma thesis.

6.3.4 Learners' Language Level

According to the Framework Educational Programme for 26-41-M/01 Electrical Engineering, the minimal outcome level of the first foreign language is B1 (CEFR).

[9] Vyhláška č. 13/2005 Sb., § 2, odst. 7

Nevertheless, the first foreign language may be taught at a higher level if the learners' abilities enable it (Rámcový vzdělávací program pro obor vzdělání 26 – 41 – M/01 Elektrotechnika, 20).

Although the Framework Educational Programme states the minimal outcome level of secondary school students, the initial level of learners at secondary schools is not specified. This might be caused by the fact that secondary and primary schools alike do not have a prescribed foreign language that is to be taught, i.e., the foreign language is not specified. Therefore, first-year students at secondary schools might study a different language than they studied at primary school or their first and second foreign language at primary school might have been different than those at secondary school. Thus, learners' initial English language level may vary significantly (Rámcový vzdělávací program pro obor vzdělání 26 – 41 – M/01 Elektrotechnika, 20), (Rámcový vzdělávací program pro základní vzdělávání, 24–30).

The School Educational Programme for the *Electronic Systems, Automation, and Communication Technology* specialization at the Secondary Technical School in Liberec states that the initial level of English students tends to be between A2 and B1 according to CEFR. However, it admits starting at a lower level in exceptional cases, i.e., at level A1 according to CEFR. The outcome level is commonly B1 according to CEFR, yet some students reach the level B2 according to CEFR. To conclude, the English language level of learners during their studies mostly rages from A2 to B1/B2 according to CEFR (Školní vzdělávací program elektrotechnika se zaměřením elektronické systémy, automatizace a sdělovací technika, 23).

6.4 Selection of Technical Topics

Since the target students are students of the *Electronic Systems, Automation, and Communication Technology* specialization, the technical topics selected for the activities are based on the School Educational Programme for this specialization. A narrowed selection has been made by elimination of the topics covered by the textbook *Flash on English for Mechanics*

& Electronics by Sabrina Richards Sopranzi (Richards Sopranzi 2016), which is generally used to introduce technical topics at the Secondary Technical School in Liberec.

As discussed in the chapter *4 ANALYSIS OF FLASH ON ENGLISH OF MECHANICS & ELECTRONICS*, there are 8 technical topics that are not covered by the recommended textbook. The topics are:

1. Numbers (1st year)
2. Proportions, colours, shapes (1st year)
3. Technical fields and areas (1st year)
4. Inventions (2nd year)
5. Modern scientific fields (2nd year)
6. Superconductivity (3rd year)
7. Measurement and technical specification (3rd year)
8. First aid (electrical shock and other injuries) (4th year)

(Richards Sopranzi 2016), (Školní vzdělávací program elektrotechnika se zaměřením elektronické systémy, automatizace a sdělovací technika, 23–29)

This thesis aims to create five classroom activities; therefore, the previously listed topics had to be further reduced. The technical topics prescribed for the third and fourth year of students' studies are supposed to be more specialized than those set for the first two years. Hence, all third- and fourth-year topics have been chosen for the classroom activities. However, there should be at least one activity for each year to maintain coherence. Therefore, one topic from the first year and one topic from the second year have been chosen, preferring the ones with greater specialization.

After a close selection, these topics have been chosen:

1. Numbers (1st year)
2. Inventions (2nd year)
3. Superconductivity (3rd year)
4. Measurement and technical specification (3rd year)
5. First aid (electrical shock and other injuries) (4th year)

6.5 Methodology of Classroom Activities

The diploma thesis aims to create classroom activities focusing on the practice of the target language via speaking and peer interaction. The target language represents specialized lexis (technical English), which ought to be practiced by speaking interactions in groups and pairs. Therefore, all designed classroom activities provide *language-oriented communication*, which Klippel (2005, 3–4) defines as communication for gaining and practising language, as opposed to *message-oriented communication*, where language serves as a means to deliver messages.

6.5.1 Teaching ESP

A characteristic trait of ESP is that it focuses on learners' needs regarding their field of specialization (Dudley-Evans, et al. 2012, 4–5). The thesis aims to address learners' needs in terms of oral practice of specialized lexis used in their specialization. The activities intend to develop the ability to use this lexis in communication via peer interaction and to use it in restricted and authentic output activities.

Dudley-Evans et al. (2012, 81) propose that the target lexis should serve as means of delivering content to learners, not as the content itself. Additionally, the authors stress that specialized vocabulary may be taught and practised in similar ways as English for General

Purposes vocabulary (Dudley-Evans, et al. 2012, 81–83). Furthermore, Pešková et al. (2021, 76) propose focusing on the implementation of specialized lexis in simple communication when creating teaching material and activities. Additionally, they emphasize that the activities should stress the specialized content and lexis; grammatical accuracy should be sidelined. Hence, the authors recommend applying the communicative approach (Pešková, et al. 2021, 75–76).

6.5.2 Accuracy and Fluency

According to Lindsay et al. (2012, 12–13), the goal of learning activities is to address different learners' abilities, which may be accuracy and fluency. Accuracy represents the ability to use language correctly regarding grammar, pronunciation, etc. Fluency means compressible communication when learners are able to adjust their language and overcome language barriers (Lindsay, et al. 2012, 12–13).

Since the classroom activities in the thesis target both vocabulary and speaking, the activities require accuracy as well as fluency. Accuracy is demanded in terms of the correct use of specialized lexis. Fluency is represented by the need for interaction and spontaneous delivery of required messages, which may test students' ability to adapt their language and improvise.

6.5.3 Teaching Speaking and Lexis, Interactive Activities

In view of the fact that the classroom activities are designed to practise lexis, not solely vocabulary, the term lexis needs to be defined. According to Scrivener (2009, 227–228), lexis, unlike vocabulary, includes not only single words and fixed two-/three-word combinations but also collocations and "ready-made" chunks. Ur (1996, 60–62) emphasizes that there are several aspects that need to be addressed when teaching lexis. Learners need to be familiarized with the meaning and with pronunciation, spelling, grammar, meaning aspects (denotation, connotation, appropriateness, meaning relationships), and word formation (Ur 2009, 60–62).

Scrivener (2009, 233–234) offers an example of a lesson procedure which may be used to teach lexis. The procedure consists of pre-teaching lexis, written practice, oral practice, and the use of lexis in a communicative activity (Scrivener 2009, 233–234).

Since the thesis aims to practice lexis in speaking and interactive activities, it intends to cover the last two stages of the recommended procedure – oral practice or/and the use of lexis in a communicative activity. Nonetheless, one activity, besides oral practice, also features written practice. All in all, the learning activities in this thesis do not primarily focus on teaching lexis and all its aspects (meaning, pronunciation, grammar, etc.). However, they intend to practice it in oral form via communicative activities, which presumes anterior knowledge of the target lexis.

Interactive activities are such activities that foster interaction, i.e., they promote social contact and communication between lesson participants (Průcha, et al. 2013, 110–111). This thesis focuses merely on the interaction between students. According to Skalková (2007, 224–225), peer interaction activities encourage student cooperation, discussions, and initiative.

Lindsay et al. (2012, 65–67) provide examples of speaking interactive activities, which may be information gap activities, discussion activities, role plays, games, and informal interaction. Furthermore, speaking activities may be represented by prepared talks (presentations), questionnaires (Harmer 2006, 274), and speaking drills (Lindsay, et al. 2012, 61). Examples of discussion activities may be group planning activities, list sequencing tasks (ranking activities), pyramid discussions (Scrivener 2009, 152–153), surveys, debates, and discussion and solving of problems (Lindsay, et al. 2012, 66).

The activity types used in the diploma thesis are classified according to suggestions by Lindsay et al. (2012, 65–67), Harmer (2006, 274), and Scrivener (2009, 152–153), which are described in the previous paragraph. The thesis features discussion activities, informal interactions, a prepared talk, games, and speaking drills.

6.5.4 Interaction Patterns and Grouping

Owing to the fact that interactive activities require student-to-student interaction, teachers need to decide what interaction pattern is the most convenient for the activity (Scrivener 2009, 84). Interaction patterns may be defined as the ways of communication between the lesson participants (Lindsay, et al. 2012, 166). According to Scrivener (2009, 84), interaction patters are tightly related to grouping and he lists the following groupings / interaction patterns that might be used for interactive student(s)-to-student(s) activities: whole class interaction (mingle), small groups, and pairs.

The interaction patterns used in the activity plans in the diploma thesis are those proposed by Scrivener (2009, 84). The activities contain 2 different types of student(s)-to-student(s) interactions: pairs and small groups. Moreover, the lead-ins and post-activities also include teacher-to-student whole class interaction.

