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# ON THE WAY TO DIALOGIC TEACHING: ACTION RESEARCH AS A MEANS TO CHANGE CLASSROOM DISCOURSE

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**Abstract**

*In this study, we present an action research project studying classroom discourse that took place at the Department of Educational Sciences at Masaryk University, Faculty of Arts, in Brno, the Czech Republic. The core of this project consisted of a development programme for teachers focused on a change in communication methods in dialogic teaching. We observed four teachers who took part in the programme in 2013/2014. Our goal was to determine how much the participation in the programme led to an actual change in teacher-student communication in the classroom. The data analysis showed that the participating teachers did actually change their communication methods – there was an increase in the average levels of openness, cognitive demand, length of student replies, and the number of cases when students themselves initiated communication. The data analysis also showed that the process of change is unique for each teacher and there is no unified trajectory.*

**Keywords**

*classroom discourse, dialogic teaching, action research*

Classroom discourse has become a key topic in educational science in recent decades. A number of authors (e.g. Alexander, 2001, 2006; Hall, 1998; Lemke, 1988; Littleton & Howe, 2010; Mercer, 1995, 2000; Mercer & Howe, 2012; Nystrand, Gamoran, Kachur & Prendergast, 1997; Nystrand, Wu, Gamoran Zeiser, & Long, 2001; Wells, 1999, 2009) dealt with forms of talk in the classroom and their educational functions. Interest in this topic takes two basic forms: empirical research projects carried out to observe communication processes in the actual classroom environment, and theoretical concepts enabling the identification and evaluation of the educational potential of various communicative methods including those which are not yet commonplace in practice.

Empirical research projects have consistently shown that communication in ordinary lessons rarely deviates from a routine IRF script (Sinclair & Coulthard, 1975) – it takes place as a sequence consisting of teacher *initiation*, student *response*, and teacher *follow up*. The teacher initiations are numerous, and they are usually closed questions, i.e. there are given answers which are seen as correct and it is the students' task to find these answers. The teacher questions are characterized by a low level of cognitive demand; typically, they require the students to show that they remember subject matter presented to them earlier. Student answers are short and simple (often one word) and they are usually listings of learned fact which correspond to the nature of the teacher's questions. The teacher's feedback is laconic, a mere statement of whether the student's answer was correct. Any developments of a student's answer or offers of new clues or impulse for further consideration are usually absent. Generally, it can be said that students rarely get the opportunity for a more complex statement resulting from highly demanding thought processes during a class. A number of international research studies have presented findings of this kind (Nystrand, 1997; Alexander, 2001; Burns & Myhill, 2004; Parker & Hurry, 2007; Kumpulainen & Lipponen, 2010). The prevalence of this pattern was also confirmed in humanities classes at lower secondary schools in the Czech Republic in recent research by Šeďová, et al. (Šeďová, Švaříček & Šalamounová, 2012; Šeďová & Švaříček, 2012; Šeďová, Šalamou-nová & Švaříček, 2014); similar results in relation to foreign language teaching were also observed by Šebestová, Najvar and Janík (2011) and Najvar, Janík and Šebestová (2013).

## The concept of dialogic teaching

The concept of dialogic teaching stands, in a sense, in opposition to the above-mentioned empirical findings. In dialogic teaching, student activity is stimulated by communication and work with language; their thought processes

are encouraged and their comprehension deepens (Alexander, 2006). The essence of this method is thus teacher-student communication in which higher cognitive processes are dominant on the students' part. For this kind of teaching, it is important that students are active, have significant autonomy, and can partly influence what happens in the classroom.[1]

The concept of dialogic teaching is founded on a sociocultural theory, as represented mainly by Vygotsky (1978) and Bruner (1978). Vygotsky postulates that each mental function appears twice during a child's development – first on the social level (i.e. on the level of the child's interaction with others) and only later on the individual level (on the level of internalized mental processes). He assumes that there is a very close relationship between discourse and thinking; when a child is able talk about something, this gets alter internalized and becomes a part of the child's thinking. Vygotsky (1978) introduced the term *zone of proximal development* which is understood as the difference between the current level of a child's performance and the potential developmental level that the child is able to achieve with a teacher's assistance. In this concept, good teaching is a little 'ahead' of the current developmental stage. Teacher-student communication should thus involve tasks that the students would not be able to manage alone, and the support given to the child is consequently internalized. What comes from the outside, from a competent teacher (or a parent or a more experienced peer), is incorporated as a tool into the cognitive structures of the child's mind.

Vygotsky's emphasis on verbal interaction between a less competent child and a more competent adult (embodied in the concept of the zone of proximal development) was further developed in the scaffolding metaphor of teaching (Bruner, 1978). Scaffolding is a temporary support provided to the student by the teacher. It is construed in order for the student to obtain a certain particular skill or piece of knowledge. When a child is working on a task or problem, an adult intervention is directed towards limiting the degree of freedom of work on the task, which lets the child focus on the particular skill which should be adopted at that moment. Scaffolding is also characterized by its safety, as it reduces the risk of student failure (Mercer, 2000).

It is obvious how this can be applied to the area of classroom discourse. A teacher-student dialogue is seen as possible scaffolding because speech

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[1] Different authors use various terms to describe teaching using dialogic forms. Wells (1999) and Pappas and Varelas (2006) use the term *dialogic inquiry*, while Skidmore (2006) prefers *dialogical pedagogy*, and Alexander (2006) uses *dialogic teaching*. The label *inquiry-based teaching* is used in a very similar sense in the teaching methods of science classes. The meaning of the terms is very similar. This paper uses Alexander's demarcation as it is clear and well defined.

is a key source of a child's cognitive development. Education is then viewed as a dialogic process, into which both teachers and students bring certain meanings and together they react to them and develop them. This does not mean that any teacher-student communication can be seen as dialogic. According to Nystrand (1997), we cannot automatically see teaching as dialogic merely because different speakers exchange lines. A true dialogic quality, as Bakhtin (1981) claims, involves alternating various mental perspectives. This means that each participant brings something original and unique to the communication, and dialogue is born from this merging of heterogeneous elements. If various perspectives and different stances are presented side by side, a 'dialogic space' is being opened. To open a dialogic space is central for the development of thinking, creativity, and the ability to learn because comprehension of a problem grows together with the realization of differences and variability.

## Features of dialogic teaching

In the course of refining the theoretical background to the concept of dialogic teaching, the question of how we can identify this type of teaching in practice has been continually asked. A number of studies have focused on particular aspects of classroom discourse assessed according to the dialogic quality it introduces. For example, Smart and Marshall (2013) focused on the quality of teacher questions. They distinguished several typical dimensions for these questions: 1) question level (varying from questions demanding lower-order thinking to those requiring analysis); 2) question length (from a focus on a correct answer to a focus on evidence and reasoning); 3) question ecology (from situations in which the teacher explains to those in which the student explains); 4) communication patterns (from a state controlled by the teacher to a state guided by student questions and ideas); and 5) classroom interaction (from a didactic pattern of interaction to the teacher facilitating dialogue among students). Smart and Marshall explain their focus on teacher questions by claiming that these questions are key for stimulating student thinking because, as they prove in an empirical analysis, the difficulty of the question level predicts the cognitive level of the student answers.

Molinari and Mameli (2013) focused primarily on students, viewing student participation as the basic criterion for an evaluation of the classroom discourse. They made their observations in these contexts: 1) dialogic space: the total time the students talked during interactive sequences; 2) triadic interaction: the total time spent in multiple party interactions, i.e. in the kind of interaction involving more than a teacher and one student reacting to each other. By observing these contexts, it is possible to see whether the

classical IRF script (see above) is breached and students participate fully in communication.

