



## **Using Discovery Learning Approach in Teaching EFL Grammar to High School Students: Its Possible Effects and Limits**

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This article presents part of a doctoral research project aimed at investigating the effects and possible limits of the discovery learning approach in teaching grammar to English as a foreign language (EFL) students in high schools in Slovakia from the teachers' perceptions. The research project deployed design-based research with a total of 7 EFL teachers in Slovak high schools collecting data in three phases. The data presented in this article focused on intervention and were collected during the second phase of the research project. During the intervention, the teachers were taking field notes which were subsequently analysed. The results of the analysis of the teachers' field notes showed there are mostly positive aspects of the discovery learning approach, pointing out students' experience with discovery and their engagement when learning grammar. However, the results also showed some limits of this approach in the high school environment. Mostly training is needed for both teachers and students so they can make the most of the discovery process.

Keywords: EFL, grammar, discovery learning approach, design-based research, high school

### **INTRODUCTION**

The foreign language teachers in high schools aim not only to prepare their students to use a foreign language in real life but also to successfully pass the school leaving exams. In Slovakia, the high school students in general education take a mandatory exam from a foreign language at a B2 proficiency level according to the Common European Framework of Reference (CEFR). A majority of students opt for English. According to the analysis of the National Institute of Certified Educational Measurements in Slovakia (NÚCEM), every year the students achieve the lowest score on average from the section of the exam which tests grammar. In the exam, the grammar is tested in a context where the students must analyse texts and choose appropriate grammar features to complete the texts.

The traditional deductive approach to the teaching of EFL grammar, which is mostly used in Slovak high schools (Masaryk, 2012), creates a teacher-centred learning environment in which the students passively memorise rules and forms (Zormanová,

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2012). It might seem to be fast and effective, but it does not allow the students to see the connections between grammar features and their usage in a context (Nunan, 1998). Therefore, studies (e.g.: Anderson, 2006; Nunan, 1998; Petrovitz, 1997) suggest a need for context when grammar is taught. Moreover, Nunan (1998) claims that students need to detect the relationships between a form, its meaning, and its usage since grammar and context are often related to each other and the purpose of communication affects the choice of grammar.

There are various approaches used in teaching EFL grammar. Teachers usually choose a method based on their experience, knowledge, and on their beliefs (Borg, 2003). Thus, the qualitative doctoral research project offered opportunities to use the discovery learning approach to the teaching of EFL grammar to the teachers to allow them to experience its effects and limits in a high school environment. The aim of the doctoral research was to investigate teachers' perceptions of the discovery approach to the teaching of EFL grammar. To achieve this aim, the following main research question was formulated:

*How do EFL teachers in high schools perceive discovery grammar learning?*

In connection with the main research question and to achieve sub-aims of the doctoral research project, the following specific research questions were formulated:

1. *What are the EFL teachers' beliefs about teaching grammar in high schools?*
2. *What are the effects and limits of the discovery learning approach in teaching EFL grammar in high schools?*
3. *To what extent has the intervention affected the teachers' beliefs about teaching grammar?*

The present article offers theory and research methodology related to the second specific research question and evaluates the findings.

### **Discovery Learning Approach**

Discovery learning, according to Harakchiyska et al. (2018), is an active learning approach which reflects constructivist theories. Constructivist theories developed in the 1960s as a response to traditional methods of memorisation (Barrow, 2006). According to Marshall et al. (2011), constructivist learning allows students to create knowledge and develop their own understanding through interactions between their existing knowledge and new experiences. Furthermore, it involves active and contextualised learning process where students construct knowledge (Mayer, 2004; Sheppard, 2008). Additionally, Woolley et al. (2004) claim that constructivist approaches are reflected in state policies and standards in some countries, and they can be also found in the Slovak National Curriculum Standards. An active learning process, in contrast to the traditional approaches, is a dynamic process where students interact with each other, with the new experiences, and with teachers (Demirci, 2017). It also allows students to actively participate in instructions (Pantiwati & Husamah, 2017). Similarly, Conklin & Stix (2014) explain that active learning "means that students are engaged in a guided

classroom activity” which offers “time for collaboration, various forms of communication, and the freedom of movement” (p. 9). Active learning also requires teachers to change their role. They need to facilitate and guide students in their learning to help them to become active participants of the learning process. This shift of the teachers’ role might be a possible reason for not using the active learning approach in educational processes since teachers lack the knowledge, know-how and experience about the active learning approach (Demirci, 2017).