6.5.5 Seating Arrangement

The seating layout in classrooms at the Secondary Technical School is permanently set, and arrangement changes are possible only for one lesson. Most classrooms are arranged in a traditional way suitable for frontal teaching (Scrivener 2009, 88). In spite of these limitations, the classrooms are big in size and offer a lot of space for movement and interaction, thus enabling any desired seating arrangement, although it has to be temporary.

6.5.6 Online Teaching

The aim of the diploma thesis is to create at least one activity suitable for online use. Since the activity is bound to focus on speaking practice and peer interaction, it is designed for synchronous online teaching. Synchronous online lessons, in contrast to asynchronous lessons, mean that students and a teacher virtually meet at a given time and the communication takes

place in a real-time, which enables desired social interaction and immediate communication (Scheiderer 2022).

Clark-Ibáñez et al. (2008, 36) mention that face-to-face activities and lessons should not be simply converted into online activities and lessons. The authors emphasize that online environment requires different structures than face-to-face lessons, and therefore, they recommend dividing online lessons into small and compact chunks (Clark-Ibáñez, et al. 2008, 36–37). Both Clark-Ibáñez et al. (2008, 37) and Baum et al. (2019, 242) agree than online environment is more demanding with regard to organization and self-discipline of students.

The platform used for online teaching at the Secondary Technical School is Microsoft Teams. Thereby, the online activity is designed in accordance with the options and functions of this platform.

6.5.7 Creating an Activity Plan

It is a common practice to create a lesson plan before conducting a real-time lesson (Harmer 2006, 308), (Lindsay, et al. 2012, 103), (Scrivener 2009, 109). Lesson plans may address various issues and they intend to ensure that a lesson has a structure and a purpose (Scrivener 2009, 109–110). As the diploma thesis deals only with classroom activities, not a whole lesson, an activity plan template has been created (see Table 6) in order to supplement a lesson plan. The activity plan in based on the suggestions of Lindsay et al. (2012, 103), Harmer (2006, 315), and Scrivener (2009, 109–121) which are described in the following paragraph.

Lindsay et al. (2012, 103) propose involving the following aspects in a lesson plan: the aim/goal of the lesson, resources/materials, types of activities and their ordering, interaction pattern, timing, and the speed/pace. In addition, when stating the lesson aim, learners' characteristics should be taken into consideration – language level, needs, etc. (Lindsay, et al. 2012, 103). Furthermore, Harmer (2006, 315) suggests predicting various problems that might

occur and their possible solutions. The author also suggests incorporating description of the procedures which would state teacher's and students' activities/behaviour during the lesson (Harmer 2006, 315). Scrivener (2009, 109) adds that students' assumed knowledge, timetable fit, and subject matter should be considered. The author defines subject matter as skills, language areas, and topics that are to be practised during the lesson. The timetable fit is understood as the context of the previous, or possibly the following, lessons (Scrivener 2009, 109–121). After conducting a lesson, Lindsay et al. (2012, 103) recommend evaluation of the lesson and self-reflection.

Having considered all the proposals, the activity plan used in the diploma thesis (see the activity plan template in Table 6) includes learners' assumed knowledge, timetable fit (in the context of the previous lesson and also the lesson itself), activity aim, resources/materials, likely problems and their possible solutions, activity stage and type, interaction pattern, timing, and procedure. Since all the activities aim to practise specialized lexis and speaking, the subject matter is replaced by an enumeration of the target lexis and set topic. The activity plan that is to be conducted in a real-time lesson also contains learners' characteristics, evaluation, and self-reflection.

Due to the fact that lessons and learning activities alike require proper staging, the topic of activity staging needs to be addressed (Lindsay, et al. 2012, 108), (Scrivener 2009, 44–46). Scrivener (2009, 44–46) proposes division of learning activities into six stages:

1. Before-the-lesson stage
2. Lead-in stage
3. Setting-up-the-activity stage
4. Running-the-activity stage
5. Closing-the-activity stage
6. Post-activity stage

Each stage assigns a different role to the participants. The *before-the-lesson stage* is solely for teachers, who are bound to prepare any material necessary for the activity and familiarize themselves with the topic and activity. Teachers are expected to predict problems which might occur and decide whether the activity is suitable and appropriate for their students. The *lead-in stage* aims to motivate and prepare students for the activity itself and serves as an introduction. The teacher tries to engage students' attention and interest. During the *setting-up-the-activity stage* the teacher provides students with instructions, arranges the classroom, and performs any other preparations needed for the activity. The *running-up-the-activity stage* is a performance of the activity. Students ought to execute the activity while the teacher adopts the role of a facilitator and an observer. The *closing-the-activity stage* gradually ends the activity. The *post-activity stage* provides time for feedback or subsequent work (Scrivener 2009, 44–46).

ACTIVITY PLAN TEMPLATE
Learners' characteristic Learners' assumed knowledge Timetable fit Topic Activity aim Target lexis Resources/materials Possible problems and solutions Activity stage Activity type Interaction pattern and grouping Timing
Procedure
Evaluation and self-reflection

Table 6: An activity plan template

6.5.8 Restricted and Authentic Output Activities and Their Position within a Lesson

According to Scrivener (2009, 112), learning process comprises three stages: input, learning, and use. As all activities in the diploma thesis aim to *practise* specialized lexis via speaking and peer interaction, they belong to the stage of *use*, which is represented by restricted and authentic output activities. Restricted output entails language accuracy and the learner's performance is limited and controlled by the teacher (e.g., speaking drills). In contrast, authentic output lays stress on fluency and it gives learners more freedom to communicate their message (e.g., discussions). Whether the activities focus on restricted or authentic output may significantly influence their position within a lesson. Restricted output activities may be suitable both for the beginning and end of a lesson; authentic output activities are convenient at the end of a lesson (Scrivener 2009, 114, 117).

Lindsay et al. (2012, 108–109) divide a lesson into three consecutive stages: the opening, the middle, and the end stage. The opening stage is suitable for warm-up activities, the introduction of the lesson topic, and motivation of learners. The middle stage is where the learning process takes place, and therefore, it may follow the learning stages described in the previous paragraph. The end stage closes the lesson and it may also serve as a quick revision (Lindsay, et al. 2012, 108–109).

Each lesson plan in the thesis recommends a convenient position for the activity in a lesson, following the division and recommendations of Lindsay et al. (2012, 108–109) and Scrivener (2009, 112–117). Thus, all activities include a lesson timeline where the recommended execution of the activity is marked (see the lesson timeline template in Figure 1).

Figure 1: Lesson timeline template

7 ESP CLASSROOM ACTIVITIES

CLASSROOM ACTIVITIES		
	Activity type	*Interaction pattern*
Numbers1st year)		
Lead-in	Informal interaction	Whole class
Activity	Drill	Pairs
Post activity	Drill	Individual work, whole class
Inventions		
Lead-in	Informal interaction	Whole class
Activity	Game	Small groups
Post activity	Discussion activity	Small groups
Superconductivity		
Lead-in	Informal interaction	Whole class
Activity	Game	Pairs
Post activity	Discussion activity	Small groups, whole class
Measurement and technical specification		
Lead-in	Informal interaction	Whole class
Activity	Game	Pairs
Post activity	Discussion activity	Pairs
First aid (electrical shock and other injuries)		
Lead-in	Informal interaction	Whole class
Activity	Discussion activity	Small groups
Post activity	Prepared talk	Small groups, whole class

Table 7: Classroom activities – types and interaction patterns

7.1 Activity 1

The activity is most suitable for the opening part or the end of the middle part of a lesson (see Figure 2). It is a short, restricted output activity suitable for revision, yet it may also be noisy. Therefore, it may be an appropriate warm-up at the beginning of a lesson or a lively revision / automating exercise at the end (Lindsay, et al. 2012, 108–109), (Scrivener 2009, 116–117).

Figure 2: Lesson timeline – activity 1

7.1.1 Activity Plan 1

Learners' assumed knowledge: The learners are familiar with the rules that are applied when reading big cardinal numbers, decimal numbers, fractions, and percentages.

Timetable fit: The previous English lessons, or possibly the activities conducted before this activity, have been dedicated to practising reading cardinal numbers, decimals, fractions, and percentages.

Topic: Numbers

Activity aim: The aim of the activity is to practise reading big cardinal numbers, decimal numbers, fractions, and percentages in a spoken form with the focus on accuracy.