Some classifications are an attempt to grasp various criteria at the same time. Nystrand et al. (1997) and Applebee, Langer, Nystrand & Gamoran (2003) used whole sets of indicators to signal dialogic teaching during observations: 1) authentic questions: a teacher's open questions which have no given answer and which are directed towards identifying students' own ideas, opinions, and attitudes; 2) uptake: the situation when a speaker further develops what a previous speaker had said; such absorption thus raises the coherence of the dialogue; 3) higher-order evaluation: the form of teacher feedback when a student's reply is not merely labelled correct or incorrect, but is commented upon, developed, and elaborated; 4) open discussion: a sequence including at least three participants who react to each other for at least thirty seconds.[2]

These criteria are rather complex, for they include key teacher actions that are crucial for setting the level of cognitive demand (questions, uptake, and feedback) as well as student participation in the communication beyond the IRF script frame (i.e., open discussion).

Resnitskaya, Kuo, Clark, Miller, Jadallah, Anderson & Nguyen-Jahiel (2012) offer an even more complex method for assessing teacher-student communication. She developed a tool for classifying the level of dialogic quality (Dialogic Inquiry Tool) that works in the following dimensions: 1) authority: the level at which a teacher controls turn taking, topic setting, and communication content; 2) questions: the nature of teacher questions in terms of their cognitive demand and openness; 3) feedback: the level of teacher provision of elaborate feedback, which can work as a scaffolding; 4) connecting student ideas: the level at which students' replies are related among themselves, if students are asked to react to each other; 5) explanations: the level of students' expression of their opinions and whether they support them with arguments and examples; 6) collaboration: whether there is a gradual construction of ideas in a way that speakers react to each other and elaborate their arguments one after another. This tool is very complex and it covers many aspects of dialogic teaching. Its disadvantage is that it is based on evaluation scales,[3] even though assessing the level at which the classroom

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[2] A sequence where a teacher asks first one student a question and then asks another student another question does not meet this condition. The point is that students should react to each other among themselves.

[3] An observer evaluates each of the above-mentioned 1 to 6 dimensions by assigning points according to the proximity to a dialogic extremity of the communication.

performance corresponds to a given extreme of dialogic teaching in individual dimensions is rather subjective because it requires an observer's opinion. In contrast, observing the quantity of occurrences of strictly given indicators, as suggested by Nystrand (1997) and Applebee et al. (2003), can lead to certain simplifications, although it can be considered more objective.

This list of various indicators used in observing dialogic teaching is by no means complete. Generally, it can be said that regardless of the particular indicators chosen by different authors, in principle, they always observe whether the classroom discourse is authoritative, i.e. controlled by the teacher who conveys information and whose talk has a transmissive function, or dialogic, i.e. created collaboratively by the teacher and students with the aim of achieving the active construction of new knowledge (Scott, 1998).

## Teachers as creators of dialogic teaching

Although the features of commonplace classroom communication are quite different from the characteristics of dialogic teaching, there are research studies describing successful dialogic teaching. These are often case studies of exceptional teachers (Gutierrez, 1994; Billings & Fitzgerald, 2002; Kutnick & Colwell, 2010; Scott, Ametller, Mortimer & Emberton, 2010).

There is empirical evidence describing the effectiveness of dialogic teaching. Mason (2001) demonstrated the positive influence of dialogic teaching which is capable of stimulating and sustaining conceptual changes in the domain of science classes. Daniel, Lafortune, Pallascio, Splitter, Slade & de la Garza (2005) proved that dialogic teaching leads to the development of students' metacognitive thinking. Resnitskaya et al. (2009) summarised research findings that showed that dialogic teaching develops students' argumentation skills.

Thus, findings have documented that dialogic teaching is possible and empirical evidence has indicated that it can positively influence student learning and thinking. This raises the question of why dialogic methods are not part of ordinary teachers' inventory of teaching methods. One possible explanation is that teachers simply do not get the kind of educational support that would allow them to implement dialogic teaching in their work. According to Corden (2009), teachers are expected to learn to outline their teaching in a dialogic way, although they were educated transmissively themselves.

Research projects that combine educational support for teachers with observations of changes in their work are viewed as very promising. Extensive research projects of this type were carried out by Alexander (2005, 2006) and Lefstein and Snell (2014). Both projects resulted from professional

development programmes at selected schools. The programmes included collaborative lesson planning, video recordings of classroom performance, and the subsequent use of these recordings in analytical discussions. There have also been a number of smaller projects focused on a certain type of communicative method. Smit and van Eerde (2011) focused on the scaffolding process in relation to teaching mathematical terminology; Oliveira (2010a) focused on types of teacher questions in class, the adoption of ways to invite students to share their opinions and articulate their own ideas, and the use of communication to build solidarity or group cohesiveness (Oliveira, 2010b).

All these projects show traits of action research, which means that a change is introduced in them in a controlled way, and the progress and effects of this change are monitored (Elliot, 1991). Thus teachers learn to communicate with their students in a way that is different than before, and the effect on the course of teaching and student learning are observed.

## Methodology

In this study, we present an action research project carried out at the Department of Educational Sciences at Masaryk University, Faculty of Arts. Its core was a teacher development programme focused on changing communication methods towards the implementation of dialogic teaching principles. In the 2013/2014 school year, we observed four teachers who took part in the programme. We asked: **What was the level at which involvement in the programme led to an actual change in teacher-student classroom communication?**

### *Research Design*

Action research is the type of research that is built on the participation of everyone involved, i.e. both researched individuals and researchers, that takes place in an actual environment and that has the goal of satisfactorily dealing with selected issues based on the considerations of the practitioners and the researchers' expert theoretical analysis. Lewin's (1946) original definition describes action research as the research of social action that leads to action. Lewin's view emphasizes research and actions, but these are but two of several components of action research. Its third necessary component is the collaborative partnership between participants and researchers (Somekh, 2006). The fourth component is the idea of social justice built upon emancipation and empowerment (Freire, 1982). The fifth component is the emphasis on the reflective turn in the 20th century; in its extreme form, teachers themselves should become researchers, with their action research helping to develop themselves professionally as well as the whole school (Elliot, 1991).

Action research has a cyclical character: first, a problem is identified and only then is a change designed and implemented. After the evaluation of the progress and effects caused by the change, another change is proposed and its implementation is monitored. In this way, there are cycles that follow one after the other; more precisely, it is a spiral process of progressively formulating and testing solutions to practical problems (Wall & Higgins, 2006).

In our case, the problem was teacher-student communications in lower secondary schools with the possibility of shifting the parameters of this communication towards principles of dialogic teaching. When defining the problem, we began with the results of a previous research project focused on describing the classroom discourse at a lower secondary school (Šeďová, Švaříček & Šalamounová, 2012; Šeďová & Švaříček, 2012; Šeďová, Šalamounová & Švaříček, 2014). In this research project, we concluded that Czech teaching practice is far removed from dialogic teaching, even though the teachers are in favour of dialogic teaching and consider it a highly productive teaching method.[4]

The discrepancy between teacher beliefs and their actual communication methods can be caused by insufficient educational teacher support. The idea at the centre of our action research project was that it is only possible to change teaching through teacher development/training (because teachers are the initiators and bearers of such change), and that education (which would be itself conceived dialogically) should become the method of such teacher development/training.

