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‘Learning to Learn’ Characteristics in Educational Interactions between Teacher and Student in the Classroom

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Abstract

This paper presents the results of a study that aimed to reveal how the components of the concept ‘learning to learn’ are interrelated in the context of teacher–students’ educational interactions in the classroom. The study outlines the characteristics of ‘learning to learn’ and specifics related to content through examining a teacher’s daily educational interactions with students in a classroom. The study involved 336 teachers from different types and levels of schools. The characteristics of ‘learning to learn’ included the self-assessment of teacher’s learning to learn skills, teaching principles applied for implementing ‘learning to learn,’ ‘learning to learn’ skills developed in lessons, student involvement, teacher–student learning co-creation, creating educational environments according to students’ learning differences, opportunities for students to control their learning, and learning strategies. The study proved that the development and improvement of the teacher’s individual educational plans in collaboration with their colleagues and a vision for the future development of the plans were directly related to each other. Moreover, the dissemination of the teacher’s good practices, active cooperation, and involvement in the school’s community activities were interrelated: the teacher’s attitude about the students’ expectations, related to the reflections, determined the students’ achievements in personal and socio-educational life; positive emotions were particularly important for students in achieving their learning goals; and feedback was obtained during the learning process. The study showed the importance of this for both teachers and students, as well as the idea that the teacher must consider the individual differences of the students in creating learning environments that motivate and enable all students to learn. The more opportunities there are for initiating creative problem-solving approaches, the more often students take responsibility for assigned learning tasks; the more often students are encouraged to self-assess and reflect on their learning strengths and

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weaknesses, the easier it is to control learning outcomes and the quality of learning. 'Learning to learn' is particularly important when teachers are no longer a main source of information and knowledge. The findings showed how such a gap can be addressed between current and future teaching-learning performances in a classroom.

Keywords: educational interaction, learning, learning to learn, statistics, student, teacher, teaching.

1. Introduction

When individuals learn to learn, they treat learning activities as objects of inquiry, personal reflection, and self-analysis (Demetriou, 2014). Learning to learn is a lifelong process in which individuals deliberately plan, monitor, and adapt their authentic learning. When students learn to learn, they treat learning activities as objects of everyday inquiry. They interpret tasks, set task-specific goals, experiment with strategies, monitor successes and failures, and implement changes to improve shortcomings. As today's knowledge economy is characterized by increasingly rapid change and shifting demands, 'learning to learn' is a critical aspect of success at school and in the classroom, where teachers and students are connected through a variety of educational interactions (Miller, Hadwin, 2012).

Within the European Union, 'learning to learn' is seen as a competence incorporating seven components: i) the ability to pursue and persist in learning; ii) the ability to organise one's own learning, including through effective management of time and information, both individually and in groups; iii) the awareness of one's learning process and needs, identifying available opportunities; iv) the ability to overcome obstacles in order to learn successfully; v) gaining, processing, and assimilating new knowledge and skills; seeking and making use of guidance; vi) building on prior learning and life experiences at home at work in both education and training; and vii) motivation and confidence (European Parliament, 2006). Thus, 'learning to learn' strategies include any thoughts, behaviours, beliefs, or emotions that facilitate the acquisition, understanding, or application and transfer of new knowledge and skills in various contexts. Furthermore, 'learning to learn' strategies help generate meaning for the new information that is to be learned (Visentin, 2017).

There is a consensus in the international educational community that 'learning to learn' is the most essential educational goal at school. Despite this, there is still no international, uniform research-based evidence regarding how 'learning to learn' is or should be implemented and what exact components it includes in teachers' and students' daily practices in the classroom and at school. Teachers are using 'learning to learn' with many different understandings of its meaning, and it is implemented through a variety of teaching and learning strategies and in different educational environments. School teachers generally have a broad and narrow vision about 'learning to learn,' which is dependent on teacher functions, task conceptions, conceptions of the learning process and the students, and the teachers' instructional approaches in the classroom (Waeytens et al., 2002).

In the literature, approaches to 'learning to learn' involve contrasting conceptions, responses through learning to the teaching subject, contextual variations students' learning demands, and the implications of autonomy and change on students' achievements (Hounsell, 1979; Benó, 2007). Researchers have connected the concept of 'learning to learn' in their studies to the idea of learning of how to learn to use tools in the school setting (James et al., 2006), as well as its improvement of classrooms, schools, and networks (James et al., 2007), teacher learning (Kennedy, 2019), feelings of learning in response to being actively engaged in the classroom (Deslauriers et al., 2019), learning outside the classroom, student concentration and interest (Idros et al., 2010; Vainikainen, Hautamäki, 2020), and the measurement of 'learning to learn' (Hoskins, Fredriksson, 2008).

'Learning to learn' happens within educational interactions in a classroom. Teachers expend significant energy preparing lectures. They must read various texts and synthesize the information, picking out the most important points and organizing them in a cohesive manner, writing lecture notes, and then delivering the information to students who may sit passively, often thinking of topics unrelated to what the teacher is saying (Hurst et al., 2013). Some large-scale, longitudinal studies, including some randomized controlled experiments, have examined the various indicators of quality (that is, structural elements, features of the physical environment, and interactions with

teachers and peers). These studies have shown that students' interactions with teachers can have unique and positive associations with their learning outcomes (Pianta et al., 2016).

Regardless of the abundance of research on 'learning to learn,' there is a gap in understanding its factual and processual aspects within educational interactions between teachers and students in the classroom. The research question raised in this study was as follows: 'How are the components of the characteristics of the concept "learning to learn" interrelated in the context of teacher–student educational interactions in the classroom?'