Target lexis: fraction, percentage, cardinal number, decimal number, nought

Activity type: drill, informal interaction

Interaction pattern and grouping: whole class, pair work, individual work

Timing: 5–10 minutes

Resources/materials: cards with numbers, magnets, a board, a chalk

Instructions regarding the material: The material (cards) is part of the Appendices. The cards ought to be printed on both sides (one side contains the numbers and the other side their word forms) on A3 paper to ensure good legibility as they are intended to be pinned on the board, and therefore, the students should be able to read them. The cards may be laminated.

Possible problems and solutions: The "moving row" might cause chaos, which might be prevented by clear instructions. If the students are generally noisier, the teacher may use a bell to indicate time for moving. Moreover, the students may not check their partner's response properly due to distractions and missing monitoring if the teacher participates in the activity.

•

Lead-in: The teacher introduces the activity by asking the students about the value of the pi number (π = approximately 3.14).

Notes: The teacher may ask other questions related to numbers, e.g., the date, difference between even and odd numbers, their favourite numbers. If necessary, the teacher quickly revises the basic rules for reading numbers in English (he/she may write some example numbers on the board and ask the students to read them).

Setting-up-the-activity: The teacher gives instructions, divides the students into two rows facing each other, and then he/she gives them cards with numbers.

Description of the activity: The students are divided into two rows facing each other and the teacher decides which row is a "moving row". Each student receives a card. One side of the card shows a number and the other side its word form. The student holds the card in a way that he/she sees the word form and his/her partner in the opposing row sees the number. The opposing partners read each other's numbers and check each other's reading. Then, the teacher instructs the "moving row" to move one place to the left. Now, each student has a new opposing partner and they do the same thing – they read each other's numbers and check the reading. The activity ends when the initial partners meet again.

Notes: If there is an odd number of students, the teacher participates as well in order to create equal rows.

Running-the-activity: Throughout the activity the teacher instructs the "moving row" to move one place to the left.

Closing-the-activity: When the initial partners meet again, the teacher ends the activity.

Post-activity: The teacher writes the following categories on the board: cardinal numbers, decimals, fractions, and percentages. The students match their number on the card with its corresponding category on the board using a magnet. Then the whole class checks the correct answers together and reads the numbers out loud in chorus.

7.2 Activity 2

The use of this activity is recommended for the end of the middle part of a lesson (see Figure 3). Since its duration is around 15–20 minutes, it makes the activity inappropriate as a warm-up. Furthermore, the activity promotes authentic output, thus assuming certain level of target language revision and preparation in the preceding part of a lesson. The post-activity may serve as a closure of a lesson as the students evaluate the importance of the discussed inventions in their daily life (Lindsay, et al. 2012, 108–109), (Scrivener 2009, 116–117).

The inventions have been chosen after consulting the article *Here are 9 of the most important electrical inventions ever* (McFadden 2023) and the internet page *HowStuffWorks* (HowStuffWorks 2023).

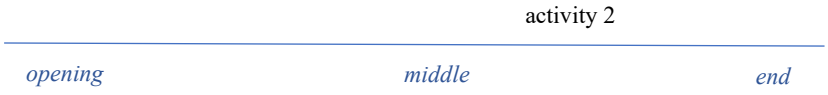

Figure 3: Lesson timeline – activity 2

7.2.1 Activity Plan 2

Learners' assumed knowledge: The learners can name inventions and their inventors that are related to or contributed to the field of electrical engineering using appropriate lexis.

Timetable fit: The previous English lessons addressed the topic of famous inventions and inventors from the English-speaking countries and the Czech Republic. The inventions significant for the field of electrical engineering might have been discussed in the previous lessons or before conducting this activity.

Topics: Inventions

Activity aim: The aim of the activity is to practise lexis connected with inventions that are significant for the electrical engineering field (see the target lexis) in a spoken form and to practise speaking in the context of inventions with the focus on fluency.

Target lexis: direct current, alternating current, light bulb, carbon filament, transistor, induction motor, Tesla coil, voltaic pile, electrical fuse, dynamo, alternator, semiconductor, asynchronous motor, electric circuit, generator, short circuit, mechanical energy

Activity type: game, discussion activity, informal interaction

Interaction pattern and grouping: whole class, group work (4 groups of 3–4 students)

Timing: 15–20 minutes

Resources/materials: cards with inventions

Instructions regarding the material: The material (cards) is part of the Appendices. The activity is intended for 4 groups of 3–4 students. Each group receives one full set of cards that are below, and therefore, these cards need to be printed at least 4 times. The cards may be laminated.

Possible problems and solutions: The students may use their mother tongue while describing the inventions; the teacher may prevent this by constant monitoring. Furthermore, the students might become too noisy while describing the inventions, which might be prevented by clear instructions before setting the activity.

•

Lead-in: The teacher asks the students to name some inventions they remember from the previous lesson that are connected with the field of electrical engineering. He/she makes sure that difficult words, such as Tesla coil and voltaic pile, are mentioned.

Setting-up-the-activity: The teacher gives instructions to the whole class. Then he/she divides the students into 4 groups, gives them the cards, and appoints the students that should start the activity.

Description of the activity: Each group of students receives a set with 9 cards. One student takes a card and intends to describe the invention on the card to his/her group without using the words that are part of the name of the invention. Other students from the group try to guess the name of the invention. When they guess it, another student from the group takes a card and does the same thing (clockwise direction). They continue until all inventions/cards are described.

Note: The cards also contain words that might be useful when describing the invention. The students might be asked to use them or to avoid them; it depends on their language level.

This activity can also be performed as a competition within the groups – the student who first guesses the name of the invention "wins" the card. When the activity ends, the student with the highest number of cards is the winner.

Running-the-activity: The students perform the activity and the teacher monitors. If some groups finish earlier, they may chronologically order the inventions (with the use of their phone).

Key (the oldest → the newest): voltaic pile, dynamo + alternating current, transistor, alternator, light bulb, induction motor, electrical fuse, Tesla coil (ETHW 2023).

Closing-the-activity: When all groups have finished, the teacher gathers students' attention and asks some students to briefly describe the inventions. The earlier-finished groups present the chronological sequence of the inventions.

Post-activity: The groups are asked to order the inventions according to their significance in the students' daily life. Afterwards, they may present it to the whole class or to another group.

7.3 Activity 3

This activity integrates movement and it is likely to become popular with kinaesthetic learners (Gardner 1983[10] in Harmer 2006, 47). As the activity involves restricted output and

[10] Gardner, Howard. 1983. *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books.

may serve both as a leading activity to promoting authentic output and a follow-up activity after introducing the topic of conductivity, it is suitable for any part of the middle stage (see Figure 4) (Lindsay, et al. 2012, 108–109), (Scrivener 2009, 116–117).

The texts used in the activity are an adaptation of the internet articles *Superconductivity* (Ginsberg 2023), *DOE Explains... superconductivity* (Office of Science 2023), and *Superconductivity* (CERN 2023).

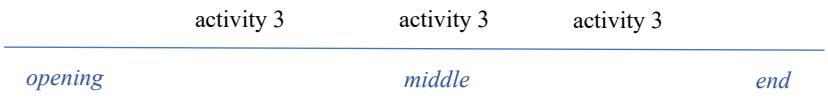

Figure 4: Lesson timeline – activity 3

7.3.1 Activity Plan 3

Learners' assumed knowledge: The students can define the term conductivity and superconductivity. They can name examples of common conductors, semiconductors, and insulators.

Timetable fit: The previous English lessons / activities have dealt with the topic of conductors and insulators. Possibly, this activity/topic could also follow the topic of properties of materials, or it could precede the topic of the electric circuit.

Topics: Superconductivity

Activity aim: The aim of the activity is to practise vocabulary connected with superconductivity and its history (see the target lexis) in a spoken and written form in the context of history of superconductivity.

Target lexis: superconductor, superconductivity, mercury, energy loss, absolute zero, niobium and titanium alloys, direct current, magnetic field, electrical resistance, non-superconducting state

Resources/materials: slips of paper with a text, papers and pens, a text with gaps (handout for students), (a projector and a computer)

Instructions regarding the material: The material (paper slips) is part of the Appendices. The paper slips need to be printed only once and then they should be cut into separate paper slips. The student's handout needs to be printed for each pair (= approximately 8 times). The paper slips may be laminated.

Activity type: game, discussion activity, informal interaction

Interaction pattern and grouping: pair work, group work (groups of 4 students), whole class

Timing: 20–25 minutes

Possible problems and solutions: Some groups may finish significantly earlier that the other groups and they may be bored or misbehave. To prevent this, the teacher may set a time limit to reduce waiting time. Furthermore, this activity may become too noisy, so the students may be asked to whisper.