### *Teacher Development Programme*

The teacher development programme that we designed and implemented in 2013/2014 consisted of two key components. The first component involved seminars for teachers connected with discussions of the presented topics; the other component was formed from video recordings of classroom performances and discussions of the recordings between a teacher and a researcher. The programme thus combined group meetings and meetings in pairs consisting of a teacher and a researcher. Four teachers participated in the programme. Each teacher had an assigned researcher who travelled to the teacher's school to record the teacher's lessons and lead video-stimulated

[4] During the in-depth half-structured interviews that we conducted with participating teachers, the importance of giving students space for complex replies and the idea that discussion is the best teaching method were repeated several times. It turned out, however, that teachers operate within a ritualized IRF structure and student participation in verbal communication does not exceed 25 percent (in contrast to teacher participation, at 75 percent).

reflective interviews. The programme was very intensive in terms of the time devoted to it by the teachers and the researchers involved, and in terms of the amount of work carried out by both parties in the course of the project. The steps were:
1) getting to know researchers and participants (October 2013);
2) entrance interviews between a teacher and a researcher (November 2013);
3) two entrance video recordings to document classroom conditions before the beginning of the programme (November – December 2013);
4) the first seminar for teachers introducing the theoretical background of dialogic teaching with a discussion of possible applications of dialogic principles in the participants' actual practice (January 2014);
5) a second seminar for teachers on asking questions and giving feedback in dialogic teaching in which the participants were given the task of preparing a lesson with dialogic questions and feedback, with a discussion of possible ways to meet this requirement (February 2014);
6) the first loop of the action research – gradual takes of three video recordings in the classroom, each followed by a reflective interview between the teacher and a researcher based on watching the video and evaluating the achieved changes and then followed by making a plan for the next lesson (February – March 2014);
7) evaluation of the proceedings of the first loop and the achieved change – an interview between teacher and researcher (April 2014);
8) a third seminar for teachers on increasing student participation and achieving mutual student reactivity with a task for the participants to prepare a lesson with high student participation and mutual reactivity and a discussion of possible ways to meet this requirement (April 2014);
9) a second loop of the action research – gradual takes of two video recordings in the classroom, each followed by a reflective interview between teacher and researcher based on watching the video and evaluating the achieved changes and then followed by making a plan for the next lesson (April – May 2014);
10) evaluation of the proceedings of the second loop and the achieved change – an interview between teacher and researcher (May 2014);
11) taking two output video recordings in the classroom that document the conditions at the end of the programme (May – June 2014);
12) a fourth seminar for teachers – the conclusion of the programme with a discussion of the achieved results and the participating teachers' and researchers' subjective views of the whole process (June 2014).

The concept of reflective practice (see e.g. Píšová, Najvar, Janík, Hanušová, Kostková, Janíková, Tůma & Zerzová, 2011) was the guiding principle of the whole programme. We were primarily inspired by Korthagen's (2001) model of an ideal process of reflection, ALACT, which features the following steps:

1) action; 2) looking back on the action; 3) awareness of essential aspects; 4) creating alternative methods of action; 5) trial. In our case, step 1 corresponds to the first lesson in which a video recording is taken, steps 2 and 3 to the teacher and the researcher watching the recording together, step 4 corresponds to making a plan for the next lesson, and step 5 to this next lesson. Our programme differs from the ALACT model in that at some stages of the programme, theoretical seminars focused on the principles and techniques of dialogic teaching were placed before step 1.[5]

The advantage of the ALACT model is that in principle, it is analogous to a general model of action research. The same order of steps thus serves teacher development and data collection. The method of video recordings also functions as a developmental and research tool (Janík, Minaříková et al., 2011).

*Participants*

Four teachers[6] from three lower secondary schools (ISCED 2A)[7] participated in the programme in 2013/2014. They were all experienced and highly motivated teachers who showed a strong interest in self-education and work improvement.[8] These teachers registered for the programme voluntarily, based on an offer sent out to schools by researchers. The offer was limited to certified teachers of Czech[9] or civics for lower secondary school. We used this limitation to prevent an overly heterogeneous group of participants and possible teaching situations; it was also our aim to create a group whose members were quite similar so that they could effectively share their experiences.

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5 Korthagen (2001) himself notes that theory plays a crucial role in his attitude toward teacher training; however, he recommends including it in step 3, later in the ALACT model.

6 This was a pilot run of the programme which will take place with new participants in the following year.

7 Lower secondary schools in the Czech Republic are part of primary schools where students undergo compulsory education, which lasts nine years. Schools consist of primary and lower secondary schools. Primary school has four grades and these are attended by students between 6 and 11/12 years of age. After completing these four grades, students can either continue to study at a lower secondary school or they can go to high school, provided they pass the entrance exams. As there is a high number of high schools in the larger cities of the Czech Republic, most gifted students often leave their schools for high schools, which is a part of the Czech educational system that is often criticised. The majority of schools are run by the state (97%) and only some of them are run by private (2%) or religious (1%) organisations.

8 The motivation of these teachers is evident in the mere fact that they were willing to enter a programme that was highly demanding on their work and intruded on their privacy.

9 In Czech lessons, we made further reductions when we observed only lessons on literature.

Table 1
*Participants*[10]

| Teacher | Length of Practical Experience | Teaching Subject | Year | School |
|---|---|---|---|---|
| Jonas | 6 years | Czech | 7 | School A: a city |
| Radek | 8 years | Civics | 9 | School A: a city |
| Hana | 20 years | Czech | 7 | School B: a town |
| Vaclav | 3 years | Civics | 9 | School C: a village |

All three schools where we carried out our research are situated in the South Moravian region, which is located in the south-eastern part of the country and is one of fourteen administrative units in the Czech Republic. Two of the participants (Jonas and Radek) worked at the same school, hereafter labelled as School A. School A is located in Brno which is the regional capital and the second largest city in the Czech Republic. Brno is characterised by below-average unemployment and by a high concentration of universities, colleges, and lower secondary schools. Students usually attend a lower secondary school close to their home. School A is an urban public school situated near housing projects. The school was built to cover the needs of the working class whose members inhabited the area in the past. It was designed to be large; there were initially a lot of parallel classes in each grade. A gradual decrease in the number of students due to demographics has resulted in two classes in each grade now. The school is not at capacity and there is the threat of a merger with a nearby primary school of a similar size. For this reason, the school tries to attract new students with extra activities (intensive English language classes, using tablets in classrooms, generous ICT equipment in classrooms, sport courses, etc.). A small number of students go directly to high school after finishing elementary school. We observed teacher Jonas in the 7th grade, in an ordinary class attended by 23 students (9 boys and 14 girls) at the time of the research. Teacher Radek was observed in the 9th grade in a selective class with intensive education in mathematics, Czech, and English. There were 21 students in this class: 13 girls and 7 boys.

[10] All participants were guaranteed that the data acquired from them would be anonymized. The names used here are pseudonyms.

School B, where Hana teaches, is located in a small town about 40 kilometres from Brno. There are three elementary schools in the town. School B is situated on the edge of the town centre; it is medium sized[11] with two to three parallel classes in each grade. There is also a high school in the town where some of the students go after finishing elementary school[12], but the majority remain at their elementary schools where they continue with lower-secondary education. At school B, students are tracked into selective classes. There is intensive education in mathematics in these classes (although the intensive education concerns mathematics, the division into selective classes is maintained in all subjects). Hana was observed teaching a selective 7th grade class. At the time of the research, there were 21 students in the class: 12 girls and 9 boys.

Vaclav works at School C, which is a typical village school in a municipality of about 1,000 inhabitants. It is the only school in the village and it was attended by 325 students at the time of the research.[13] The school does not suffer from the departure of students to the lower grades of an eight-year secondary school; its classes remain almost unchanged for the whole school attendance. The collaboration with Vaclav took place in one of the 9th grade classes. There were 19 students in the class: 10 girls and 9 boys.

We observed each participant teacher at work in a single class. Our goal was to observe teachers of the same subject in the same year in order to be able to better compare their work. This intersection was the case in the 7th grade with Jonas and Hana and in the 9th grade with Radek and Vaclav.