In this paper, 'learning to learn' is seen as related to learning strategies (Hattie, Donoghue, 2016), action learning (Kember, 2000), constructivist teaching (Kim, 2005; Tobias, Duffy, 2009), experiential learning (Kolb, 1984), active learning (Meyers, Jones, 1993), learning how to learn (Blacka et al., 2006; James et al., 2006; Peculea, Bocos, 2015; Letina, 2020), integrative learning (Wrenn, Wrenn, 2009), and learning and teaching co-creation (Bovill, 2020).

The aim of the present study was to reveal the characteristics of 'learning to learn' and the specifics of the content through teachers' daily educational interactions with students in the classroom.

2. Literature Review

The 'learning to learn' paradigm was developed within two research paradigms: i) cognitive psychology, which focuses on mechanisms used to internalise knowledge (Schunk, 2012; Illeris, 2018); and ii) social-cultural, which focuses on learning embedded within a social context (Wang et al., 2011). The European definition refers to the ability to access, gain, process, and assimilate new knowledge and skills, followed by the ability to reflect critically on the purposes and aims of learning (European Parliament, 2006). The definition of learning to learn also contains numerous references to the ways that learning to learn is embedded in social relationships and the social context; for example, it references group work, 'seeking and making use of guidance,' and building on 'life experiences' (Huhtamaki, Hautamäki, 2001; Deakin Crick et al., 2004; Moreno, Valdez, 2007; Demetriou et al., 2011).

Learning to Learn is Related to Various Concepts

'Learning to learn' strategies. 'Learning to learn' is implemented through strategies that have several characteristics in common (Fredriksson, Hoski, 2007; Visentin, 2017): First, the strategies are goal-directed and used to reach learning goals. Second, they are intentionally invoked; incorporating some level of active selection of one or more of such strategies is determined by several factors, such as a student's prior experience with the strategies, their prior experience with similar learning tasks, their ability to deal with distractions, and their commitment to the student's goals. Third, the strategies require time and involve multiple steps. Thus, a student must be motivated to initiate and maintain strategy use, believe that the strategy will be effective, and that they can be successful using it. Fourth, strategies are situation specific. This means that the students' goals, the task requirements, the context, and other factors all interact to help determine which strategy may be best. The students must understand under what circumstances a given strategy is or is not appropriate.

Action learning. 'Learning to learn' is related to action learning, which seeks to facilitate skill development based on the integration of knowledge gained from experience and knowledge gained by formal learning, underlined by critical reflection (Kelliher, 2014). Action learning is a process of insightful questioning and reflective listening, focusing on the learning and the action. Theoretically, this does not require the extension of new knowledge. In action learning, the students select some issues, analyse them, take some action, and reflect on that action (Marquardt, 2004). The action learning approach provides a combination of theory and experience; it creates positive change in motivating participants to actively participate in the learning process and acquires more effective 'learning to learn' skills (Bourner, Frost, 1996). 'Learning to learn' through action learning is a continuous group-based process of engagement, learning, and reflection, where a group of students meet regularly in a classroom under the guidance of a teacher over an extended time period. Thus, lessons in the classroom with students can be seen as action learning groups, to which students raise and bring issues for discussion with the aim of generating innovative and creative ways of dealing with complex issues within the context of a specific teaching–learning subject in a classroom (Kember,

2000). Teachers facilitate students' learning through the development of practical solutions that are implemented with planned intent and are related to specific teaching–learning goals (Ashton, 2006). In lessons, students discuss their problems through a question-and-answer process that elicits critical thinking and dialogue and encourages the generation of ideas and clarification of assumptions (Michel et al., 2009). The process of action learning in a classroom encourages students to reflect on and learn from their own and their fellow students' experiences (Kelliher, 2014). Action learning provides a sustainable way of building the capacity of teachers to improve teaching and learning practices. Some of the advantages of action learning include flexibility, respect for the knowledge and experience of participants, involvement, collegiality, empowerment, and ownership. The challenge for teachers is to engage students in the activity and the development of 'learning to learn' skills necessary to function today (Dolapcioglu, 2020).

Constructivist teaching. Constructivism's central idea is that human learning is constructed, and students build new knowledge upon the foundation of previous learning. It is 'an approach to learning that holds that people actively construct or make their own knowledge and that reality is determined by the experiences of the student' (Elliott et al., 2000: 256). Constructivism believes in the personal construction of meaning by the student through experience and that meaning is influenced by the interaction between prior knowledge and new events (Arends, 1998). Thus, prior knowledge influences what new or modified knowledge an individual will construct from new learning experiences (Phillips, 1995). Learning is a social activity, which means acting or interacting together (Dewey, 1938). Learning based on constructivism is an active process in which students construct meaning through active engagement with the world. Here, students' understanding must come from making meaningful connections between prior knowledge, new knowledge, and the processes involved in learning (Ernest, 1994). Each individual student has a distinctive point of view, based on their existing knowledge and values. This means that the same lesson, teaching, or activity may result in different learning by each student, as their subjective interpretations differ (Brooks, Brooks, 1993). This principle appears to contradict the view that knowledge is socially constructed. Students have their own personal history of learning; nevertheless, they can share knowledge. However, teaching and learning are interrelated social processes influenced by cultural factors. Cultures and their knowledge bases are in a constant process of change, as are the knowledge stored by students and teachers, and knowledge is not a rigid copy of some socially constructed template. In learning a culture, each student changes that culture, and this process is a basic concept in the implementation of 'learning to learn' in the classroom (Fox, 2001). Thus, students try to develop their own individual mental models of the real world from their perceptions of that world. As they perceive each new experience, students continually update their own mental models to reflect the new information and construct their own authentic interpretation of reality (Driscoll, 2000). Constructivist teaching and learning is student-centred. The primary responsibility of the teacher here is to create a collaborative problem-solving environment where students become active participants in their own learning. Thus, the teacher acts as a facilitator of learning rather than an instructor. The teacher seeks to understand the students' pre-existing conceptions and to guide the activity to address these ideas and then build on students' learning in the classroom (Oliver, 2000). Constructivist learning environments must be considered when implementing constructivist teaching strategies so that 'learning to learn' skills can be developed by students in the classroom: knowledge is shared between teachers and students; teachers and students share authority; teachers facilitate or guide students' learning in the classroom; and learning groups consist of small numbers of heterogeneous students in the classroom (Honebein, 1996; Tam, 2000).