Another problem that may occur is that the students may write the answer with incorrect spelling. The teacher may solve this problem by projecting the complete text while the whole class checks the correct answers (the post-activity), so the students can correct their spelling mistakes.

•

Lead-in: The teacher asks the students to define electrical conductivity and superconductivity and to name some common electrical conductors, semiconductors, and insulators used in their field.

Possible answers: conductivity = the ability of a material to conduct electric current; superconductivity = conductivity without energy losses; conductors: metals, water; semiconductors: silicon, germanium; insulators: dry wood, ceramics (Richards Sopranzi 2016, 4 – 12).

Setting-up-the-activity: The teacher gives instructions to the whole class. Then he/she divides students into pairs, appoints a sitter and a runner for the first slip of paper, and starts the activity.

Description of the activity: Each pair of students receives an incomplete text with gaps about superconductivity and its history. The missing information can be found on the slips of paper that the teacher has placed all around the classroom. One student in the pair is a sitter and the other student is a runner. The runner runs to one slip of paper, memorizes the needed information, and then goes back to his/her partner, the sitter, who writes the information into the proper gap in the text. Then the sitter becomes a runner and does the same thing until the pair completes their text.

Note: If the teacher uses this activity right at the beginning of the lesson, he/she may place the slips of paper around the classroom before the lesson starts. If this activity takes place during the lesson, the teacher may choose to do a written lead-in (the students would be asked to write the definitions and examples down) and he/she places the slips of paper during the lead-in.

If there is an odd number of students, there can be one group of 3 students. The teacher also may set a time limit for the activity.

Running-the-activity: The students perform the activity and the teacher monitors.

Closing-the-activity: The activity ends when the last pair completes their text or after a given time limit, provided that the teacher decides to set a time limit.

Post-activity: The students form groups consisting of two pairs (there would be one group consisting of three pairs in case of an odd number of pairs) and they check/compare their answers. After that the whole class checks together the correct answers – students take turns in reading the text out loud and thus they also practise pronunciation.

7.4 Activity 4

This activity is designed for online use via Microsoft Teams with the use of separate breakout rooms. Although this activity might seem difficult for organization, it is designed for third year students, and therefore, it assumes certain level of autonomy and self-management of students. As the students have been using Microsoft Teams since the beginning of their studies, they are familiar with this platform and they know how to use it (e.g., how to share screen). It may be suitable as a warm-up at the beginning of a lesson or as a revision at the end of the middle part of the lesson as it promotes restricted output (see Figure 5) (Lindsay, et al. 2012, 108–109), (Scrivener 2009, 116–117).

Since this activity is created for third years students, it features not only well-known quantities and units, but also those which are less common in order to provide the students with desired challenge (Scrivener 2009, 110). The quantities and units used in the Pelmanism game have been chosen after a consultation with the author's colleagues teaching physics.

Figure 5: Lesson timeline – activity 4

7.4.1 Activity Plan 4

Learners' assumed knowledge: The students know the terms "unit" and "quantity". They can name some units and quantities commonly used in the field of electrical engineering.

Timetable fit: The previous English lessons, or the preceding activities, have addressed the topic of measurement and technical specifications. The lessons/activities have introduced the SI system of units and different systems of measurement.

Topics: Measurement and technical specifications

Activity aim: The aim of this activity is to practise names of quantities and their corresponding units used in the field of electrical engineering (see the target lexis) in spoken form. Furthermore, the aim of the post-activity to practise speaking focusing on fluency in the context of units and quantities used in the electrical engineering field.

Target lexis: capacitance (C) – farad (F), charge (Q) – coulomb (C), power (P) – watts (W), frequency (f) – hertz (Hz), inductance (L) – henry (H), impedance (Z) – ohm (Ω), conductance (G) – siemens (S), resistance (R) – ohm (Ω), current (I) – ampere (A), voltage (V) – volt (V)

Activity type: game, discussion activity, informal interaction

Interaction pattern and grouping: pair work, whole class

Timing: 15 minutes

Resources/materials: Microsoft Teams, online Pelmanism game, extra work (handout)

Instructions regarding the material: The link for the activity and the extra task (see the post-activity) are part of the Appendices.

Possible problems and solutions: The students in the Microsoft Teams breakout rooms may not perform the activity, which may be prevented by instant teacher monitoring. Some pairs may finish significantly earlier, in this case, they may receive extra task (see the post-activity). Furthermore, some students or the teacher might have problems with internet connection, which cannot be prevented in any way.

•

Lead-in: The students are asked to write all quantities they know and their corresponding units into the chat box in one minute.

Setting-up-the-activity: The teacher gives instructions to the whole class. Then he/she divides the students into pairs (separate Microsoft Teams breakout rooms), appoints the “card flipper”, and sends them an online link for the activity.

Description of the activity: The students are divided into pairs in separate Microsoft Teams breakout rooms. They are sent a link for an online Pelmanism game, where their task is to match a quantity with its unit. One student from the pair is a "card flipper" and his/her task is to flip the cards and share his/her screen so his/her partner can see it. The "card flipper" starts the game in a way that he/she flips two cards and reads the words on the cards. If the cards match, he/she can continue. If not, his partner gives him/her instructions which two cards he/she wants to flip. The activity ends when all cards are matched.

Note: If there is an odd number of students, there will be one group of 3 students. The students may perform this activity as a competition, and they can receive (note down) points for matched cards.

Running-the-activity: The teacher monitors the activity via visiting the Microsoft Teams breakout rooms.

Closing-the-activity: When all the students are finished with the Pelmanism game, the teacher closes the breakout rooms and he/she asks what quantities and units were the most difficult to match. The students write their answers into the chat box.

If some pairs finish significantly earlier than others, the pairs will receive a document with quantities and units from the Pelmanism game and their task will be to fill together the missing symbols of quantities and units with the help of the Internet (see the Appendices).

Post-activity: The pairs return back to the breakout rooms and they answer the questions sent by the teacher.

Questions: Which quantities and units from the Pelmanism game do you use the most in your specialization? Which ones do you use the least? Are they used in other school specializations/fields? What school subjects deal with those quantities and units and what for?

7.5 Activity 5

It is recommended to use this activity towards the end of a lesson as it is too complex to be used as a warm-up (see Figure 6). Furthermore, since the students need to apply their previously gained knowledge and lexis in an authentic output activity, it serves as a revision of the topic of safety (Lindsay, et al. 2012, 108–109).

The activity is not meant to picture special cases of accidents but to introduce examples of electrical shock that the students might encounter in their work. The accidents are not described in detail in order to facilitate discussion regarding possible solutions and different influencing factors.

The recommended course of action has been created using proposals by an inspection technician and suggestions published in the Internet articles *Electric shock first aid treatment* (Safety First Aid 2023), *Electric shock – low voltage current* (St John Ambulance 2023), and *Electrical shock: First aid* (Mayo Clinic 2023).

Figure 6: Lesson timeline – activity 5

7.5.1 Activity Plan 5

Learners' characteristic: 14 students, language level B1–B2, the students tend to actively participate in the lessons, the students work as a team and there is no animosity between them, they enjoy working in pairs/groups and cooperation in general, they are talkative and sometimes become noisy when working together but they calm down quickly if instructed, speaking skills are their strong point, spelling and grammar (tenses especially) are their weaker side.

Learners' assumed knowledge: The students are familiar with possible dangers and safety measures at work. They can identify various warning signs.

Timetable fit: The preceding English lessons have dealt with the topic of safety in the workplace and they have introduced desired rules of conduct in a workplace. Possibly, the previous lessons, or activities, could have addressed the topic of first aid.

Topics: First aid – electrical shock

Activity aim: The aim of the activity is to practise speaking focusing on fluency and spoken form of lexis related to first aid (see the target lexis) in the context of electrical shock.

Target lexis: main circuit breaker, electrical socket, electrical device, get an electrical shock, electrical conductor, be electrocuted, electrocute, electrical current, non-conductive objects, be unconscious, access the situation, give someone first aid, cardiopulmonary resuscitation (CPR), vital signs, downed high voltage wires, power distribution company, electric arc

Activity type: discussion activity, prepared talk (presentation), informal interaction

Interaction pattern and grouping: group work (4 groups of 3–4 students, then 2 groups of 6–7 students), whole class

Timing: 20 minutes

Resources/materials: paper slips with 2 different accidents and sets of paper slips with a recommended solution

Instructions regarding the material: The material (paper slips) is part of the Appendices. This activity is designed for 4 groups when each group receives one paper slip with an accident and one set of paper slips with a recommended solution. As there are only two different accidents, each accident paper slip needs to be printed twice. The sets of paper slips with recommendations need to be printed eight times – four sets need to be cut into separate paper slips; the other four sets will not be cut as they will be given to groups as a key. The paper slips may be laminated.