Discovery learning has been commonly used in teaching science (Conklin & Stix, 2014), where it is also known as inquiry-based learning or guided discovery approach. As Anderson (2002) proposes, it involves an active process, where students learn using model situations during which they articulate problems, experiment, discover, evaluate alternatives, and derive conclusion from facts discovered (Linn et al., 2004).

In foreign language teaching, discovery learning utilises an inductive approach to teaching. This approach represents a learner-centred teaching process in which students are exposed to examples of grammatical structures, usually in a context, and they try to identify the patterns and work out the rules on their own (Harmer, 2007). Applying the inductive approach helps students to retain the knowledge for a longer time (Ur, 2012). Therefore, discovery learning refers to techniques inferring forms from examples (Phipps & Borg, 2009). Gollin (1998) suggests that when using discovery, teachers define a context or a situation and use control questions to check whether students understood the forms, meaning and usage of the target grammar. Moreover, using discovery, students usually work independently in pairs or small groups, and deal with the tasks (Gollin, 1998). Students’ success is directly linked to how well teachers prepare the discovery process if they prepare enough opportunities for students to cooperate, collect and analyse the data, and take part in discussions with peers and teachers (Morrison, 2008).

Banchi and Bell (2008, p. 27) suggest four levels of inquiry: (1) confirmation inquiry, which is the most guided form of inquiry. At this level students reinforce already acquired knowledge, and practise certain skills. (2) Structured inquiry, when students investigate questions presented by teachers, and they follow teachers’ instructions. (3) Guided inquiry is less guided compared to the first two. In this form, teachers present questions, and students decide which methods they use to investigate. Teachers only guide students using control questions. (4) Open inquiry is the least guided form of inquiry. Students formulate questions themselves, and then decide how they will investigate them.

Marschall and French (2018, p. 29) outline seven phases of inquiry (see Picture 1). According to their definition, it is important to engage students emotionally and intellectually in the first phase to activate their prior knowledge and stimulate interest in a given topic. The second phase is focused on examples which are to be investigated in the following third phase. In the fourth phase students organise their thoughts in abstract and concrete levels for which they use various sources and materials. Next, they generalise their knowledge and create relations between examples and discover patterns. The sixth phase involves verification and reasoning of patterns transformed

from the preceding phase. In the last phase, students reflect the inquiry process, either individually or in a group. The above mentioned seven phases of inquiry were applied also to the lesson plans and worksheets used during the intervention described later in this study.



Picture 1

Phases of inquiry (adapted from: Marschall & French, 2018, p. 28)

## **METHOD**

### **Research Design**

The aim of the doctoral research project was to investigate teachers' perception of discovery learning approach, its effects, and possible limits in a high school environment. The present article focuses on one of the research questions which was formulated as follows: What are the effects and limits of discovery learning when teaching grammar in EFL classrooms in high schools? Thus, design-based research was utilised as the main research methodology. According to Anderson and Shattuck (2012) it was designed by and for educators. Moreover, Collins (1990) argues that design-based research is focused on understanding of the context and suggesting meaningful changes for that context. Therefore, the aim of this research design is to move the intervention from experimental conditions to a common classroom, with common students, and common teachers (Brown, 1992, p. 143). Collins (1990) also claims that it allows teachers to become co-investigators. These characteristics show that the design-based research is the most effective for investigating teachers' perception of the target teaching approach.

### **Setting and participants**

The present study was conducted in two state high schools in Slovakia focused on general education. The ages of students in Slovak high schools usually range from 14 to 19 years old, and their English proficiency level varies between A2 and B2 according to CEFR. They regularly attend 4 EFL classes per week, each class lasts 45 minutes and the classes are mostly taught by qualified Slovak teachers. For foreign language learning the classes in Slovakia are usually divided into two groups of 15 students in each group on average.

The 7 EFL teachers, one male and six female, who participated in the research were all Slovak teaching practitioners. They were chosen based on the following criteria: (1) a post-graduate teaching qualification in English as a foreign language; (2) at least 2 years of teaching experience; and (3) teaching a class of students aged from 14 to 16 years old at A2 to B1 proficiency level according to CEFR. The second criterion was set based on Farrell and Bennis's (2013) findings, who claim that novice teachers tend not to make decisions about the teaching process based on what their students need, but on what their students ask for. Thus, novice teachers were not suitable participants to provide reliable data. The age limit and proficiency level of students were set to make the lessons during the intervention logically connected to the EFL syllabus in the high schools to provide as relevant information as possible. Besides that, Cohen et al. (2011, p. 92) suggest that anonymity of the participants brings more reliable data. Therefore, all the participants were given pseudonyms which enabled them to provide more explicit information. Students' perception was not included into the research sample to reduce the amount of data. Nevertheless, their experiences with discovery are reflected in the teachers' field notes.