*Data*

We collected the following data during the project: a) an individual entrance interview between a teacher and a researcher; b) sound recordings of group discussions at seminars; c) video recordings from lessons; d) sound recordings of reflective interviews stimulated by the video recordings; e) questionnaires for students handed out at the beginning and at the end of the whole programme.

The core of the data corpus consists of the video recordings from the lessons together with the reflective interviews about the classes stimulated by the videos. In total, we took nine video recordings of each teacher (each lasted a full lesson, i.e. 45 minutes); each recording was followed by an interview which took place a couple of days after the recording was made.

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11 461 students attended the school in 2013/2014.

12 This high school has only one class in each grade.

13 It is a catchment school for surrounding villages, too. There are two parallel classes in each grade.

A series of nine video recordings makes it possible to document the development that the participants made during the whole process of the action research. It is a very extensive data source and allows numerous subtle analyses. For this study, we worked only with data from the first two and the last two video recordings[14] which is the first analytical output from our research project. It is our aim to compare the teacher communication methods before the teachers began the programme (the first two video recordings) and at the end (the last two video recordings). The comparison of the conditions before and after the programme will allow us to determine whether the observed teachers showed a positive shift towards dialogic teaching. We used video recordings of lessons as the comparative material. These recordings were made as part of the Communication in the Classroom research project, which took place from 2009 to 2011.[15] The recordings were of 32 lessons by 16 teachers at lower secondary schools in lessons of Czech, civics, and history.[16] We consider the teachers included in this research project to represent a fair sample of ordinary teachers[17] and our goal is to compare the teachers who attended our development programme with this ordinary sample.

### *Tools and Methods of Analysis*

We worked further with lesson protocols using the software ATLAS.ti, which is intended for qualitative analysis and also allows simple descriptive quantitative analysis because it can be used to observe the number of appearances of individual codes. We used the software Statistica for statistical operations, the results of which are also presented in this study.

The basis of the analytical method was a coding process where we worked with a set of codes designed to indicate features of dialogic teaching. We observed the following while coding: 1) the character of teacher initiations (cognitive demand, openness, and absorption); 2) the character of student replies (length and cognitive correspondence to teacher initiations); 3) the presence of student initiations and their nature (cognitive demand and openness); 4) the occurrence of triadic interaction. It would have been possible

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14 We have transcribed all video recordings into the form of a lesson protocol. The recording protocol included anonymized basic personal identification about the lesson and a transcript of verbal communication during the whole lesson. The transcription rules followed notation by Jefferson (1984).

15 See, for example, Šeďová, Švaříček, & Šalamounová, 2012; Šeďová & Švaříček, 2012; Šeďová, Šalamounová, & Švaříček, 2014.

16 We recorded two lessons of each of the participants always in the same class.

17 For more on the selection of participants, see Šeďová, Švaříček, & Šalamounová, 2012.

to use other indicators as well.[18] We chose these four criteria primarily because we have the data about their occurrence in a broader sample of lessons by teachers of the humanities in lower secondary school classes from a previous project (see Šeďová, Švaříček & Šalamounová, 2012). Using identical indicators will let us compare the participants of our development programme with a sample of teachers who did not take part in it.

The coding of the acquired data material was a demanding operation because the research team had four members all of whom participated in the coding. It was necessary to pay attention to correspondence among the coders and return to the coded material so that it could be reworked in order to reach a high level of consistency and thus meet the reliability criterion.[19] We can make simple quantitative operations (absolute and relative quantities of individual features) with codes that were created this way and we also used the codes to organize the material for a more subtle qualitative analysis, which we will carry out in the subsequent stages of the analysis.

We used some statistical methods in this study with the aim of comparing communication in lessons by the teachers who have passed our course with lessons by ordinary teachers. For this purpose, we analysed the frequency of selected communication indicator occurrences, including an analysis of teacher variability, and we also used a t-test. We wanted to find the level at which the lessons by our teachers are similar to or different from lessons by teachers from the representative sample of the South Moravian region in terms of the average occurrence of communication indicators.

## Results

### *Different Paths to the Same Goal*

In this section, we present the changes that took place – as measured by the selected indicators – in our participants' teaching after they passed our course. The first interesting finding to emerge from early analysis is that individual teachers introduced quite different types of innovations into their communication methods. It is impossible to say that all of them followed the

[18] Due to the limited scope of this study, we have completely omitted the phenomenon of feedback, which is also observed in a study of dialogic teaching. For the same reason, we do not deal with the cognitive level of student answers and their correspondence to teacher initiations. Both phenomena are highly complex and multi-layered and we will therefore deal with them in another text.

[19] Each researcher coded the transcripts of recordings that they participated in as an observer in order to secure the best comprehension of communication exchanges. Next, we performed multiple coding (more researchers coding the same text) and a repeated coding of the whole data block.

expected trajectory: growth of cognitive demand and openness of initiations – length of student replies – strengthening of the triadic interaction. Below, we thus describe the most prominent changes for our teachers.

## Jonas

The principal change which took place in teacher Jonas's lessons was the implementation of a triadic interaction, i.e. sequences in which several students respond to each other together with the teacher. While most communication sequences had met the traditional IRF structure before the course, video recordings created after the course show a dramatic disruption of the IRF pattern. The first video recordings show a teacher who asks his students more cognitively demanding questions to which students reply and the teacher gives them feedback. The cognitive demand of these questions is enormously high – 76 percent of Jonas's questions in these lessons are questions of higher cognitive demand; in contrast, 40 percent of such questions were detected in a sample of ordinary teachers (Šeďová, Švaříček & Šalamounová, 2012). Literary works that the teacher introduces to his students are also very difficult for readers (*The Chronicle of Dalimil* and the works of Jan Hus, which are early Czech literary works written in Old Czech and deal with history of the distant past and various religious and social topics, respectively).

The situation is completely different in the lessons recorded after the course. Discussions partly led by students themselves are the dominant feature in these lessons. In a lesson dealing with the works of John Amos Comenius, who is generally known in the Czech culture as 'the teacher of nations' and considered a founder of pedagogy, students are introduced to his literary heritage and rules to guide teachers in their work are created in collaboration. The teacher asks questions in these passages, as do his students, or students come up with an idea and other students spontaneously react to them. (**Student Nikol**: *I don't want this to sound stupid but I sometimes think that it's like the student's fault that he doesn't know anything because he sometimes fools around in the lesson and then he like doesn't get it and I think this is stupid, why should the teacher explain it again?* **Student Jana:** *But what about when he pays attention and he tries to understand and still doesn't understand? And he gets an unnecessary five* [a failing grade], *because he didn't get it and the teacher didn't explain it properly? So what then?*)Students made 51 replies within the frame of the triadic interaction in the lessons before the course; they made 327 replies in the lessons after the course. This clearly shows a huge increase in this type of communication sequence. This invasion of the triadic interaction consequently changes some of the other communication indicators. Above all, student replies become longer, which is evident in Tables 2 to 4.