Possible problems and solutions: The students might use their mother tongue during the discussions, the teacher may eliminate this by monitoring. Furthermore, the discussions might be too noisy, hence the students should be instructed to keep their voices low. If some groups finish earlier than the other groups, the teacher provides them with additional discussion topic (see closing-up-the activity).

•

Lead-in: The students translate a joke into English: "Pokud tancuji a nehraje hudba, vypněte hlavní jistič.".

"If I am dancing and there is no music playing, turn the main (circuit) breaker off."

Setting-up-the-activity: The teacher gives instructions to the whole class and then divides the students into groups. He/she gives them paper slips with accidents and later other paper slips with a recommended solution.

Description of the activity: The students are divided into 4 groups and each group receives a paper slip with an accident containing electrical shock. First, their task is to discuss possible solutions for the given situation. Later, the teacher gives them a set of paper slips with a recommended solution and their task is to chronologically order the paper slips.

Running-the-activity: The teacher monitors the groups.

Closing-the-activity: When the groups have ordered the recommended solution, the teacher gives them an uncut set of recommendations containing the correct chronological order so they can check it. Then they can evaluate their original solution(s). If some groups finish significantly earlier than the other groups, their task is to discuss possible precautions for the situation.

Post-activity: Groups with different accident cards join each other, introduce/describe their accident, and present the recommended solution to the other group using their own words. The groups are instructed to engage all members in the description and presentation process.

7.5.2 Conduct of the Activity in a Real-time Lesson

The activity was executed on 30th October 2023 during the 3rd lesson (10:00–10:45) in the class of fourth-year students of the *Electronic Systems, Automation, and Communication Technology* specialization. The class is a solely-boys class, and there were 13 students present (out of 14). For the classroom arrangement, see Figure 7. The activity was intended as a revision and closing activity for the topic of safety and it was conducted as the last activity before closing the lesson.

First, the students were asked to translate the lead-in joke, which they did with ease. The teacher pointed out that it is a zero conditional sentence. Then the teacher set the activity by giving instructions and dividing the students into groups. Since there were 13 students present, it resulted in forming three groups of three students and one group of four students. The teacher asked one student to repeat the instructions and then handed a slip of paper with an accident to each group. However, one group was unsure what to do, so the teacher had to clarify the instructions.

The teacher monitored the students during the whole activity. One group did not take the task seriously and did not work much at first, so they were instructed to calm down. Some students had to be occasionally reminded to speak English. Otherwise, the groups worked well and all group members seemed to participate. The teacher stirred up the discussions by asking additional questions when the conversation in groups started to wane.

When the group conversation declined significantly, the teacher handed each group the recommended solution (key). The groups had around one minute to compare their solution with the recommended solution. Then two groups with different accidents were joined together and they presented the recommended solution and also their original solution to the group with a different accident. The teacher monitored the groups during this post-activity.

After the presentations, the teacher showed a total-stop device (see Figure 9 and 10) to the students and their task was to discover what was not right about the device (the case must be yellow to provide better visibility). Although this last stage was not part of the activity plan, it proved to be successful and the students seemed to appreciate it. The activity, without presenting the total-stop device, lasted the estimated 20 minutes.

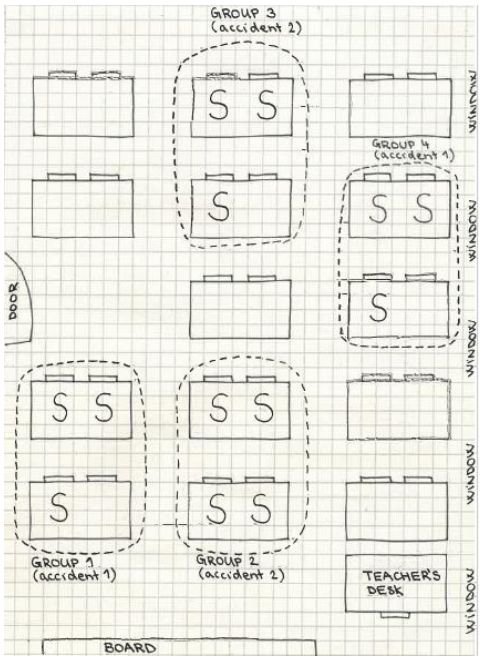

Figure 7: The classroom arrangement
(author's own source)

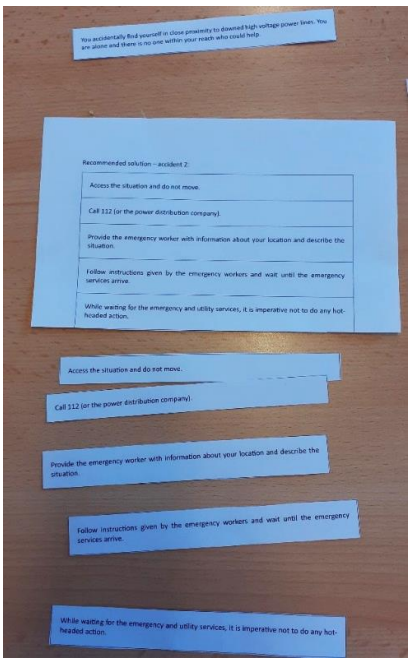

Figure 8: Recommended solution – accident 2
(author's own source)

Figure 9: A total-stop device
(author's own source)

Figure 10: A total stop device
(author's own source)

7.5.3 Teacher's Evaluation and Self-reflection

Some students liked the lead-in joke; however, I would choose a different lead-in next time as some students did not take the following activity seriously enough, which might have been bolstered by the lead-in. In addition to being difficult to motivate, the fourth-year students are often too relaxed and it is challenging to make them take some topics seriously. I did not take this aspect into consideration, which proved to be a mistake. Next time I would use an introduction of a total-stop device as a lead-in activity. I introduced the total-stop device after the post-activity during that lesson and the students seemed to be interested in it and it gave a more professional and serious impression.

During the activity, the students participated without problems and they discussed together. All groups worked at similar pace, so I did not need to assign any extra activities and tasks. Nevertheless, next time before starting the activity I would emphasize that the accidents are not described in detail on purpose so the students could speculate about possible solutions and dangers. The fact that I had not mention this led to initial confusion, which was settled after my clarifications during the activity. Another solution might be to prepare a set of questions addressing the problematic or ambiguous aspect of the accidents that the student would have to answer. This might help starting the discussion and it might encourage speculating.

The post-activity worked the best of all the stages. The students cooperated well and everyone participated. Nevertheless, this was expected as this class of students is generally talkative and willing to participate.

All in all, the activity served its purpose due to good participation of students. However, some stages could have been managed better. Next time I would dedicate more effort to make sure that the students know what to do in order to prevent confusion and I would add questions addressing ambiguous aspects of the accidents to the paper slips. Furthermore, I would change the lead-in stage and make it more "professional" by introducing a total-stop device.

7.5.4 Students' Evaluation

After executing the activity, the students were asked to write a short feedback comment. While analysing the feedback comments, it has to be considered that the students are in their 4th year of studies and they are aware that the author of the thesis will be their examiner during Maturita examination. The students' written feedback comments have been scanned and can be found in the Appendices.

Generally, the students suggested using more complex and difficult accidents, which would be more interesting for them. They mentioned that the second accident's solution was too simple. Furthermore, they recommended using these examples with younger students (first- or second-year students).

Overall, the students considered the solution to be too simple and not challenging enough. Nonetheless, while consulting this activity with an inspection technician, he advised me to keep the solution as simple as possible and to avoid too specialized situations. The reason for this recommendation was that specialized and detailed situations belong in the hands of trained specialists.

To summarise, although the students participated actively, they did not find the activity challenging enough, and they would appreciate more difficult situations. On the contrary, the inspection technician explicitly discouraged using too complex and specialized situations and solutions. Owing to these facts, the activity might be adapted by adding extra questions addressing the accidents as mentioned in the previous chapter. The questions might direct ambiguous aspects of the accidents, and therefore, making the activity slightly more difficult. Additionally, the teacher might tell the students what the primary purpose of the activity is – to facilitate communication using specialized vocabulary, not to introduce new courses of action in difficult situations as they are expected to already know that. This initial clarification might change students' expectations regarding the activity.

CONCLUSION

The diploma thesis dealt with practising specialized lexis related to the field of electrical engineering. The aim of the thesis was to create and methodologically describe five classroom activities for the English language subject addressing practice of specialized lexis via speaking and peer interaction. One activity was specifically designed for online use via the Microsoft Teams platform. The target group were the students of the *Electronic Systems, Automation, and Communication Technology* specialization at the Secondary Technical School in Liberec.