### **Instruments**

The instrument used to collect qualitative data during the intervention phase of the doctoral research project was an observation sheet. To ensure that the data collected would serve its purpose in the research, a semi-structured participant observation was used. As Cohen et al. (2011, p. 457) propose, this type of observation does not test the hypothesis, but it creates them. Moreover, the semi-structured observation also examines the hypothesis and draws conclusions at the same time. The observation sheet was piloted with four EFL teachers to make sure the items were aligned with the design and the aim of the research project. During the intervention, the teachers were in the role of *participant-as-observer* (Gold, 1958) which enabled them to gather insider knowledge from the teaching process. Bailey (1994, pp. 243-244) claims that the participant observation of the teaching process allows teachers to immerse in the day-to-day activities and collect also non-verbal data about the behaviour of students, the students' reactions to the instructions, their interaction with other students and with the tasks themselves. The observation sheet served as an instrument not only for taking field notes, but also to comment on what the teachers observed (Hendl, 2016, pp. 201-202). The observation sheet was adapted from similar research conducted by Svalberg (2005) and was divided into four parts (see Table 1). The first part aimed at the discovery activities themselves and how students approached the activities. The second part assessed the interaction between students and the activities. It also tried to assess the extent to which the students understood and practised the target grammar. The third part focused on self-observation of the teachers and their behaviour during the lessons. The last part examined whether there had been any changes in students' approach to the discovery activities from the first to the last lesson using the target approach. The field notes from the observation sheets were also used as stimulated recall (Nunan, 1992, pp. 94-95) in the third phase of the doctoral research project during the post-intervention interviews with the teachers.

Table 1  
The structure of the observation sheet

Categories for observation	Criteria to be observed
Students' approach to the discovery tasks	What was happening during the tasks? What were the students doing during the tasks? How were the students feeling during the tasks? Were the students engaged during the tasks? Did the students ask any questions?
Interaction between students and the discovery tasks	Did the students understand the meaning and usage of the target grammar? Did the students practise the target grammar enough? How do you think the tasks helped students to acquire the target grammar?
Teachers' self-observation	What were you doing during the tasks? How were you feeling during the tasks? What was different to your common grammar lesson? What would you do differently during the lesson?
Changes in students' approach	Did you notice any changes in the students' approach towards the task compared to previous lessons using the discovery learning approach?

### The Intervention

The intervention took the form of model lessons. The teachers were given lesson plans and worksheets for students, prepared by the author of the project, which reflected principles of the discovery learning approach according to Anderson (2002), and Linn et al. (2004) with the focus on grammar. For the purposes of the intervention, a structured discovery (Banchi & Bell, 2008; Mackenzie, 2016) was used. As Banchi and Bell (2008) state, in this type of discovery the teacher is in control of what questions need to be answered by students, what sources are used, and what the outcomes should be to show students' understanding of the target grammar. Additionally, Suryanti et al. (2020) state, that it provides a learning environment in which teachers assist students by providing hints, directions, coaching, feedback, and modelling to keep the students on track.

All the worksheets were at B1 level according to CEFR. The grammar features were chosen so they reflected the grammar presented in the course books used in the high schools where the intervention occurred. Specifically, the worksheets dealt with conditional sentences, the passive, relative clauses, reported speech, and future forms. The model lessons were prepared with the use of various course books and grammar books available. Each of the worksheets comprised the seven phases of inquiry according to Marschall and French (2018, p. 29) mentioned earlier. The first phase, *engage*, of each worksheet usually consisted of a listening task and/or pictures. The aim was to set the topic of the lesson, show students a situation in which the target grammar is commonly used, and to elicit and activate students' prior knowledge (see Picture 2). The following two phases, *focus & investigate*, were sometimes joined, and always linked to the first phase. Thus, the students were able to see the situation again, explore the examples, and practise the inquiry process (see Picture 3). Having completed these

tasks, the students proceeded to the *organise* phase in which they organised information they had discovered (see Picture 4). Then the students *generalised* the knowledge acquired, and formed connections and patterns which they practised in common gap-fill tasks. Having done the tasks, the students *transferred* the knowledge into meaningful actions, usually in the form of a short writing or a presentation using the target grammar in a similar situation as was presented in the first phase. Finally, the students *reflected* on what they had learnt in the lesson, what was the most useful for them, and how it will help them in future.