Table 2
*Total length of student replies in teacher Jonas's lessons*

| JONAS | Before the Course n | Before the Course % | After the Course n | After the Course % |
|---|---|---|---|---|
| 1–4 words | 140 | 72 | 214 | 55 |
| 5–9 words | 29 | 15 | 68 | 17 |
| 10 or more words | 25 | 13 | 111 | 28 |
| total | 194 | 100 | 393 | 100 |

Table 3
*Length of student replies in teacher Jonas's lessons – within IRF*

| JONAS | Before the Course n | Before the Course % | After the Course n | After the Course % |
|---|---|---|---|---|
| 1–4 words | 106 | 74 | 48 | 73 |
| 5–9 words | 18 | 13 | 7 | 11 |
| 10 or more words | 19 | 13 | 11 | 16 |
| total | 143 | 100 | 66 | 100 |

Table 4
*Length of student replies in teacher Jonas's lessons – within triadic interaction*

| JONAS | Before the Course n | Before the Course % | After the Course n | After the Course % |
|---|---|---|---|---|
| 1–4 words | 34 | 67 | 166 | 51 |
| 5–9 words | 11 | 21 | 61 | 19 |
| 10 or more words | 6 | 12 | 100 | 30 |
| total | 51 | 100 | 327 | 100 |

Table 2 shows that student replies have become longer in teacher Jonas's lessons – while 13 percent of replies were very long replies (of 10 or more words) before the course, 28 percent of replies were very long replies after the course. Table 3 shows that longer replies do not occur in situations where the teacher asks individual students who answer directly (the IRF structure). Table 4 proves that replies become longer within the frame of the triadic interaction. The rapid growth of the triadic interaction shown here resulted in the effect of lengthened replies even if we consider a lesson as a whole, without differentiating between the types of interaction. The involvement of the triadic interaction somewhat further changes the character of initiations

(i.e. questions). Not only do students face the teacher's initiations, they may also receive questions from other students. Jonas's method of asking his students questions shifts towards a lower openness and higher cognitive demand (39 percent of questions were open before the course, 33 percent after the course; 76 percent of questions were cognitively demanding before the course, 81 percent after it). This shift is not a massive one, but its direction is striking – the cognitive demand had been high before the course and it keeps rising while the openness drops. In contrast, the questions asked within the frame of the triadic interaction by Jonas and the students change substantially and in the proper direction (11 percent of questions were open before the course, 58 percent after it; 28 percent of questions were cognitively demanding before the course, 73 percent after it).

If we are to work with indicators of openness and cognitive demand of all initiations in the lessons, disregarding whether they come from the teacher or students and whether they have the IRF structure or triadic interaction, we get the results captured in Tables 5 and 6.

Table 5
*Openness of all initiations in Jonas's lessons*

| **JONAS** | **Before the Course n** | **Before the Course %** | **After the Course n** | **After the Course %** |
|---|---|---|---|---|
| Open | 63 | 36 | 90 | 49 |
| Closed | 112 | 64 | 96 | 51 |
| Total | 175 | 100 | 186 | 100 |

Table 6
*Cognitive demand of all initiations in Jonas's lessons*

| **JONAS** | **Before the Course n** | **Before the Course %** | **After the Course n** | **After the Course %** |
|---|---|---|---|---|
| Lower | 51 | 29 | 45 | 25 |
| Higher | 124 | 71 | 141 | 75 |
| Total | 175 | 100 | 186 | 100 |

We can see that while the total change in the cognitive demand is quite small, the openness of initiations grew rather significantly. The mechanism behind this growth is not a change in the teacher's questioning style within the IRF but rather in the teacher's loosening of the communication structure and giving a part of the initiative to students.

## Hana

Hana's teaching changed substantially in the way she asked her questions. The observed lessons maintained a similar structure for the whole duration of the project. A literary text was chosen for each lesson and a conversation between the teacher and the students about the topics in the book was held at the beginning of the lesson which was followed by a group reading of excerpts from the book, a plot summary, and an interpretation of meaning. This lesson scenario concept offers space for applying dialogic teaching principles and for this reason some parameters of Hana's teaching seemed very much dialogic from the beginning. This was a primary indicator of the openness of a teacher's questions. Of the questions Hana asked her students in the first two observed lessons, 85 percent were open. Compared to the average 23 percent measured in the sample of ordinary teachers in the previous research, this is a really exceptionally high value. As for the cognitive demand of the questions, Hana's parameters were common. We measured 39 percent of questions with a higher cognitive demand in her lessons before the course (it was 40 percent in the sample of common teachers). Tables 7 and 8 show how the characteristics of Hana's questions changed after she completed the course.[20]

Table 7
*Openness of teacher questions in Hana's lessons*

| HANA | Before the Course n | Before the Course % | After the Course n | After the Course % |
|---|---|---|---|---|
| Open | 126 | 85 | 85 | 66 |
| Closed | 25 | 15 | 43 | 34 |
| Total | 151 | 100 | 128 | 100 |

Table 8
*Cognitive demand of teacher questions in Hana's lessons*

| HANA | Before the Course n | Before the Course % | After the Course n | After the Course % |
|---|---|---|---|---|
| Lower | 94 | 61 | 66 | 52 |
| Higher | 57 | 39 | 62 | 46 |
| Total | 151 | 100 | 128 | 100 |

[20] The numbers in all of the tables in this section are always the sum of both observed lessons a before the course and after it.

We can see that in Hana's case, the openness of teacher questions was surprisingly reduced (from 85 to 66 percent) and the number of more cognitively demanding questions rose at the same time (from 39 to 46 percent). This can be primarily explained by a decrease in asking questions with a low level of cognitive demand, which had dominated in Hana's lessons before the course. Before the course, emphasis was placed primarily on evocative discussions about the topics in a given book. In these discussions, Hana asked a lot of questions in order to link student experiences with the content of a given literary text (*Do you have a pet at home? Have you ever thought about running away from home?*). It was clear that the teacher aimed for the high involvement of the students, and some activities in the lessons were very dialogic in terms of openness and space for the students, but the usefulness of these activities was problematic concerning the curriculum. For example, in one lesson a stone was passed around the classroom and students were supposed to say what they were thinking when they held it. After the course, Hana began to place more emphasis on the part of the lesson when the literary work is interpreted. This is the reason her questions become more cognitively demanding (*What kind of qualities does a man have if we say that he lives like Robinson Crusoe? So if we say about someone that he lives like Robinson Crusoe, does it mean that he lives on his own and that he is independent – why do we say this about him? How did we figure this out?*).

Another indicator of a change in the style of asking questions is the increase in questions with absorption – i.e. questions where a speaker reacts to what was said by a previous speaker. While 9 percent of all questions that Hana asked her students were of this type before she completed the course, it was 23 percent after the course. Questions with absorption are highly valued in dialogic teaching because they raise the coherence of a dialogue. They make it possible to overcome one of the limitations within the IRF structure, which is that dialogue is broken up into short sequences that do not follow one another. This way of asking questions also allows for a more detailed and focused study of the topic that is being dealt with. Hence, it contributes to raising the cognitive demand and consequently to a deeper understanding among students. (**Hana:** *Why do people read this book, in your opinion?* **Student:** *It's a classic.* **Hana:** *That it's a classic, great. It is a classic. What does it mean that it's a classic?*)

In Hana's case, as in Jonas's, the triadic interaction grew, but on a much smaller scale. The number of student replies in the triadic interaction grew from the original 18 to 52. A substantial difference is that in Jonas's case, the communication parameters in the triad are distinctively different from IRF communication, but we do not find such striking differences in Hana's case. We can thus conclude that while Jonas transformed the style of communication by empowering his students, self-development is more typical of Hana.

### Vaclav

A lot of questions of various types were present in teacher Vaclav's lessons even before he completed the course. From the analysis of the first recordings, it was clear that regardless of the topic, Vaclav keeps his students alert with his questions. His questions in these lessons exceeded the standard in terms of openness (51 percent of all questions were open) and cognitive demand (59 percent of questions had a higher cognitive demand). The number of questions in the initial lessons is connected to the length of student replies to a certain degree. Despite the fact that the questions were cognitively demanding, students mostly replied very economically. In the initial lessons, there are almost no autonomous student initiations, i.e. situations when students actively enter into a dialogue with the teacher without being asked to do so. Generally, in the beginning, Vaclav is a teacher whose style is characterized by speed (a quick succession of questions and answers) and who fills in the communication space with his own activities. The recorded lessons differ from each other before and after the course in this perspective, as the following descriptive tables show.