The creation of the classroom activities was based on theoretical and methodological grounds. The theoretical part of the thesis included an analysis of the recommended technical textbook *Flash on English for Mechanics & Electronics* by Sabrina Richards Sopranzi (Richards Sopranzi 2016) with regard to the technical topics given by the School Educational Programme. It also analyzed the market offer of technical textbooks that would be suitable for use at the Secondary Technical School in Liberec. The market offer analysis showed that although the recommended textbook may not be ideal regarding targeted language skills, it was a convenient choice considering included technical topics, language level, target learners, number of volumes, and price. Furthermore, the theory focused on ESP issues, English Maturita examination, and on Framework and School Educational Programmes in relation with ESP and foreign languages.

The methodological part was engaged in ESP and classroom methodology, learners' characteristic, and selection of technical topics for the classroom activities. The selection of topics was based on a list of technical topics, which were not included in the textbook *Flash on English for Mechanics & Electronics* by Sabrina Richards Sopranzi (Richards Sopranzi 2016). The following topics were chosen: numbers, inventions, measurement and technical specification, superconductivity, and first aid (electrical shock accidents).

The practical part embraced creation of activities and activity plans, conduct of one activity in a real-time lesson, and evaluation. The activities aimed to practise specialized lexis in oral form and/or speaking communication via student(s)-to-student(s) interaction. Thus, the following types of activities were incorporated in the thesis: speaking drills, discussion activities, games, and a prepared talk. The student(s)-to-student(s) interaction was achieved via group and pair work.

The last activity, dealing with first aid and electrical shock accidents, was executed in a real-time lesson and evaluated by the author of the thesis and the students themselves. The activity succeeded in achieving its learning aim; however, the students would appreciate more difficult examples of electrical shock accidents, which would make the activity more appealing and challenging.

In conclusion, the diploma thesis addressed theory and methodology related to teaching ESP to upper-secondary electrical engineering students. The output of the thesis was the creation and methodological description of five classroom activities practising specialized lexis via speaking and peer interaction. Additionally, one of the activities was conducted in a real-time lesson and evaluated.

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APPENDICES

1. ACTIVITY PLANS

1.2 Activity 1

The cards ought to be printed on both sides (one side contains the numbers and the other side their word forms) on A3 paper to ensure good legibility as they are intended to be pinned on the board, and therefore, the students should be able to read them. The cards may be laminated.

362,876,288	**669,044**
452,714	**707,805,204**

three hundred (and) sixty-two million eight hundred (and) seventy-six thousand two hundred (and) eighty-eight	six hundred (and) sixty-nine thousand forty-four
four hundred (and) fifty-two thousand seven hundred (and) fourteen	Seven hundred (and) seven million eight hundred (and) five thousand two hundred (and) four

10.7843	**14.8241**
122.36	**0.42**

ten point seven eight four three	fourteen point eight two four one
one hundred (and) twenty-two point three six	nought/zero point four two

3⁄6	**5/17**
4 2/3	**2/5**

three-sixths	five-seventeenths
four and two-thirds	two-fifths

99.95%	**35.5%**
3.02%	**88.83%**

ninety-nine point nine five percent	thirty-five and a half percent, thirty-five point five percent
three point nought/zero two percent	eighty-eight point eight three percent

1.2 Activity 2

This activity is intended for 4 groups of 3–4 students. Each group receives one full set of cards that are below, and therefore, these cards need to be printed at least 4 times and then cut into separate cards. The cards may be laminated.

ALTERNATING CURRENT *Nicola Tesla* *AC* *direct current* *electricity*	**LIGHT BULB** *Thomas Edison* *glow* *glass* *carbon filament*
TRANSISTOR *Bell labs* *switch* *current* *semiconductor*	**INDUCTION MOTOR** *Galileo Ferraris and Nicola Tesla* *asynchronous* *AC* *electric motor*

ELECTRICAL FUSE *Thomas Edison* *electric circuit* *safety* *short circuit*	**DYNAMO** *Michael Faraday and Hippolyte Pixii* *generator* *direct current* *electricity*
TESLA COIL *Nicola Tesla* *transformer* *AC* *electricity*	**VOLTAIC PILE** *Alessandro Volta* *first* *battery* *electric circuit*
ALTERNATOR *Michael Faraday and Hippolyte Pixii* *generator* *mechanical energy* *alternating current*	---

1.3 Activity 3

The paper slips need to be printed only once and then they should be cut into separate paper slips. The student's handout needs to be printed for each pair (= approximately 8 times). The paper slips may be laminated.

The texts are an adaptation of the following internet articles: *Superconductivity* (Ginsberg 2023), *DOE Explains... superconductivity* (Office of Science 2023), and *Superconductivity* (CERN 2023).

Paper slips

Superconductivity

At “normal” temperatures, all materials have some amount of electrical resistance. This means that when electricity moves through a material, some energy is inevitably lost. However, there are materials which do not lose energy – superconductors. Superconductors are such materials which can conduct direct current electricity without losing energy if they are cooled below a certain temperature.

History

In 1911 the Dutch physicist Heike Kamerlingh Onnes and his team were studying the properties of substances at very low temperatures. They found out that the electrical resistance of mercury goes to zero below 4.2 K (-269°C), 0 K is absolute zero. This is when the phenomenon of superconductivity was observed for the first time. Onnes and his team discovered that most chemical elements may become superconductors if their temperature is low enough.

How to reverse superconductivity?

Heike Kamerlingh Onnes also discovered that a superconducting material can be returned to the nonsuperconducting state. This may be done by passing a sufficiently large current through the material or by applying a sufficiently strong magnetic field to it.

Interesting facts

Approximately half of the elements in the periodic table can become superconductors when exposed to sufficiently low temperature. However, superconductivity is often applied with alloys as they are easier to use or less expensive, such as niobium and titanium alloys.

Student's handout

Superconductivity

At "normal" temperatures, all materials have some amount of _____. This means that when electricity moves through a material, some energy is inevitably lost. However, there are materials which do not lose energy – superconductors. Superconductors are such materials which can conduct direct current electricity _____ if they are cooled _____.

History

In 1911 the Dutch physicist Heike Kamerlingh Onnes and his team were studying the properties of substances at very low temperatures. They found out that the _____ goes to zero below 4.2 K (-269°C), 0 K is _____. This is when the phenomenon of superconductivity was observed for the first time. Onnes and his team discovered that most chemical elements _____ if their temperature is low enough.

How to reverse superconductivity?

Heike Kamerlingh Onnes also discovered that a superconducting material can be returned to the nonsuperconducting state. This may be done by passing a sufficiently _____ through the material or by applying a sufficiently strong _____ to it.

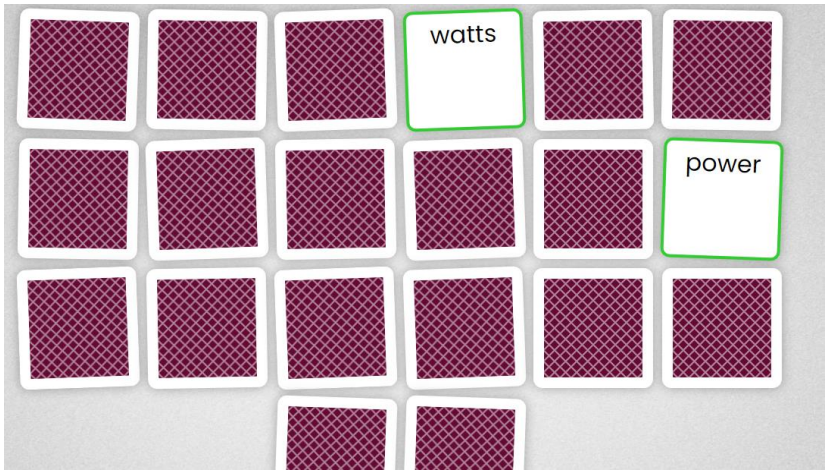
Interesting facts

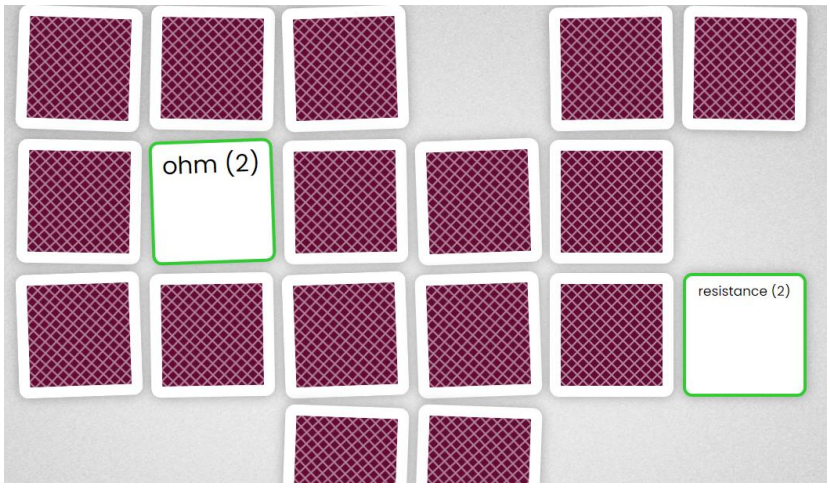
Approximately half of the elements in the periodic table can become superconductors when exposed to sufficiently low temperature. However, superconductivity is often done with alloys as they are easier to use or less expensive, such as _____.