Experiential learning. Experiential learning is the process of learning by doing. By engaging students in hands-on experiences and reflection, they are better able to connect theories and knowledge learned in the classroom to real-world situations. In his experiential learning theory, Kolb (1984) described two different ways of grasping experience (concrete experience and abstract conceptualisation) and identified two ways of transforming experience (reflective observation and active or reflective experimentation). According to Kolb, concrete experience provides information that serves as a basis for reflection. From reflection, students assimilate the information they have gathered through a concrete experience and develop new theories about the world, which they then actively or reflectively experiment with. Experiential learning techniques include a rich variety of practices whereby the participants have opportunities

to learn from their own and each other's experiences, being actively and personally engaged in the learning process (Kohonen, 2001). Students learn from immediate experiences and are engaged in the learning process as whole persons, both intellectually and emotionally. Experiential learning involves observing the phenomenon and doing something meaningful with the observations through active participation. It emphasises learning in which the student is directly in touch with the phenomenon being studied, rather than simply watching, reading, hearing, or thinking about it (Kolb, 1984). When students participate in experiential learning, they gain a better understanding of the subject material; a broader view of the world and an appreciation of the learning community in the classroom; insight into their own skills, interests, passions, and values; opportunities to collaborate with diverse organizations and people; positive professional practices and skill sets; the gratification of assisting in meeting community needs; and self-confidence, leadership, and 'learning to learn' skills (Tanaka et al., 2016; RameshBabu et al., 2019).

Active learning. Active learning is a process that has student learning at its centre. Active learning focuses on how students learn, not only on what they learn. Students are encouraged to 'think hard,' rather than passively receive information from the teacher (Prince, 2004). Teachers must make sure that they challenge their students' thinking (Meyers, Jones, 1993). With active learning, students play an important part in their own learning process. They build knowledge and understanding in response to opportunities provided by their teachers. Because active learning encourages students to take a central role in their own learning, it stipulates their 'learning to learn' skills and prepares them better for education at school (Haak et al., 2011). Analytical skills also help students to improve their problem-solving skills and the application of their knowledge (Ambrose et al., 2010). Active learning is based on a theory called constructivism (Meyers, Jones, 1993), which emphasises the fact that students construct or build their own understandings. Constructivists argue that learning is a process of 'making meaning.' Students develop their existing knowledge and understanding to achieve deeper levels of understanding. This means that students are more able to analyse, evaluate, and synthesise ideas (Phillips, 1995). Skilled teachers make these deeper levels of understanding possible by providing the learning environments, opportunities, interactions, tasks, and instruction necessary to foster the deep learning of the students in the classroom (Elliott et al., 2000). Thus, learning should be relevant and within a meaningful context. This means that students learn best when they can see the usefulness of what they are learning and connect it to the real world (Fox, 2001). The benefits of active learning are as follows (Harmin, Toth, 2006; Lumpkin et al., 2015): active learning helps students to become 'lifelong learners'; in an active learning approach, learning is not only about the content, but is also about the process; active learning develops students' autonomy and their ability to learn; active learning provides students with opportunities for greater involvement and control over their learning; active learning is engaging and intellectually exciting; and an active learning approach encourages all students to stay focused on their learning, which often gives them greater enthusiasm for their learning. Furthermore, teachers often find that they enjoy the level of academic discussion with their students that an active learning approach encourages.

Integrative learning. Integration in education can be defined as the coordination of different learning activities to ensure the harmonious functioning of the educational process (Kanwar et al., 2017). Integrated teaching refers to a way of connecting skills and knowledge from multiple sources and experiences or applying skills and practice in various settings. It simply means bridging the connection between academic knowledge and practice (Vashe et al., 2019). Integrated teaching is believed to develop critical thinking, self-learning ability, deep learning, and problem-solving skills (Quintero et al., 2016). There are four major components in integrated teaching (Kanwar et al., 2017): integration of experience, social integration, integration of knowledge, and integration as curriculum design. Integrative learning is an approach where the student brings together prior knowledge and experiences to support new knowledge and experiences. By doing this, students draw on their skills and apply them to new experiences on a more complex level. The concept behind integrative learning is that students take ownership of their own learning, developing critical inquiries and making meaningful connections between different disciplines, as well as utilising critical thinking to address real-life problems (Mansilla, 2008). Integrative learning is a learning theory describing a movement towards integrated lessons helping students make connections across curricula (Harr et al., 2015). Integrative learning comes

in many varieties: connecting skills and knowledge from multiple sources and experiences; applying skills and practices in various settings; utilizing diverse and even contradictory points of view; understanding issues and positions contextually; and making connections within a major, between fields, between curriculum, co-curriculum, or between academic knowledge and practice (Huber et al., 2009).