**CRAZY INVENTIONS (the Passive)**

1 Listen to a radio programme about authors of inventions.  
Which problems did the inventions below solve?

(adapted from Goodwin, C. et al. (2000). See English 150 Pre-Intermediate Student Book (p.7))



1) \_\_\_\_\_



2) \_\_\_\_\_



3) \_\_\_\_\_

Picture 2

A sample task from the worksheets used in the intervention (The Engage Phase)

2 Listen again and complete the extracts A to E with the missing SUBJECTS.

(adapted from Goodwin, C. et al. (2000). See English 150 Pre-Intermediate Student Book (p.7))

- a) Today the \_\_\_\_\_ is used by millions of people all over the world.
- b) The \_\_\_\_\_ was invented by a man, but ...
- c) So, \_\_\_\_\_ decided to try and invent a machine ...
- d) \_\_\_\_\_ had a brilliant idea. ...
- e) \_\_\_\_\_ all over the world are protected by something which was invented by a woman.

3 Answer the questions 1 – 4 about the extracts A to E above

1. Do the extracts have the same meaning? \_\_\_\_\_
2. Which extracts are about a person who did the action? \_\_\_\_\_
3. Which extracts are about the result of the action? \_\_\_\_\_
4. In extracts A and B, which word is used to introduce a person or a thing that does the action? \_\_\_\_\_

Picture 3

A sample task from the worksheets used in the intervention (The Focus and Investigate Phase)


**Now look at extracts A to G again**

What verb forms follow the subjects in extracts A, B, & E? \_\_\_\_\_ + \_\_\_\_\_

Are the extracts A, B & E active or passive?

**Complete the rules:**

1. In an active sentence we \_\_\_\_\_ WHO did the activity.
2. In a passive sentence we \_\_\_\_\_ WHO did the activity.
3. We form the passive with: *subject* + the verb \_\_\_\_\_ (in present, past or other tense) + \_\_\_\_\_
4. We use the passive to put the focus on the person or thing *doing the action* / affected by the action.
5. We use the passive to bring the object of the verb to the *beginning* / the *end* of the sentence.



Picture 4

A sample task from the worksheets used in the intervention (The Organise Phase)

During the intervention, the teachers were able to observe how their students approached the tasks. Moreover, the teachers experienced the target grammar from other views, and therefore, they could detect the advantages but also limits of the approach. Since this approach has been mostly used in teaching science, it was anticipated that the teachers participating in the research might not have been familiar with the principles of discovery learning. Therefore, they were introduced to the lesson plans prior to the intervention to familiarise them with their content. The familiarisation was done individually with each teacher. Each lesson plan offered a brief introduction to the discovery learning approach. Likewise, the lesson plans were thoroughly structured, so the teachers were constrained to follow the structured discovery during the lessons. The intervention was in progress for three months and each teacher delivered the lessons in compliance with their timetables.

### **Data Analysis**

After the intervention, the observation sheets were collected for further analysis. The observation sheets were read through using a thematic analysis, and patterns were grouped using a mixed deductive-inductive coding process (Švaříček & Šed'ová, 2007). The code categories reflected the structure of the observation sheet and are shown in Table 2.

Table 2

The code categories of deductive-inductive coding process for observation sheets

Categories for deductive coding	Categories for inductive coding
Students' approach to the discovery tasks	Students' work & behaviour - advantages Students' work & behaviour - limits Students' engagement - advantages Students' engagement - limits
Interaction between students and the discovery tasks	Understanding of the target grammar – advantages Understanding of the target grammar - limits Practice of the target grammar – advantages Practice of the target grammar – limits The effect of the activities on students' further studies – advantages
Teachers' self-observation	Teachers' work & behaviour - advantages Teachers' behaviour & behaviour - limits Comparison with common lessons
Changes in students' approach	Students' work lesson 1 Students' work lesson 2 Students' work lesson 3 Students' work lesson 4 Students' work lesson 5

### **FINDINGS**

The present findings are the results of the data analysis of the second phase of the doctoral research project, in particular, semi-structured participant observations of EFL lessons focused on teaching grammar using the discovery approach. These observations proceeded for three months in 2022. Table 3 shows profiles of seven classes, with 103 students in total, which attended the lessons.