Table 9
*Openness of teacher questions in Vaclav's lessons*

| **VACLAV** | **Before the Course n** | **Before the Course %** | **After the Course n** | **After the Course %** |
|---|---|---|---|---|
| Open | 92 | 51 | 126 | 79 |
| Closed | 90 | 49 | 34 | 21 |
| Total | 182 | 100 | 160 | 100 |

Table 10
*Cognitive demand of teacher questions in Vaclav's lessons*

| **VACLAV** | **Before the Course n** | **Before the Course %** | **After the Course n** | **After the Course %** |
|---|---|---|---|---|
| Lower | 74 | 41 | 43 | 27 |
| Higher | 108 | 59 | 117 | 73 |
| Total | 182 | 100 | 160 | 100 |

Table 11
*Length of student replies in Vaclav's lessons*

| VACLAV | Before the Course n | Before the Course % | After the Course n | After the Course % |
|---|---|---|---|---|
| 1–4 words | 177 | 82 | 127 | 49 |
| 5–9 words | 20 | 9 | 72 | 28 |
| 10 or more words | 5 | 9 | 58 | 23 |
| Total | 217 | 100 | 257 | 100 |

Tables 9 to 11 document a straightforward shift towards a more dialogic nature. The share of open and cognitively demanding questions by the teacher increases and student replies become longer. The total number of questions asked in the lessons slightly decreases after the course, although it still remains relatively high. It is interesting that although the number of teacher questions decreases, the number of student replies increases (from 217 to 257). This is because the triadic interaction is a new element that appears in Vaclav's lessons after the course. It takes a somewhat different shape than in Jonas's case and partly than in Hana's case. Vaclav deliberately supports student initiations when he invites his students to ask one another questions about the latest subject matter. A varying level in the demand of student questions results in communication sequences that are rarely extensive and continuous. Vaclav often enters into student initiations, adjusting the questions and passing them on. This is a change because there were no such sequences in the first recordings.

Unlike in the first lessons, there were autonomous student initiations in the lessons after the course. These are moments when a student actively articulates a question that relates to the current subject matter (it can be aimed at the teacher or classmates). While there were 4 such questions on average before the course, there were 18 after it. Both the appearance of triadic interaction and the growth of autonomous student initiations show that students now get more space and autonomy in Vaclav's lessons. They are breaking free from the stereotypical position of students who merely answer teacher questions, their replies become functionally more variable, and they have a chance to at least partially influence the direction of the dialogue.

This was also expressed in the fact that Vaclav reacts to student replies more sensitively. As many as 25 percent of Vaclav's questions build upon a student's previous reply; they are questions with absorption. There is a positive shift in comparison to the first lessons, too. A greater compactness of communication sequences is immediately visible (**Vaclav:** *Somebody, try to*

*tell me an argument that came up during that debate of capital punishment.* **Student Jakub:** *Well, recidivism was an argument for it.* **Vaclav:** *What do you more or less imagine with this recidivism, Libor?* **Student Libor:** *Well, they could sit there for some time and still they come out and do the same thing again, I guess.* **Vaclav:** *Excellent; another reason?* **Student Karel:** *Like an eye for an eye, a tooth for a tooth?* **Vaclav:** *What does he mean by this eye for an eye, Denisa?* **Student Denisa:** *Like when somebody does something to somebody else, they then will do the same to him.*)

Generally, it can be said that Vaclav worked equally on changing his own communicative strategies and on opening the space for students and allowing them greater autonomy.

### Radek

Radek's teaching changed primarily in the following observed parameters: the number of open questions increased at the expense of closed ones and the total number of teacher questions doubled. With regard to a more subtle distinction of questions, there was an increase in the number of open questions with higher cognitive demand, which are considered to be the most valuable in dialogic teaching, but the frequency of questions with lower cognitive demand grew at the same time, too.

Table 12
*Cognitive demand of teacher questions in Radek's lessons*

| **RADEK** | **Before the Course n** | **Before the Course %** | **After the Course n** | **After the Course %** |
|---|---|---|---|---|
| Lower | 20 | 23 | 46 | 27 |
| Higher | 66 | 77 | 125 | 73 |
| Total | 86 | 100 | 171 | 100 |

Table 13
*Openness of teacher questions in Radek's lessons*

| **RADEK** | **Before the Course n** | **Before the Course %** | **After the Course n** | **After the Course %** |
|---|---|---|---|---|
| Open | 28 | 33 | 93 | 54 |
| Closed | 58 | 67 | 78 | 46 |
| Total | 86 | 100 | 171 | 100 |

The number of Radek's questions grew substantially, which cannot be considered a positive trend. The rapid pace of the questions corresponds to a smaller amount of time for answers, making it impossible to thoroughly consider the answer and formulate longer replies (see Švaříček, 2011). Radek's situation is specific because most of his questions are not new but they are previously asked questions that are being re-initiated. (**Radek:** *The value of that school, what is it for you? Like, do you evaluate it as good or bad or where do you put this school on your scale? If you were doing a chart of ten things that you respect the most, Šárka?* **Student Šárka:** *I don't know.* **Radek:** *So, would you place it high or low?* **Student Šárka:** *High, I guess.* **Radek:** *High. Elen?* **Student Elen:** *The same, I guess.*) Re-initiation differs from questions with absorption, as it follows from what was said but the stated ideas are not being further developed. The teacher goes back to the original question and repeats it in a slightly modified way. Table 14 shows that the share of Radek's questions with absorption remained the same after the course, but re-initiations increased substantially.

Table 14
*Share of questions with absorption and re-initiated questions in Radek's lessons*

| **RADEK** | **Before the Course n** | **Before the Course %** | **After the Course n** | **After the Course %** |
|---|---|---|---|---|
| Absorption | 18 | 21 | 32 | 19 |
| Re-initiation | 18 | 21 | 79 | 46 |
| Other | 50 | 58 | 60 | 35 |
| Total | 86 | 100 | 171 | 100 |

The type of questions Radek re-initiates the most are primarily open questions of higher cognitive demand. The re-initiation is a signal that the teacher attributes great importance to this type of question. In principle, his attention is focused in a good direction, but he has not adopted a method that would lead the students to formulate their answers in a better way, which is probably the aim of the re-initiations.

In the introduction, we mentioned the concept of scaffolding as a clever hint, a type of teacher assistance to the student that helps the students to achieve a certain goal they could not otherwise achieve. Radek is probably moving towards such scaffolding, asking stimulating questions that can lead the students to a cognitive unbalance, which is considered a basic point of teaching, but he is unable to lead the students out of this unbalance using a series of suitable hints. (**Radek:** *So what about this garbage?* **Student Jana:** *We'll wait till it decomposes. It will decompose on its own.* **Radek:** *Eh, in 6 billion years? That's stupid, isn't it?* **Student Alice:** *And we won't have water in the ocean.* **Radek:**

*What do you need water in the ocean for?* **Student Alice:** *For the fish.* **Radek:** *We'll do without the fish and we'll build huge poultry farms.* **Student Petr:** *But there's a lot of oxygen in that water.* **Radek:** *Eh, yeah, that's right.*)

Yet the teacher initiations are the exclusive stimuli that are offered to the students in the lessons. Unlike the other teachers, Radek does not manage to implement the triadic interaction in his lessons. The level of student autonomy is thus rather low. In some respects, Radek's teaching after the course resembles the situation where the teacher Vaclav found himself at the beginning: the focus on teacher activities limits the space for students. We reach the same conclusion when we study the length of student replies: Radek was the only participant in whose case there was no prolongation.