Learning co-creation. Co-creation is a new educational idea that emphasises student empowerment through teaching and learning in the classroom. Attitudes such as ‘students as partners’ are basic principles of co-created learning and teaching implementation in the classroom (Cook-Sather, 2018). The essence of learning and teaching co-creation is student engagement, which refers to a broad range of learning and teaching activities that teachers employ to motivate and interest students, as well as the time and efforts students dedicate to meaningful learning in the classroom (Bovill, 2020). ‘Students as partners’ refers to a deeper level of student involvement and a teacher’s professional agency, which is implemented through teaching (Bovill et al., 2015). The learning and teaching partnership is a cooperative and reciprocal educational interaction-based process between a teacher and students through which they can contribute equally to curricular and educational conceptualization, decision-making, implementation, investigation, and analysis in a variety of ways (Bovill, 2015). Collaborating with students is an effective way to develop curricula, classroom activities, and sometimes, assessments. While many are familiar with the concept of co-creation, fewer are confident in how, on a practical level, to effectively work with students to shape their learning. Here, we pull together advice from academics who are successfully using co-creation in their teaching and seeing positive learning outcomes as a result (Bovill et al., 2015). Participatory design plays a core role in learning and teaching co-creation and refers to the collaboration of a group of teachers and students in the design and development of initiatives, which can include curricula (Bergmark, Westman, 2016).

3. Methodology

Sample

The study participants were selected using a targeted convenience sampling technique. In a survey conducted March-June 2021, 336 respondents from three major Lithuanian cities and regions participated. The sample of the study is dominated by women, accounting for 89.1 %. Most teachers surveyed are middle-aged (41-45 years old – 14.2 %, 46-50 years old – 18.3 %) and older (51-55 years old – 21.3 %, 56-60 years old – 15.8 % and 61-65 years old – 12.6 %) (their mean age was 49.23, SD = 9.96). According to the data, more than half (57 %) of teachers’ sample had acquired pedagogic education, and 40.9 % of them – finished university level studies in different areas other than pedagogy and have obtained additionally a pedagogical qualification. Almost half of the respondents of the survey work in gymnasiums (48.9 %). Most respondents have pedagogical experience, having worked in an educational institution for 21-25 years. – 15.8 %, 26-30 years – 19.9 %, 31-35 years – 14.6 %, and even 17 % (average 24.73 years, SD = 10.97). The educators who participated in the study have more than 36 years of pedagogical experience. According to the pedagogical category, almost half (46.7 %) of pedagogues have a pedagogical category of a teacher-methodologist, a third (32.8 %) have a senior teacher qualification category. The sample of the study is dominated by teachers of the Lithuanian language and literature (22.4 %), natural sciences – 21.3 %, arts and technology education – 21 %, mathematics – 18.6 %, moral education – 17.5 %.

Measures

A closed-ended original questionnaire on learning to learn within the teacher-student interaction in a classroom was used for data collection.

The instrument consisted of two parts – demographic and learning to learn dimensions. The construction of the learning to learn dimensions’ part of the questionnaire was based on the concepts of learning strategies (Hattie, Donoghue, 2016), action learning (Kember, 2000), constructivist teaching (Kim, 2005; Tobias, Duffy, 2009), experiential learning (Kolb, 1984), active learning (Meyers, Jones, 1993), learning how to learn (Blacka et al., 2006; James et al., 2006; Peculea, Bocos, 2015; Letina, 2020), integrative learning (Wrenn, Wrenn, 2009), learning co-creation (Bovill, 2020), self-assessment in a classroom (Brown, Harris, 2014), teacher self-assessment (Ross, Bruce, 2007), creation of educational environment in a classroom (Bucholz, Sheffler, 2009; Villa, Baptiste, 2014; Prameswari, Budiyo, 2017).

Table 1. Demographic characteristics of respondents

		Frequencies	Percent	Total	Mean	SD
Gender	Man	40	10.9	366	-	-
	Woman	326	89.1			
Age	20-25 years old	7	1.9	366	49.23	9.96
	26-30 years old	10	2.7			
	31-35 years old	17	4.6			
	36-40 years old	27	7.4			
	41-45 years old	52	14.2			
	46-50 years old	67	18.3			
	51-55 years old	78	21.3			
	56-60 years old	58	15.8			
	61-65 years old	46	12.6			
	over 66 years old	4	1.1			
Education	University level, pedagogical	209	57.1	366	-	-
	University level, non-pedagogical with additionally acquired pedagogical qualification	157	42.9			
School (in the teacher works) type	Pre-school	22	6.0	366	-	-
	Pre-primary	6	1.6			
	Primary	38	10.4			
	General	41	11.2			
	Secondary	11	3.0			
	Pro-gymnasium	39	10.7			
	Gymnasium	179	48.9			
	Multifunctional centre	10	2.7			

	Professional/vocational school	20	5.5			
Pedagogical experience	0-5 years	23	6.7	342	24.73	10.97
	6-10 years	24	7.0			
	11-15 years	26	7.6			
	16-20 years	39	11.4			
	21-25 years	54	15.8			
	26-30 years	68	19.9			
	31-35 years	50	14.6			
	Over 36 years	58	17.0			
Pedagogic category	Teacher	54	14.8	366	-	-
	Senior teacher	120	32.8			
	Teacher methodologist	171	46.7			
	Teacher expert	21	5.7			
Teaching subject	Moral education	64	17.5	366	-	-
	Lithuanian literature and language	82	22.4			
	Foreign language	39	10.7			
	Social sciences (history, geography)	54	14.8			
	Mathematics	68	18.6			
	Natural sciences (biology, physics, chemistry, integral course for natural sciences)	78	21.3			
	Physical culture	55	15.0			
	Art or technological education (arts, music)	77	21.0			
	Drawing/graphic design	3	0.8			
	Economics and entrepreneurship	12	3.3			
	Information Technology	24	6.6			

	Basics of citizenship	17	4.6			
	Human safety	24	6.6			

The demographic part consisted of seven questions, which cover gender, age, level of education, school type, pedagogical work experience at school, pedagogical category, and teaching subject(s). All these demographic characteristics covered 48 items in total. All questions were multiple choice, where respondents were asked to choose one response from the list provided.