Table 3  
Profiles of classes which attended the target lessons

Teachers' pseudonym	Age of students	Number of students in a group	Proficiency level according to CEFR
Beáta	14	14	A2
Emília	15	15	A2 – B1
Iveta	14 – 15	15	A2 – B1
Karolína	15	14	A2 – B1
Kristína	16	15	B1
Lukáš	15	14	A2 – B1
Nad'a	16	16	B1

### Students' Pace and Individual Approach

The teachers' notes revealed some effects and possible limits of learning grammar using the discovery learning approach in a high school environment. One of the effects the teachers noticed during the lessons was that students were able to work on the tasks at their own pace. This allowed the more advanced students to progress faster. On the other hand, the weaker students who needed more time were able to go back to the tasks they were not sure about and spend as much time as they needed to complete the tasks (see Extract 1).

#### Extract 1

##### The effects of Discovery Learning – students' own pace

Teacher	Extract from the field notes
Karolína	<i>"... The students worked at their own pace, some had to listen to the recording more than once, some students skipped some tasks and proceeded to those they found more challenging."</i>
Lukáš	<i>"Faster students continued independently to the following tasks."</i>
Nad'a	<i>"... the faster students did some tasks ahead."</i>

Moreover, most of the teachers stated that this type of teaching enabled them to monitor how each of their students worked, and thus approach them individually based on what each student needed (see Extract 2).

#### Extract 2

##### The effects of Discovery Learning – individual approach to students

Teacher	Extract from the field notes
Emília	<i>"I had to monitor each of the groups and help them if needed ..."</i>
Iveta	<i>"I monitored the students, and observed how each student coped with the tasks."</i>
Karolína	<i>"I monitored how the lesson progressed and responded to students' questions."</i>
Lukáš	<i>"I observed the students' work, and when needed, I guided or explained each student individually."</i>

### Experience with Discovery

All seven teachers agreed that the most significant effect of the discovery learning was the students' experience with the discovery process. To be more precise, students had to

discover how the target grammar behaves in context, formed the rules themselves, and then used what they had discovered in a real situation. According to the teachers, this experience helped their students to retain the knowledge for longer periods, and to create logical connections. Additionally, it encouraged the students' engagement in the learning process, and also motivated them to ask meaningful questions (see Extract 3).

#### Extract 3

##### The effects of Discovery Learning – the experience with discovery

Teacher	Extract from the field notes
Beáta	<i>"Since they had to figure out how the grammar works themselves, I think they acquired the knowledge lastingly."</i>
Emília	<i>"I think it helped them radically. They will probably remember the grammar much better, since they struggled to discover the rules." "Through their own experience they had to understand how the grammar works. I believe, they will keep the knowledge for longer."</i>
Iveta	<i>"It was a great approach, since they first had to notice the grammar, form the rules, and then use what they discovered."</i>
Karolína	<i>"The students were forced to ask questions and work independently. They were curious about the grammar ..."</i>
Kristína	<i>"Since they were discovering the rules themselves they were engaged, because they like discovering."</i>
Lukáš	<i>"They struggled with the grammar, that's why they will keep it in their memory for much longer."</i>
Nad'a	<i>"... the fact they had to discover the grammar independently helped them, because they weren't just told about the grammar."</i>

#### Students' Training Effect

The data collected suggests some training effect over the three months, which, according to Svalberg (2005), occurs during student-centred learning after the students have been exposed to the target approach several times. The teachers' notes (see Extract 4) show that the students were confused at the beginning, and reluctant to participate in the lesson.

#### Extract 4

##### Students' training effect – the first lesson

Teacher	Extract from the field notes
Emília	<i>"...Not from the beginning. They didn't like the activity, they grumbled. I had to force them to work this way. They are not used to this way of work." "... the students were confused, they didn't understand the task at the beginning, only after I helped them and we did the task together."</i>
Karolína	<i>"They were interested from the beginning, but later on they got tired and very passive."</i>
Lukáš	<i>"From the beginning, they were a bit confused, they were asking me what they were supposed to do. It was ok after clarifying the instructions."</i>

The field notes from the second lesson using the target approach, illustrated in Extract 5, vary depending on the teacher and their students. Some teachers claimed their

students were still confused and reluctant, whereas others stated their students' attitude was neutral.

#### Extract 5

##### Students' training effect – the second lesson

Teacher	Extract from the field notes
Karolína	<i>"According to them, they were still confused."</i>
Lukáš	<i>"Some students were pleased when they saw the worksheets again, but others just said AGAIN?."</i>
Nad'a	<i>"The students followed the instructions given in the worksheet, ... , they didn't ask anything themselves."</i>

Certain results of the training effect appeared during the third lesson. The teachers stated their students were happy when they saw they were going to do "something new" again compared to their usual lessons (see Extract 6). The teachers commented on the fact saying that it might have been caused by the students' prior experience from the first two lessons using the target approach. Therefore, the students were already familiar with the course of the lesson, and for this reason they were relaxed and willing to cooperate. The third lesson seems to be the breaking point in students' attitude.