Table 15
*Length of student replies in Radek's lessons*

| RADEK | Before the Course n | Before the Course % | After the Course n | After the Course % |
|---|---|---|---|---|
| 1–4 words | 127 | 84 | 140 | 86 |
| 5–9 words | 16 | 11 | 19 | 12 |
| 10 or more words | 7 | 5 | 3 | 2 |
| Total | 150 | 100 | 162 | 100 |

Radek, like Hana, focuses on self-development rather than on opening space for the students. Although he manages to make some positive changes, he also falls into various traps such as, primarily, a high number of questions and the corresponding lack of space for student replies.

*Course Participants v. 'Ordinary' Teachers*

In this section, we look at the results of our course participants as a whole in comparison to data from a sample of ordinary teachers that we collected in a previous research project. Our aim is to find the degree to which the lessons by teachers who completed our professional development programme differ in the frequency of occurrences of the observed indicators from the average lessons of a comparative sample of teachers at lower secondary schools in South Moravia, the Czech Republic.[21] We observed lessons by four

[21] Both samples are from the same population – qualified teachers at lower secondary schools. We studied teachers of Czech, civics, and history in the first study, and teachers of Czech and civics in the second one.

participants in an intervention in the form of a development programme. For the purposes of control, we also analysed the lesson of these teachers before the intervention.

We treat the group of teachers who participated in the course of dialogic teaching as an experimental group. We want to observe whether the lessons of this experimental group differ substantially from the average lessons of a selected teacher population. At the same time, we want to look at changes in the patterns of the lessons of the individual teachers from the group. It must be stressed that we realize that it is difficult to follow statistical differences in the frequency of dialogic teaching characteristics in such small samples. The representative sample itself is based on a relatively small number of analysed lessons (32 lessons). On the other hand, it is the largest collection of data in the Czech Republic in terms of the required indicators, which is why we chose to work with it. The compared samples of teachers (before and after the intervention) are even more problematic as they are built on the average occurrences of respective indicators over eight lessons; in other words, two lessons of each teacher from the experimental group were analysed in both the pre- and post-measurement form. From this perspective, this is truly a statistical micro-analysis. Still, we believe that this approach can provide interesting data for verifying the effects of our intervention. We therefore see the results presented here in this limited context and we will gradually expand the sample of the analysed lessons of the experimental group because there will be another wave of data collection with new participants.

We focused on the following indicators in our comparison: 1) cognitive demand of initiations (we count teacher question and student initiations, as it would be impossible to capture the change that takes place after the implementation of the triadic interaction, when a part of initiations is left to students); 2) openness of initiations (both student and teacher); 3) presence of long student replies (consisting of 5 to 9 words); 4) presence of very long student replies (of 10 or more words); and 5) presence of autonomous student initiations (questions dealing with the subject matter directed at the teacher or classmates). The results of the measurements and the consequent comparisons are summarized in Table 16.

Both samples are from the same population – qualified teachers at lower secondary schools. We studied teachers of Czech, civics, and history in the first study, and teachers of Czech and civics in the second one.

Table 16
*Average frequency of indicator occurrences in teacher lessons before and after intervention*

| | **Initiations of higher cognitive demand[22]** **Mean** | **Open initiations[23]** **Mean** | **Long student replies (5-9 words)** **Mean** | **Very long student replies (10 or more words)** **Mean** | **Autonomous student initiations** **Mean** |
|---|---|---|---|---|---|
| Average population of 1 lesson (representative sample – S. Moravia) (N = 32 lessons) | 17.3 | 10 | 12 | 7.9 | 2.75 |
| Hana (pre measurement) | 29 (SD 14.2) | 63.5 (SD 14.8) | 24 (SD 7.1) | 7 (SD 5.6) | 8.5 (SD 7.7) |
| **Hana (post measurement)** | **34 (SD 11.3)** | **41 (SD 11.3)** | **20 (SD 2.8)** | **14.5 (SD 7.7)** | **8 (SD 2.8)** |
| Jonas (pre measurement) | 54 (SD 14.1) | 23.5 (SD 12) | 14.5 (SD 6.3) | 12.5 (SD 2.1) | 7 (SD 4.2) |
| **Jonas (post measurement)** | **66* (SD 4.2)** | **40.5* (SD 2.1)** | **34 (SD 4.2)** | **55.5* (SD 3.5)** | **36 (SD 15.6)** |
| Radek (pre measurement) | 38 (SD 7.1) | 16 (SD 12.8) | 8 (SD 4.2) | 3.5 (SD 4.9) | 7.5 (SD 7.7) |
| **Radek (post measurement)** | **68 (SD 8.4)** | **48.5 (SD 20.5)** | **9.5 (SD 6.3)** | **1.5 (SD 2.5)** | **7 (SD 8.4)** |
| Vaclav (pre measurement) | 54 (SD 29.2) | 46 (SD 25.4) | 10 (SD 8.5) | 2.5 (SD 3.5) | 4 (SD 1.4) |
| **Vaclav (post measurement)** | **51 (SD 16.9)** | **51 (SD 18.3)** | **36* (SD 1.4)** | **29 (SD 5.6)** | **18 (SD 9.8)** |
| Experimental group teachers (pre measurement) (N = 8 lessons) | 43.7* (SD 17.9) | 37.2* (SD 23.9) | 14.1 (SD 8.3) | 6.3 (SD 5.2) | 6.8 (SD 4.8) |
| **Experimental group teachers** (post measurement) (N = 8 lessons) | **54.8** (SD 16.9)** | **45.25** (SD 12.3)** | **24.9* (SD 12.1)** | **22.3 (SD 21.3)** | **17.3* (SD 14.6)** |

* the marked values are significant at the level of $p<0.05$; ** $p<0.01$. Statistical significance was t-tested for an independent sample; the referential constant was the representative sample average.

[22] We count both teacher and student initiations.
[23] We count both teacher and student initiations.

Table 16 offers an analysis of the lessons by the experimental group of teachers as a whole. It clearly follows from the penultimate line of the table that the quantity of occurrences of various indicators in the lessons of the observed teachers differed from those in the lessons of the representative sample (first line) even before our intervention. Except for the indicator of very long student replies (of 10 or more words), the average representation of the indicator was always higher in the lessons by the experimental group. As for the indicators of the higher cognitive demand and the openness of initiations, the difference was statistically significant at the significance level of 0.05. This can lead to the conclusion that teachers in the experimental group were positively different from the teachers of the representative sample of the region in terms of their use of features of dialogic teaching even before our intervention. Of course, this does not make our position for further analyses any easier. In this respect, the data in the last line are crucial for us. These are the average frequencies in lessons after the intervention. It is clear from the data that the teachers strongly confirm a trend towards application of dialogic teaching. Their lessons significantly statistically differ from the lessons in the sample in all indicators after the completion of the course. There is one exception: the indicator of very long student replies. An increased frequency is visible in this characteristic, too, i.e. from an average of roughly 6 very long replies per lesson before the intervention, we measured an average of about 22 very long replies per lesson after the intervention. The average of the representative sample is less than 8 very long student replies per lesson. This difference is not statistically significant due to the high unbalance of lessons after the intervention (standard deviation 21.3). In other words, both pre- and post-intervention lessons are above standard in terms of the representation of very long replies. Two of the indicators (the higher cognitive demand of initiations and the openness of initiations) with a statistically significant difference in the average frequency before the intervention naturally show this difference from the average of the representative sample and in the measurement after it, this time on the level of significance of 0.01. This makes the difference more provable. We repeat that we cannot overestimate the statistical significance here due to the number of analysed lessons. Yet these results show that the course played a positive role in terms of increasing the representation of features of dialogic teaching.