The 'learning to learn' part consisted of eight themes (diagnostic blocks) and every theme included the particular amount of items: i) teacher's self-assessment of learning to learn skills (18 items); ii) teacher's principles for implementing learning to learn (13 items); iii) learning to learn skills developed in lessons (10 items); iv) learning to learn: student involvement (6 items); v) learning to learn: teacher and student learning co-creation (13 items); vi) learning to learn: creating educational environments according to differences in student learning (10 items), vii) learning to learn: opportunities for students to control their learning (7 items); viii) learning to learn strategies (23 items). In total this part incorporated 109 items.

In total the questionnaire included 157 items.

The questionnaire parts were formed from closed-ended statements and each part was presented in a matrix-type question which was expanded by separate items. Items were assessed on different scales, such as "strongly disagree", "disagree", "neither agree nor disagree", "agree", "strongly agree"; "very often", "often", "do not know", "seldom", "very seldom"; "definitely yes", "yes", "do not know", "no", "definitely no"; "no skills", "minimum skills", "average skills", "good skills", "great skills".

Based on the results of our study sample, internal consistency reliability (Cronbach's α) coefficients for items of the separate diagnostic blocks of the questionnaire were calculated. All the diagnostic blocks' Cronbach's alpha coefficient estimates range from .788 to .929, what proves that coefficients of every diagnostic block are more than 0.5 and it means that they are acceptable and, according to methodological requirements, it should be at least in between .65 and .8. Cronbach's alpha coefficient of all the questionnaire is .966. Therefore, it can be stated that the data were reliable, and it was not necessary to exclude any diagnostic block estimates from further analysis.

Table 2. Cronbach's alpha coefficient estimates

No.	Themes (diagnostic blocks)	Cronbach's Alpha
1.	Self-assessment of teacher's learning to learn skills	0.919
2.	Teacher's principles for implementing learning	0.796
3.	Learning to learn skills developed in lessons	0.811
4.	Learning to learn: student involvement	0.788
5.	Learning to learn: teacher and student learning co-creation	0.846
6.	Learning to learn: creating educational environments according to differences in student learning	0.875
7.	Learning to learn: opportunities for students to control their learning	0.815
8.	Learning to learn strategies	0.929

Data analysis

The software package SPSS 27.0 was used for statistical analysis.

Cronbach's alpha as a measure was used to assess the reliability, or internal consistency, of a set of questionnaire or items. In other words, the reliability of the given measurement refers to the extent to which it is a consistent measure of a concept, and Cronbach's alpha is one way of measuring the strength of that consistency.

The Pearson correlation coefficient was used to determine the statistical relationships, the values of which can range from -1 to +1. The closer the result is to 1 (-1), the stronger the correlation. Statistical significance was applied when p-value: ** $p < .01$ and * $p < .05$.

The Mann-Whitney U test is a nonparametric alternative independent sample t test that is used to compare two sample means obtained from the same population and is used to check whether the means of the two samples are the same or not. Nonparametric Mann Whitney (between two independent groups) was used to search for possible relationships between demographic variables. Differences in study results were considered statistically significant at $p \leq .05$. The Mann and Whitney U test is the best known and most widely used of the two independent nonparametric comparison test of samples. The essence of this test can be briefly explained as follows: the combined data from both samples obtained by testing the same test are ranked. The ranks of each sample are then summed separately. If the null hypothesis is correct, i.e., the distributions of the variables are the same, the ranks will be distributed among the groups at random. The statistics of the Mann and Whitney criterion U are calculated based on the sum of the ranks of each sample, based on which the statistical hypothesis is decided: H_0 : the distributions of the variables are the same; H_1 : the distributions of the variables are not the same.

The Wilcoxon signed-rank test (also called the Wilcoxon signed rank sum test) is a non-parametric test to compare data. When the word "non-parametric" is used in statistics, it does not quite mean that researchers know nothing about the population. It usually means that researchers know the population data does not have a normal distribution. The Wilcoxon signed rank test was used in the study because the differences between pairs of data were non-normally distributed.

Z-score indicates how much a given value differs from the standard deviation. The Z-score, or standard score, is the number of standard deviations a given data point lies above or below mean. Standard deviation is essentially a reflection of the amount of variability within a given data set. A Z-score (also called a standard score) gave researchers an idea of how far from the mean a data point is; if a Z-score is 0, it indicates that the data point's score is identical to the mean score. In the case of our study, all calculated Z-score values were greater than zero. According to the Percentile to Z-Score Calculator, the z-score that corresponds to the 90th percentile is 1.2816. In our research all the estimates of Z-score are greater than 1.2816 and it would be considered a "good" z-score.

Ethics

Ethical principles and validity of the research were evaluated and an ethical permission to conduct the questioning survey-based study was received from the Research Board of Vytautas Magnus University (26-01-2020, Protocol No. 1). The questionnaire was anonymously completed online with no risk of revealing personal or institutional identity of research participants.

Limitations

The sample of the study was not selected on a random basis, so the empirical results have limited applicability to the entire teacher population nationwide.

The main methodological limitation of the study was related to the composition of the sample by gender: the sub-sample of women is eight times larger than sub-sample of men, so the results of the study regarding the teachers' gender, should be treated with extreme caution.