#### Extract 6

##### Students' training effect – the third lesson

Teacher	Extract from the field notes
Emília	<i>"The students were uplifted by the fact that they are using different worksheets again. They were happy and engaged."</i>
Iveta	<i>"They were engaged, since we had already had this type of a lesson for a few times, the students knew what to do."</i>
Kristína	<i>"I think they felt fine, they were familiar with this type of work."</i>
Nad'a	<i>"The students felt relaxed, there was a working atmosphere in the classroom, and there were free discussions."</i>

### Teachers' Training Effect

It was quite interesting that the training effect was also noticed in teachers' self-observation. After the first lesson, the teachers stated that it was quite challenging for them. Some teachers were also confused and anxious like their students. As it is shown in Extract 7, the teachers' anxiety was caused by the fact they did not prepare the lessons themselves and did not know what to expect from the lessons.

#### Extract 7

##### Teachers' training effect – the first lesson

Teacher	Extract from the field notes
Emília	<i>"It was quite gruelling for me to lead my students to these new – for them new – type of tasks. But on the other hand, it was interesting for me as a teacher and also motivating."</i>
Iveta	<i>"I was nervous from the beginning because I didn't now how the lesson was going to end up, ..."</i>
Nad'a	<i>"... I was stressed a bit, since it wasn't a lesson I'd prepared, so I wasn't settled into it yet."</i>

Subsequently, having used the lesson plans repeatedly, the teachers became relaxed and more confident (see Extract 8). Some teachers stated they even felt not needed in the lesson, since their students worked independently on the tasks, followed the instructions, analysed the grammar features, and formed the grammar rules themselves.

#### Extract 8

##### Teachers' training effect – the following lessons

Teacher	Extract from the field notes
Emília	<i>"I had to explain some parts to the students but otherwise I felt comfortable."</i>
Nad'a	<i>"I felt comfortable, I liked the fact that students were working independently and were discovering the grammar rules."</i>

#### Limits of the Discovery Learning Approach

In spite of all the above-mentioned effects of the discovery learning, the teachers agreed that the time constraint is probably the most influential limit of this approach. As it is shown in Extract 9, the usual EFL lesson, which lasts for 45 minutes, is not long enough to complete all the seven phases of inquiry mentioned earlier. In fact, the same limit was one of the main arguments against using the student-centred approach when teaching grammar based on the findings of Uysal & Bardakci (2014).

#### Extract 9

##### The limits of Discovery Learning – the time constraint

Teacher	Extract from the field notes
Emília	<i>"Yes, but we would need another lesson to practise thoroughly."</i>
Iveta	<i>"... we needed two lessons to do all the tasks, because I wanted the students to discover the rules themselves."</i>
Lukáš	<i>"To complete all the tasks we had to do some of them in the next lesson."</i>
Nad'a	<i>"... from my perception 45 minutes is not enough to complete all the tasks."</i>

Furthermore, teacher Karolína noticed that, on one hand, advanced students were more engaged during the lessons, whereas, the weaker students were quite lost and needed help from the teacher when working independently (see Extract 10).

#### Extract 10

##### The limits of Discovery Learning – independent students' work

Teacher	Extract from the field notes
Karolína	<i>"Mostly, only advanced students were engaged. Those, who struggle with listening were more or less lost."</i>

#### DISCUSSION

This research aimed to determine the effects and limits of the discovery learning approach when teaching EFL grammar in a particular high school environment. Field notes analysis was used to gather relevant data to achieve the aim of the research project, and answer one of the research questions: What are the effects and limits of discovery learning when teaching grammar in EFL classrooms in high schools? The

following paragraphs summarise the partial findings and answer the research question in detail.

The data collected during the intervention suggest that discovery learning allows students to work independently, as suggested by Conklin & Stix (2014), in compliance with their own pace, their language abilities and skills. The students were able to spend as much time as they needed on each task. After completing the task, they either proceeded to the next one or returned to clarify any doubts. As the field notes proposed, this also allowed the teachers to monitor their students, and spend more time with those who needed it. Owing to this, the working atmosphere was established, and students got more engaged in the lessons.