It follows from the lines summarizing the average values for the teachers of the experimental group that none of the teachers showed a significant difference in their lessons before the intervention in any of the observed indicators against the representative sample. This result, however, does not usually change even in the lessons measured after the intervention. Jonas's lessons after the intervention are a positive exception. Jonas shows a statistically significant difference at a level of significance of 0.05 in the

indicators of more cognitively demanding initiations, openness of initiations, and very long student replies against the representative sample. There is always a higher frequency of occurrence in Jonas's lessons. Vaclav's lessons after the intervention are also statistically significantly different – a higher average frequency – in the indicator of very long student replies. We can nearly always observe a clearly higher frequency of occurrence for the other measurements with the teachers from the experimental group. The differences are not statistically conclusive due to the size of the sample of analysed lessons. We therefore find the analyses of the dispersion of indicator occurrence for the individual teachers before and after the intervention to be more interesting. A comparison of standard deviations shows that all of the teachers in their lessons after the course quite unequivocally stabilized the positive occurrence of the observed features of dialogic teaching. In other words, not only is the average frequency higher in the lessons after the intervention than the average of the sample, as well as higher than in the lessons before the course, but – as standard deviations prove – these lessons are also generally much more consistent in terms of the positive occurrence of indicators. For example, in teacher Hana's lessons, there were on average 24[24] long replies by students in the pre-measurements, but there was a deviation of roughly 7 replies per lesson. Her lessons after the intervention show an average of 'only' 20 long replies per lesson, but the standard deviation is under 3 replies per lesson. This trend is observable in all cases with the exception of Radek's lessons, which unfortunately are not always stable. Radek still has to work on this aspect. Yet, in general this is further evidence of the positive influence of our course, although we must again note the size of the sample.

## Conclusion and discussion

In this study, we introduced the initial results of an action research project focused on implementing dialogic teaching principles in lower secondary school teaching. We acquired a vast amount of data in the first stage of our research project and this study is only the first analytical result in which we show that teachers who participated in our professional development programme changed some of the parameters of their communication with students in a desirable fashion, i.e. towards a more dialogic nature.

[24] The average for the representative sample is 12 replies per lesson.

The teachers as a group made their questions more open and more cognitively demanding, and at the same time student replies became longer and the number of student initiations also grew. We can compare these findings with a methodologically similar project by Snell and Lefstein (2011), who also carried out a development programme for teachers and monitored whether communication in the classroom became more dialogic. They observed several indicators, but an increase in the openness of teacher questions was the only common pattern they found in their data. In this respect, our findings are more vivid because several parameters changed at once for our teachers. We observed that when teacher communication methods change a change in student communication patterns follows. Specifically, when teachers started to ask questions in a different way, student willingness to participate in the communication grew and student replies became very long. This interdependence of teacher and student communicative actions is extremely important. As Sedláček and Šeďová (in press) show, student activity and participation is the communicative variable that most influences the results of teaching. To maximize student learning, it is necessary to make students more involved in communication. This study proves that it is possible to achieve a change in the students by changing the teachers. This finding fully legitimises the effort invested in developmental work with teachers.

We statistically proved that our teachers as a group changed the way they communicate with their students in all observed parameters. This overall picture loses its contours as soon as we move from the group level to individual teachers. Each case is unique and the changes that our teachers made do not follow a single trajectory. This claim is illustrated by a comparison of Jonas and Hana. While in Jonas's case the openness of teacher questions grew rapidly, in Hana's case the number of such questions dropped. The difference in their trajectories is caused primarily by the different initial positions of the two participants – Hana had asked a high number of open questions before the project and it was not desirable to further increase their share. The individual indicators of dialogic teaching we chose cannot be seen in absolute terms. The whole is never a simple sum of all partial data; for this reason, it also holds that one cannot achieve dialogic teaching by a mere increase in the values of partial indicators.

Alexander (2006) summarizes several key features that form the essence of dialogic teaching. Dialogic teaching is: (1) collective,[25] (2) reciprocal,[26]

[25] The whole classroom or at least some of its groups should participate in it.

[26] Teachers and students listen to each other, share their thoughts, and consider alternative viewpoints.

(3) supportive,[27] (4) cumulative,[28] and (5) purposeful.[29] These principles are superior to indicators because if teaching diverts away from them it cannot be labelled as dialogic regardless of the levels of individual indicators. Our analysis is rather rough in this regard because it lacks a concurrent observation of both indicators and principles. In our opinion, including principles in the analysis could explain some of the specifics in the trajectories of individual teacher changes. For example, in Hana's case, where the level of question openness was paradoxically lowered, we can hypothesize that this was a result of her attempt to meet the principles of cumulation and purposefulness. Open questions concerning student life experiences, which Hana asked extremely often in the beginning, were often not directly connected to Hana's educative goals nor was it possible to achieve cumulation in this way.[30] When Hana decided to replace cognitively undemanding conversation with a teaching dialogue with scaffolding (see Bruner, 1978), it was necessary to limit the openness of the questions so that the teacher could control the dialogue more effectively in terms of the set educative goals.

According to Nurkka, Viiri, Littleton & Lehesvuori (2014), the principles of dialogic teaching (namely cumulation) can be achieved by alternating various types of classroom discourse. They claim that a certain level of oscillation between a dialogic discourse and an authoritative discourse, i.e. one controlled by a teacher, that conveys information and with talk that has a transmissive function (see Scott, 1998) is desirable. While dialogic discourse is effective when it is necessary to explore a topic, these authors believe that authoritative discourse is more appropriate in a stage of introducing and reviewing. In this view, dialogic discourse is not a goal to be approached by teachers in a linear way but rather a part of a certain 'rhythm of classroom discourse' (Nurkka et al. 2014).

These topics – dialogic teaching principles and the question of the rhythm and oscillation between dialogic and authoritative natures – go beyond the frame of this analysis. They require more subtle, mostly qualitative analytical methods. Still, we believe that this study has fulfilled its goal, which is to show that it is possible to change teacher communicative methods through education. Mercer and Howe (2012) say that there is a gap between theory

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27 Students share their ideas freely, participate in communication, and are not afraid of making mistakes.

28 The process of acquiring new skills and knowledge makes use of previous stages and emphasizes a straightforward and thorough examination of the content matter.

29 The teacher teaches with specific educational goals in view.

30 Student answers to questions such as *What pets do you have at home?* were simply placed one after another and Hana did not ask any further questions (of a different type) to make any elaborate connection between them.

and actual practice – while the theory of dialogic teaching is well developed, this academic concept still has only a small effect on teaching practice. There is probably no unequivocal answer to the question of why dialogic methods are not included in the teaching inventory of ordinary teachers. Corden (2009) says that teachers lack adequate educational support – they are expected to learn to design their teaching in a dialogic way, yet they themselves were educated in the transmissive way. Lefstein (2010) notes that dialogic teaching is depicted so idealistically in literature that it is virtually impossible to meet its requirements in actual practice. Teachers who attempt to do so struggle with the limits of the institutional organization of their schools as well as their abilities and they experience failure. Action research can present an answer to both problems. It contributes to changing practices while providing teachers with necessary education and support; it can also help to monitor what happens when implementing dialogic teaching methods and help to place the concept of dialogic teaching in the environment of the real classroom where teachers have to face real limits and contradictions (Lefstein, 2010).

Smit and van Eerde (2011) say that researchers and practitioners respectfully meet in action research in order to create a new conceptualisation of phenomena that are seen as problematic, which is anchored in actual experience and reflection. This was the aim of our research: to be guides for teachers on their way towards dialogic teaching and to identify forms of teaching that have a positive effect on student learning.

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