5. Results

Learning to learn

Self-assessment of teacher's learning to learn skills. A moderate correlation was found between leadership and mentoring ($r = .608$, $p = .000$, $N = 366$) and team building ($r = .576$, $p = .000$, $N = 366$). A strong correlation was found between the improvement of curriculum in

collaboration with teachers and the consultation with other teachers on the improvement of school plans ($r = .758, p = .000, N = 366$) and the evaluation of school plans based on data analysis ($r = .605, p = .000, N = 366$). Consultation with teachers on the improvement of school plans correlates with the collective implementation of school plans ($r = .678, p = .000, N = 366$), the evaluation of school plans based on data analysis ($r = .666, p = .000, N = 366$) and professional development at school in collaboration with teachers ($r = .509, p = .000, N = 366$). A moderate correlation was obtained between the statements “Collective implementation of school plans” and “Evaluation of school plans based on data analysis” ($r = .688, p = .000, N = 366$). This means that the development and improvement of the teacher’s individual education plans in collaboration with their colleagues and having a vision for the future development of these plans are directly related not only to each other but also to the evaluation of school education plans.

A moderate correlation was found between the use of research results for the improvement of teaching and the analysis and systematization of scientific sources ($r = .664, p = .000, N = 366$). Consequently, the more a teacher reads, analyses, and systematises scientific sources, the more often he/she uses research results to improve teaching/learning. A moderate correlation was found between sharing information on best practice with teachers and contributing to various school initiatives ($r = .566, p = .000, N = 366$) and sharing information read with peers about different educational sources ($r = .605, p = .000, N = 366$). It can be said that the dissemination of the teacher’s good practice, active cooperation of the teacher and involvement in the school’s community activities are interrelated.

The statement “I contribute to various initiatives at school” correlates with the statement “I contribute to various initiatives outside school” ($r = .618, p = .000, N = 366$). A moderate correlation was also found between contributing to various initiatives outside the school and sharing information about different educational sources with fellow teachers ($r = .509, p = .000, N = 366$). It can be said that an active involvement of the teacher in the activities organized in the school enables the teacher to share his/her good experience and competencies with other teachers or members of the educational community outside the school.

Table 3. Correlations: self-assessment of teacher’s learning to learn skills

Statements	Mentorship	Team building	Consultation with teachers on improving school plans	Collective implementation of school plans	Evaluation of school plans based on data analysis	Implementation of professional development at school in	I make a positive impact on student learning	I analyse and systematise scientific sources	I contribute to various initiatives at school	I contribute to various initiatives outside of school	I share with my fellow teachers the information I have read about
Leadership	.608**	.576*									
Improving curriculum in collaboration with teachers			.758*		.605*						

Consultation with teachers on improving school plans				.678**	.666*	.509**					
Collective implementation of school plans					.688*						
I make a positive impact on teaching							.727*				
I use research results to improve teaching								.664*			
I share information with teachers about best practices in their practice									.566*		.605*
I contribute to various initiatives at school									.618*		
I contribute to various initiatives outside of school											.509*

Analyzing the characteristics of the self-assessment of teacher’s learning to learn skills diagnostic block, it was found that women are better able to assess their skills of team building (p = 0.026) and improvement of educational plans in cooperation with teachers (p = 0.012) compared to men.

Table 4. Mann – Whitney criterion and comparing the responses by gender: self-assessment of learning to learn skills

Statement	Teacher’s gender	N	Mean rank	Mann-Whitney	Wilcoxon W	Z	Asym p. Sig.
Team building	Man	40	151.66	5246,500	6066,500	-2.229	.026
	Woman	326	187.41				

Improving curriculum in collaboration with teachers	Man	40	147.28	5071,000	5891,000	-2.506	.012
	Woman	326	187.94				

Teacher principles for implementing learning to learn. Analyzing the teacher’s principles in the implementation in learning to learn, moderate correlations were obtained between the statements “every student can learn” and “every student can learn” ($r = .531, p = .000, N = 366$) and “every student can learn to learn” ($r = .531, p = .000, N = 366$). This means that the educator’s attitude that a student can learn is related to the teacher’s attitude that each student can achieve positive outcomes. A moderately strong correlation was also found between the statements “important expectations and reflections on students’ abilities in teaching” and “important student achievements as part of their personal and school life” ($r = .503, p = .000, N = 366$). Consequently, the attitude of the teacher about the students’ expectations, which is related to the reflection on the available abilities, determines the students’ achievements in personal and socio-educational life.

Table 5. Correlations: teacher’s principles for implementing learning to learn

Statements	Every student can learn	Every student can learn to learn	The achievements of students as part of their personal and school life are important to me
Every student can learn	.531**	.531**	
Students’ expectations and reflections on their abilities are important to me in teaching			.503**

Analyzing the teacher’s principles in implementing the characteristics of learning to learn diagnostic block, it was found that women better appreciate “teaching creates supportive and responsible environments that encourage students to become active” ($p = .003$), “I provide students with a variety of situations, examples they would make their own choices, solve problem situations and make decisions” ($p = .011$), “I use various illustrations, tools, art artifacts, practical verbal examples, etc. during teaching. t. to create interesting learning environments for students” ($p = .006$), “I teach students that fact is not an objective argument but is a fact in a specific context” ($p = .001$), “I pay attention to students’ expectations in teaching” ($p = .012$), “Students’ expectations and reflections on their abilities are important in teaching” ($p = .022$) compared to men.