As Linn et al. (2004) point out, the discovery learning brings opportunities for students to investigate, and verify their discoveries. These opportunities were mentioned as the biggest advantage of the target approach in the teachers' notes. In fact, the experience with discovery when looking for patterns, connections, and forming the rules should help the students to retain the acquired knowledge for longer periods. In addition, the students transformed from passive thinkers into active ones who looked for evidence (Conklin & Stix, 2014). What is more, implementing discovery learning "contributes to the development of independent learners who discover knowledge" (Harakchiyska et al., 2018, p. 26).

The data also confirmed some of the Svalberg's (2005) findings. Most of all, the longer the students were exposed to the discovery process when learning grammar, the more engaged they got. The question remains, whether the engagement was caused by the discovery process itself, or whether it was caused by the topic of the lesson, the production tasks, or the combination of all these variables. However, Svalberg (2005) did not emphasise the teachers' training effect in her study. Further analysis of the interviews with the teachers after the intervention will show how it might affect their beliefs about teaching grammar.

The teachers' notes also implied that the high school environment does not provide ideal conditions for the target approach to be used in its full advantage. The teachers were not able to complete all the tasks at once, they had to divide each of the worksheets into two or more lessons. Whether the consequences of this were positive or negative, the teachers did not mention in their field notes. Hence, it was discussed further during the post-intervention interviews.

## **CONCLUSION**

The aim of this article was to present partial findings of a doctoral research focused on investigating effects and limits of the discovery learning approach when teaching EFL grammar in secondary schools in Slovakia. Since similar research has not been done in Slovakia yet, it can be assumed that the findings of this study can indicate the appropriateness of the target approach in given conditions. Based on the findings, the approach encourages students' engagement during grammar lessons, emphasising their experience with the discovery process. Moreover, the students were able to work independently with the guidance of their teachers. On the other hand, both students and

teachers' training are needed to ensure that students will benefit from learning grammar using the target approach the most.

For the pedagogical implications, the study highlights the importance of applying the active learning approach also to language learning. This approach makes students active members of the learning process and allows them to be engaged with language. Moreover, it provides them with opportunities to use their existing knowledge to experiment, discover, evaluate, and construct new knowledge. However, it is also important to train teachers and provide them with appropriate knowledge and skills to use the active learning approach.

Whether using the target approach will help students in Slovakia to achieve higher scores in the school leaving exams should be the subject of future research, involving students, and probably using a different research design.

#### REFERENCES

- Anderson, J. (2006). Zooming in and zooming out: Putting grammar in context into context. *The English Journal*, 95(5), 28-34. <https://doi.org/10.2307/30046585>
- Anderson, R. (2002). Reforming science teaching: What research says about inquiry. *Journal of Science Teacher Education*, 13(1), 1-12. <https://doi.org/10.1023/A:1015171124982>
- Anderson, T., & Shattuck, J. (2012). Design-based Research: a decade of progress in ducation research? *Educational Researcher*, 41(1), 62-75. <https://doi.org/10.3102/0013189X11428813>
- Bailey, K. D. (1994). *Methods of social research*. The Free Press.
- Banchi, H., & Bell, R. (2008). The many levels of inquiry. *Science and Children*, 42(2), 26-29.
- Barrow, L. H. (2006). A brief history of inquiry: from Dewey to standards. *Journal of Science Teacher Education*. 17(3), 265-278. <https://doi.org/10.1007/s10972-006-9008-5>
- Borg, S. (2003). Teacher cognition in language teaching: a review of research on what language teachers think, know, believe and do. *Language Teaching*, 36(2), 81-109. <https://doi.org/10.1017/S0261444803001903>
- Brown, A. L. (1992). Design experiments: Theoretical and methodological challenges in creating complex interventions in classroom settings. *Journal of the Learning Science*, 2(2), 141-178. [https://doi.org/10.1207/s15327809jls0202\\_2](https://doi.org/10.1207/s15327809jls0202_2)
- Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education*. Routledge.
- Collins, A. (1990). *Toward a design science of education (Report No. 1)*. Centre for technology in education.