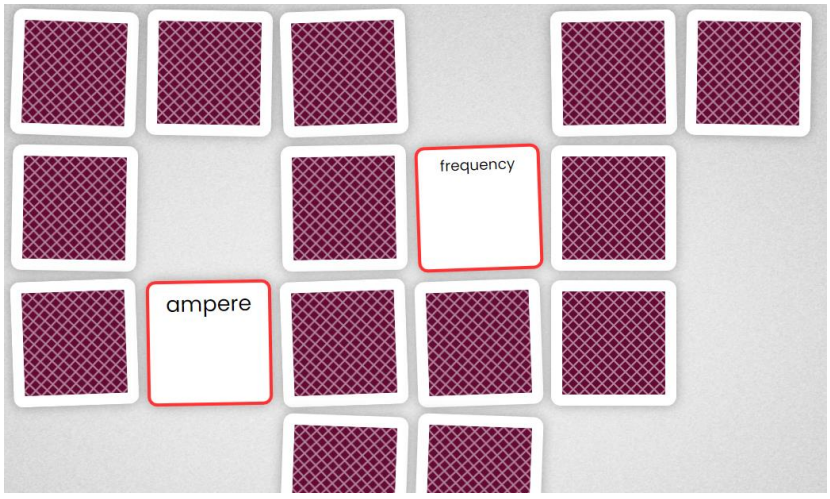
1.4 Activity 4

The link for the activity:

https://www.flippity.net/mg.php?k=1v4ZVTci7QnveG5IvAhtbz-KioipH3MWPVSL4z_iM0_g







1.4.1 Student's handout – extra task

QUANTITY	QUANTITY SYMBOL	UNIT	UNIT SYMBOL
capacitance		farad	
charge		coulomb	
power	P	watts	W
frequency		hertz	
inductance		henry	
impedance	Z	ohm	
conductance		siemens	
resistance		ohm	
current		ampere	
voltage		volt	V

1.4.2 Student's handout – extra task (key)

QUANTITY	QUANTITY SYMBOL	UNIT	UNIT SYMBOL
capacitance	*C*	farad	*F*
charge	*Q*	coulomb	*C*
power	P	watts	W
frequency	*f*	hertz	*Hz*
inductance	*L*	henry	*H*
impedance	Z	ohm	*Ω*
conductance	*G*	siemens	*S*
resistance	*R*	ohm	*Ω*
current	*I*	ampere	*A*
voltage	*V*	volt	V

1.5 Activity 5

This activity is designed for 4 groups when each group receives one paper slip with an accident and one set of paper slips with a recommended solution. As there are only two different accidents, each accident paper slip needs to be printed twice. The sets of paper slips with recommendations need to be printed eight times – four sets need to be cut into separate paper slips; the other four sets will not be cut as they will be given to groups as a key. The paper slips may be laminated.

The recommendations are chronologically ordered and they have been created using proposals by an inspection technician and suggestions published in these Internet articles: *Electric shock first aid treatment* (Safety First Aid 2023), *Electric shock – low voltage current* (St John Ambulance 2023), and *Electrical shock: First aid* (Mayo Clinic 2023).

Accident 1

You have just returned from a lunch break and you find your colleague lying unconsciously on the floor with his body touching an electrical device. It is clear he has been electrocuted and that the electrical devices are still turned on. You are alone and there is no one within your reach who could help.

Accident 2

You accidentally find yourself in close proximity to downed high voltage power lines. You are alone and there is no one within your reach who could help.

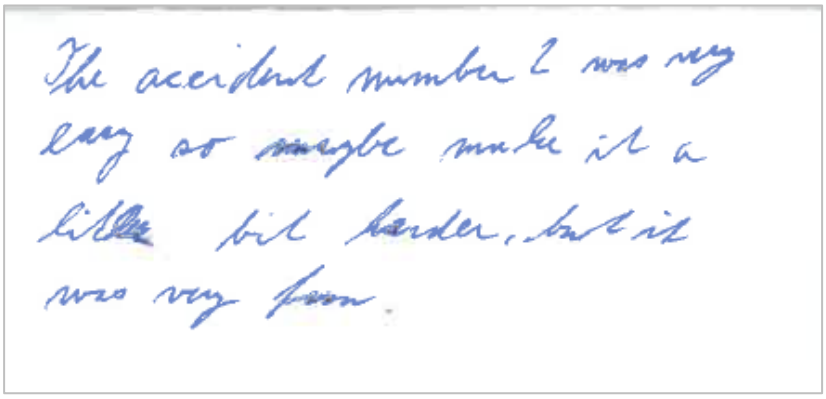
Recommended solution – accident 1

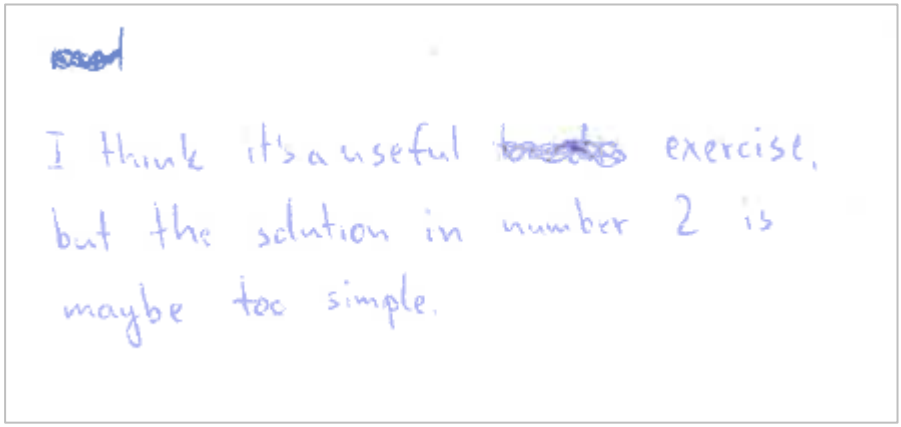
Access the situation and check for danger.
Turn the (main) circuit breaker off.
Check vital signs and access the health condition of the injured person.
Call for ambulance (155 or 112) and give the injured person first aid. If the person is unconscious or does not breathe, begin cardiopulmonary resuscitation (CPR).
In case of cuts or bleeding, apply a bandage or try to stop the bleeding. You should cover any burned areas with a sterile gauze bandage or a clean cloth. Try to prevent the injured person from becoming chilled. You should reassure the injured person and you should keep checking their condition until the ambulance arrives.

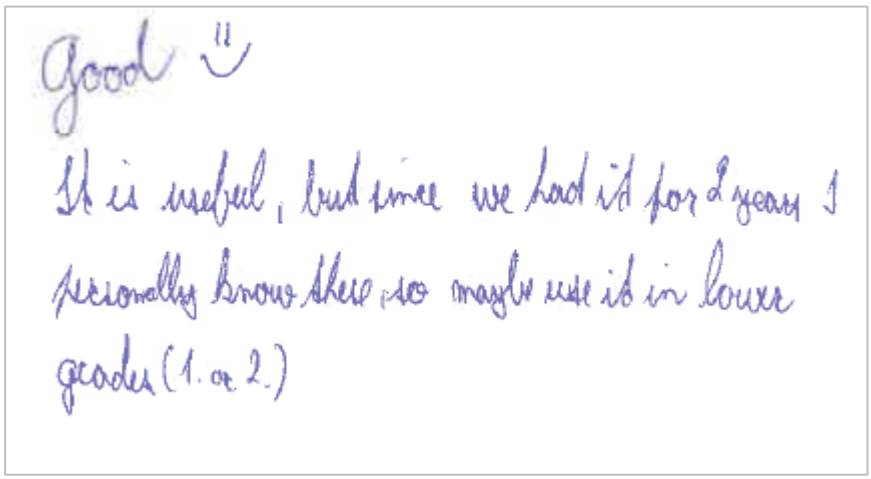
Recommended solution – accident 2

Access the situation and do not move.
Call 112 (or the power distribution company).
Provide the emergency worker with information about your location and describe the situation.
Follow instructions given by the emergency workers and wait until the emergency services arrive.
While waiting for the emergency and utility services, it is imperative not to do any hot-headed action.