Table 6. Mann-Whitney criterion and comparing the responses by gender: teacher’s principles in implementing characteristics of learning to learn

Statements	Teacher’s gender	N	Mean rank	Mann-Whitney	Wilcoxon W	Z	Asym p. Sig.
In teaching, I create support and responsibility-based educational environments that encourage students to become active	Man	40	143.63	4925.000	5745.000	-2.995	.003
	Woman	326	188.39				
During teaching, I provide	Man	40	149.91	5176.500	5996.50	-2.547	.011

students with a variety of situations, examples, contexts to make their own choices, solve problematic situations, and make decisions.	Woman	326	187.62		0		
I use a variety of illustrations, tools, art artifacts, practical verbal examples, and so on. t. to create exciting learning environments for students	Man	40	145.36	4994.500	5814.500	-2.726	.006
	Woman	326	188.18				
I teach students the notion that a fact is not an objective argument but is a fact in a specific context	Man	40	134.81	4572,500	5392.500	-3.457	.001
	Woman	326	189.47				
In teaching, I pay attention to students' expectations	Man	40	149.03	5141,000	5961.000	-2.509	.012
	Woman	326	187.73				
Students' expectations and reflections on their abilities are important to me in teaching	Man	40	152.15	5266,000	6086.000	-2.286	.022
	Woman	326	187.35				

Learning to learn skills developed in lessons. A moderate correlation ($r = .660$, $p = .000$, $N = 366$) was found between communication and collaboration. Consequently, communication skills strengthen students' collaboration skills in the classroom.

Table 7. Correlations: learning to learn skills development in lessons

Statements	Collaboration
Communication	.660**

Analyzing the learning to learn skills developed in the lessons, it was found that women value creativity ($p = .020$), problem solving ($p = .019$), critical thinking ($p = .034$), leadership ($p = .003$), communication ($p = .000$), cooperation ($p = .000$), adaptability ($p = .002$), interest ($p = .018$), reflection ($p = .021$) compared to men.

Table 8. Mann-Whitney criterion and comparing the responses by gender: learning to learn skills developed in lessons

Statement	Teacher's gender	N	Mean rank	Mann-Whitney	Wilcoxon W	Z	Asym p. Sig.
Creativity	Man	40	152.01	5260.500	6080.500	-2324	20
	Woman	326	187.36				
Problem solving	Man	40	151.19	5227.500	6047.500	-2355	19
	Woman	326	187.46				

Critical thinking	Man	40	154.00	5340.000	6160.000	-2119	34
	Woman	326	187.12				
Leadership	Man	40	141.39	4835.500	5655.500	-2952	3
	Woman	326	188.67				
Communication	Man	40	116.93	3857.000	4677.000	-4996	0
	Woman	326	191.67				
Cooperation	Man	40	135.74	4609.500	5429.500	-3595	0
	Woman	326	189.36				
Adaptability	Man	40	140.73	4809.000	5629.000	-3073	2
	Woman	326	188.75				
Curiosity	Man	40	151.24	5229.500	6049.500	-2374	18
	Woman	326	187.46				
Reflecting	Man	40	151.23	5229.000	6049.000	-2308	21
	Woman	326	187.46				

Learning to learn: student involvement. The moderate correlation was found between students' attentiveness to positive emotions and positive emotions to achieve their intended learning goals ($r = .583$, $p = .000$, $N = 366$), which means that positive emotions are particularly important for students to achieve their learning goals.

Table 9. Correlations: learning to learn through students' involvement

Statements	Students are attentive because they experience positive emotions while learning
Experiencing positive emotions in pursuit of intended learning goals	.583**

Statistical analysis using the Mann-Whitney criterion and comparing the responses by gender showed that here are no statistically significant differences between genders.

Learning to learn: learning co-creation between the teacher and students. Analyzing the results of the correlation analysis of teacher-student learning co-creation, a moderate correlation was obtained between the provision of teacher feedback to students and the provision of student feedback to the teacher ($r = .519$, $p = .000$, $N = 366$), which means that feedback is obtained in the learning process is important from both teachers and students.

Table 10. Correlations: learning to learn through co-creation between the teacher and students

Statements	In each lesson, I provide students with generalized feedback
In each lesson, I provide to students the generalized feedback	.519**

Analyzing teacher-student learning co-creation, it was found that women value the statements “ I pay attention to their emotions and motivation when working with students” (p = .002), “My experience suggests that students' positive expectations for personal learning are the basis for their learning achievements and self-confidence” (p = 0.011) more as compared to men.

Table 11. Mann-Whitney criterion and comparing the responses by gender: teacher-student learning co-creation within the learning to learn implementation

Statement	Teacher's gender	N	Mean rank	Mann-Whitney	Wilcoxon W	Z	Asymp. Sig.
When working with students, I pay attention to their emotions and motivation	Man	40	141.10	4824.000	5644.000	-3.085	.002
	Woman	32	188.70				
My experience suggests that students' positive expectations for personal learning are the basis for their learning achievement and self-confidence.	Man	40	148.68	5127.000	5947.000	-2.542	.011
	Woman	32	187.77				
When working with students, I clearly communicate my expectations, describing their learning activities, arguing why they will be done in the lesson.	Man	40	144.20	4948.000	5768.000	-2.857	.004
	Woman	32	188.32				

Learning to learn: creating educational environments according to students' learning differences. Analyzing the developed educational environments according to the differences in students' learning, a strong correlation was obtained between the available knowledge and abilities / skills (r = .739, p = .000, N = 366). Moderate correlations were found between learning styles and expectations (r = .529, p = .000, N = 366), interests and motivation (r = .565, p = .000, N = 366), interests and expectations (r = .530, p = .000, N = 366), differences in cultural and linguistic learning (r = .567, p = .000, N = 366), differences in cultural and social learning (r = .580, p = .000, N = 366), differences in linguistic and social learning. differences (r = .511, p = .000, N = 366). This means that the teacher must consider the individual differences of the students in creating learning environments that motivate and enable the student to learn.