- Conklin, W., & Stix, A. (2014). *Active learning across the content areas*. California: Shell Education Publishing.
- Demirici, C. (2017). The effect of active learning approach on attitudes of 7<sup>th</sup> grade students. *International Journal of Instruction*, 10(4), 129-144. <https://doi.org/10.12973/iji.2017.1048a>
- Farrell, T., & Bennis, K. (2013). Reflecting on ESL teacher beliefs and classroom practices: A case study. *RECL Journal*, 44(2), 163 – 176. <https://doi.org/10.1177/0033688213488463>
- Gold, R. L. (1958). Roles in sociological field observations. *Social Forces*, 36(3), 217-223. <https://doi.org/10.2307/2573808>
- Gollin, J. (1998). Deductive vs. inductive language learning. *ELT Journal*, 52(1), 88-89. <https://doi.org/10.1093/elt/52.1.88>
- Harakchiyska, T.K., Pessoa, T., Zámečníková, D., Márová, I., Trnová, E., Mottelson, M., Baltzeren, J., Yang, J., Qu, S., Liu, L., & Li, S. (2018). *Learner-centred teaching manual. A training pack for university teaching staff*. Masarykova univerzita.
- Harmer, J. (2007). *The practice of English language teaching*. Pearson Education Limited.
- Hendl, J. (2016). *Kvalitativní výzkum*. Portál.
- Linn, M. C., Davis, E. A. & Bell, P. (Eds.). (2004). *Internet environments for science education*. Lawrence Erlbaum Associates Publishers.
- Mackenzie, T. (2016). *Dive into inquiry*. ElevateBooksEdu.
- Marshall, J. C., Smart, J., Lotter, C., & Sirbu, C. (2011). Comparative analysis of two inquiry observational protocols: Striving to better understand the quality of teacher-facilitated inquiry-based science instruction. *Bilingual research journal*, 26(2), 213-239. <https://doi.org/10.1111/j.1949-8594.2011.00091.x>
- Marschall, C., & French, R. (2018). *Concept-based inquiry in action*. SAGE Publication Ltd.
- Masaryk, E. (2012). *Teachers' perception and attitude to an inductive / discovery approach to the teaching of grammar in secondary schools in Slovakia*. [dissertation]. University of Sussex.
- Mayer, R. E. (2004). Should there be a three-strikes rule against pure discovery learning? *American psychologist*, 59(1), 14-19. <https://doi.org/10.1037/0003-066X.59.1.14>
- Morrison, J. A. (2008). Individual inquiry investigations in an elementary science methods course. *Journal of Science Teacher Education*, 19(2), 117–134. <http://www.jstor.org/stable/43156460>
- Nunan, D. (1992). *Research methods in language learning*. Cambridge University Press.

- Nunan, D. (1998). Teaching grammar in context. *ELT Journal*, 52(2), 101-109. <https://doi.org/10.1093/elt/52.2.101>
- Pantiwati, Y. & Husamah. (2017). Self and peer assessments in active learning model to increase metacognitive awareness and cognitive abilities. *International Journal of Instruction*. 10(4). 185-202.
- Petrovitz, W. (1997). The role of context in the presentation of grammar. *ELT Journal*, 51(3), 201-207. <https://doi.org/10.1093/elt/51.3.201>
- Phipps, S., & Borg, S. (2009). Exploring tensions between teachers' grammar teaching beliefs and practices. *Science Direct*, 37(3), 380-390. <https://doi.org/10.1016/j.system.2009.03.002>
- Sheppard, I. (2008). Towards a constructivist pedagogy for Year 12 mathematics. *Australian Senior Mathematics Journal*. 22(1), 50-58.
- Svalberg, A. M.-L. (2005). Consciousness-raising activities in some Lebanese English language classroom: teacher perception and learner engagement. *Language Awareness*, 14(2-3), 170-184. <https://doi.org/10.1080/09658410508668832>
- Suryanti, Widodo, W., & Budijastuti, W. (2020). Guided discovery problem-solving: An attempt to improve science process skills in elementary school. *International Journal of Instruction*. 13(3), 75-88. <https://doi.org/10.29333/iji.2020.1336a>
- Švaříček, R., & Šedřová, K. (2007). *Kvalitativní výzkum v pedagogických vědách*. Portál.
- Ur, P. (2012). *A course in language teaching*. Cambridge University Press.
- Uysal, H. H., & Bardakci, M. (2014). Teacher beliefs and practices of grammar teaching: focusing on meaning, form or forms? *South African Journal of Education*, 34(1), 1-16.
- Woolley, S. L., Benjamin, W.-J. J., & Williams Woolley, A. (2004). Construct validity of a self-report measure of teacher beliefs related to constructivist and traditional approaches to teaching and learning. *Educational and Psychological Measurement*. 64(2), 319-330. <https://doi.org/10.1177/0013164403261189>
- Zormanová, L. (2012). *Výukové metody v pedagogice*. Grada Publishing a.s.