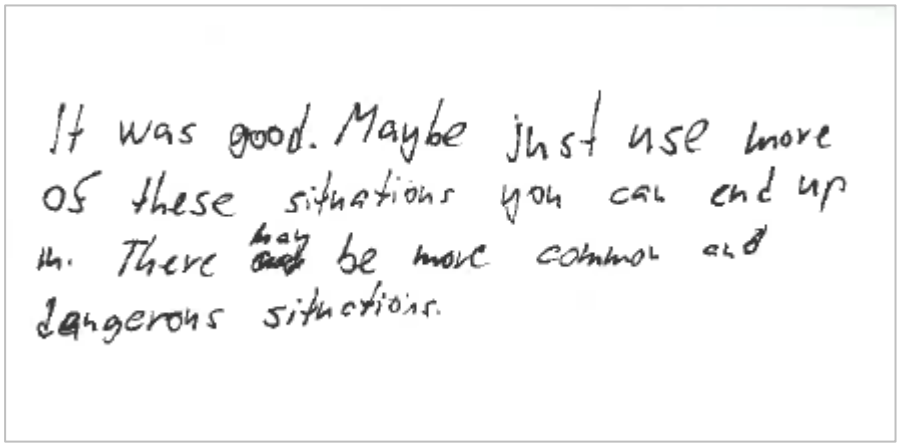
2 FEEDBACK – STUDENTS' EVALUATION


The accident number 2 was very easy so maybe make it a little bit harder, but it was very fun.


I think it's a useful exercise, but the solution in number 2 is maybe too simple.


Good

It is useful, but since we had it for 2 years I personally know these so maybe use it in lower grades (1. or 2.)

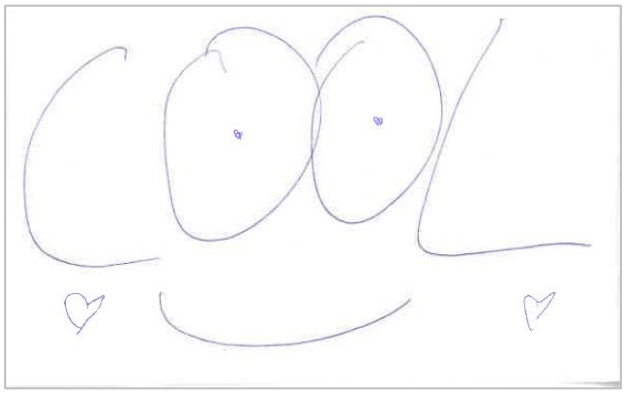

It was good. Maybe just use more of these situations you can end up in. There may be more common and dangerous situations.

The activity was some unpredicted activity that I didn't expect.
still better than grammar or voabulary, and little worse that to hear
otherwise GREAT

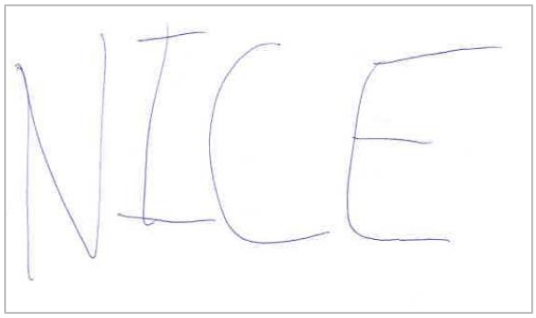
not great not horrible
- Not useful for lower classes

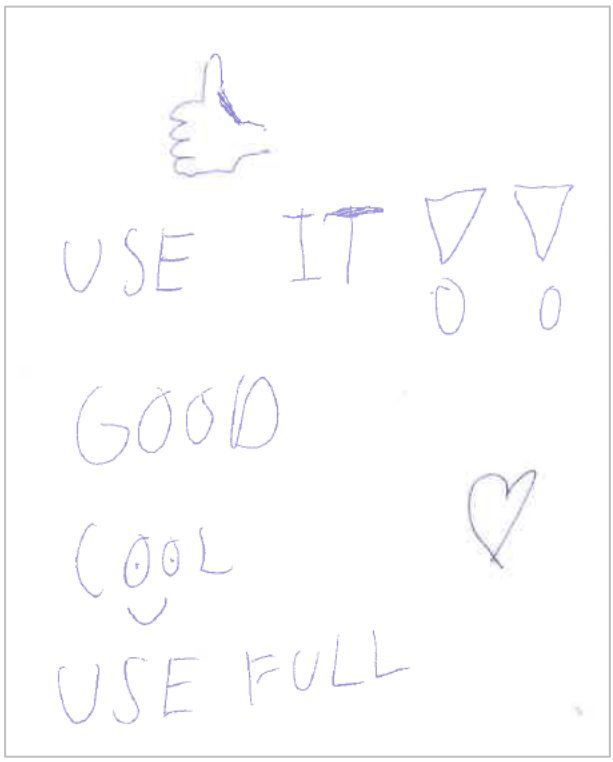
I think its useful. +
good advice +

THIS ACTIVITY WAS WELL PREPARED AND WELL PRESENTED.
THIS SHOULD BE PRESENTED EVEN TO THE NON-ELECTRICAL CLASSES.
THE ASSIGNENT WAS FIRST UNCLEAR WHAT WE SHOULD DO.



It was great, informational and overall fun




USE IT
GOOD
COOL
USE FULL

3 STRUCTURE OF THE ORAL ENGLISH MATURITA EXAM

This instructional material is an unofficial school document. It serves as a manual for students and English teachers at the Secondary Technical School and Higher Vocational School in Liberec.

Váha dílčí zkoušky: 60%
Délka konání zkoušky: 15 minut příprava + 15 minut zkouška
Maximum získaných bodů: 39
Minimální hranice úspěšnosti: 18 bodů

- **0. ČÁST ÚSTNÍ ZKOUŠKY – PŘEDSTAVENÍ SE MATURITNÍ KOMISI** (0,5 min.) a sdělení čísla vybraného pracovního listu k ústní zkoušce. Tato část není hodnocena, jedná se o vstupní rozehřání a seznámení žáka s komisí.
- **1. ČÁST ÚSTNÍ ZKOUŠKY** (+/- 3,5 min.)

V první části ústní zkoušky (PART ONE) Vám zkoušející zadá tematicky zaměřené **otevřené otázky** (tři až šest otevřených otázek na nějaké téma, např. Hobbies, Free Time, Culture, Travelling…) a Vy na ně budete odpovídat.

- **Doporučeno k přípravě: Longman Maturita Activator/New Maturita Activator**

- **2. ČÁST ÚSTNÍ ZKOUŠKY** (+/- 4 min.)

V druhé části (PART TWO) se nachází **popis a porovnávání obrázku** na stejné téma jako v 1. části (TASK ONE) a krátké **samostatné mluvení** (TASK TWO) na dané téma, např. "Povězte nám o Vašich minulých letních prázdninách."

- **Doporučeno k přípravě: Longman Maturita Activator/New Maturita Activator**

- **3. ČÁST ÚSTNÍ ZKOUŠKY** (+/- 3 min.)

V této části dostanete otázku z reálií anglicky mluvících zemí nebo České republiky. Otázka se bude tematicky vztahovat k části 1 a 2 (např. Travelling – Which parts of the USA would you like to visit and why?). Budete mluvit samostatně, někdy s využitím obrázků nebo mapy.
Doporučeno k přípravě: Maturitní sloupečky a karty na www.bridge-online.cz, materiály z hodin ANJ

- **4. ČÁST ÚSTNÍ ZKOUŠKY** (+/- 4 min.)

Ve čtvrté části ústní zkoušky dostanete jedno téma z odborné angličtiny (např. Car parts, engine). Buď budete odpovídat na otázky a budete s Vaším zkoušejícím na danou problematiku anglicky diskutovat, nebo budete maturitní otázku na dané téma sami prezentovat. K některým úlohám dostanete jako pomůcku obrázek, schéma apod., případně text na doplnění termínů.

Doporučeno k přípravě: FLASH (English for Mechanics & Electronics, 2nd edition) + **materiály z hodin ANJ**

- **Vaše úroveň anglického jazyka musí odpovídat jazykové úrovni B1**