Table 12. Correlations: learning to learn through creating educational environments according to students' learning differences

Statements	Abilities /skills	Motivation	Expectations	Linguistic learning	Social learning
Available knowledge	.739**				
Learning styles			.529**		

Interests		.565**	.530**		
Motivation			.582**		
Cultural learning				.567**	.580**
Linguistic learning					.511**

Analyzing the created environments according to the differences in students' learning, it was found that women value emotions higher ($p = .005$) than men.

Table 13. Mann-Whitney criterion and comparing the responses by gender: the learning to learn through creating educational environments according to students' learning differences

Statement	Teacher's gender	N	Mean rank	Mann-Whitney	Wilcoxon W	Z	Asymp. Sig.
Emotions	Man	40	144.39	4955.500	5775.500	-2.794	.005
	Woman	326	188.30				

Learning to learn: opportunities for students to control their learning. A moderate correlation was found between the statements “when working with students, I provide them with the opportunity to form their own learning goals and link them to learning outcomes” and “plan learning opportunities that support students' learning goals” ($r = .570$, $p = .000$, $N = 366$). This means that the planning learning opportunities that support students' learning goals is linked to the provision of opportunities to them form their own learning goals in relation to their learning outcomes.

Statistical analysis using the Mann-Whitney criterion and comparing the responses by gender show that there are statistically significant differences in some of the statements “I plan learning opportunities that support students' learning goals” ($p = .012$); “I encourage the development of students' language and metacognitive abilities by enabling them to discuss and reflect on personal learning” ($p = .004$); “Feedback is effective for students if it gives them time to understand and change the actions based on it” ($p = .004$). All other statements do not differ statistically significantly between genders.

Table 14. Correlations: learning to learn through opportunities for students to control their learning

Statement	I plan learning opportunities that support students' learning goals
Working with students ensures that they can shape their learning goals and relate them to learning outcomes	.570**

Table 15. Mann-Whitney criterion and comparing the responses by gender: learning to learn through opportunities for students to control their learning

Statement	Teacher's gender	N	Mean rank	Mann-Whitney	Wilcoxon W	Z	Asymp. Sig.
I plan learning opportunities that support students' learning goals	Man	40	150.80	5212.000	6032.000	-2.523	.012
	Woman	32	187.51				
I encourage the development of students' language and metacognitive skills by giving them opportunities to discuss and reflect on personal learning	Man	40	142.88	4895.000	5715.000	-2.872	.004
	Woman	32	188.48				
Feedback is effective for students if it gives them time to understand it and change the behaviour based on it.	Man	40	144.20	4948.000	5768.000	-2.851	.004
	Woman	32	188.32				

Learning strategies

Learning strategies: application. A moderate correlation is identified among the statements “I encourage students to test theories, models by discussing and/or working in groups” and “I create learning situations in which students have to make decisions relevant to specific learning contexts” ($r = .536, p = .000, N = 366$) connection. This means that the more often learning situations are created for students in specific learning contexts, the more often students apply the methods in practice by discussing or working in groups and / or teams. A moderate correlation was also found between the statements “I create learning situations in which students have to make decisions relevant to specific learning contexts” and “develop students' ability to reflect on their experiences on a specific issue and find applicability” ($r = .596, p = .000, N = 366$). Consequently, the more often learning situations are created for students, making specific decisions, and overcoming various problems, the easier it is for students to discover adaptability.

Table 16. Correlations: learning strategies – application

Statements	I create learning situations in which students must make decisions that are relevant to specific learning contexts	I develop students' ability to reflect on their experiences on a specific issue and find opportunities for applicability in them
I encourage students to test theories and models by discussing and/or working in groups	.536**	
I create learning situations in which students must make decisions that are relevant to specific learning contexts		.596**

Learning strategies: acting. A moderate correlation was found between the opportunities for students to act and take responsibility for solving assigned learning tasks and the opportunities for students to initiate creative solutions to problems ($r = .550, p = .000, N = 366$). Therefore, it can be argued that the more opportunities there are for initiating creative problem-solving approaches, the more often students take responsibility for assigned learning tasks.

Table 17. Correlations: learning strategies – acting

Statements	I enable students to take actions and take responsibility for their own tasks
I provide opportunities for students to initiate creative solutions to problems relevant to learning instead of what I suggest	.550**

Learning strategies: reflecting. Based on the results of the study, it can be stated that encouraging students to rethink their learning strengths and weaknesses and predict learning goals is moderately correlated with encouraging students to rethink what they learned in the lesson ($r = .510, p = .000, N = 366$). The moderate correlation is evident between the opportunity for students to communicate their reflections in writing and to share with other students, and the opportunity for students to reflect on the quality of learning and present their reflections to the audience ($r = .572, p = .000, N = 366$). This means that the teacher is focused on students' reflection, which is directly related to the students' motivation for successful learning activities. Also, the more often students are encouraged to self-assess and reflect on their learning strengths and weaknesses, the easier it is to control learning outcomes and the quality of learning.

Learning strategies: abstracting/working with information. The moderate correlation was found between assigning target tasks that require working with various information and encouraging them to choose information sources to perform learning tasks or solve problems ($r = .583, p = .000, N = 366$). A strong correlation was found between teaching to systematise information related to a learning task or situation and teaching to summarize information related to a learning task or situation. ($r = .767, p = .000, N = 366$). This means that the teacher encourages the students to independently search for answers to the questions, systematise, summarize, and use various sources of information, plan their activities, and encourage the student to choose the sources of information.

Table 18. Correlations: learning strategies – reflecting

Statements	I encourage students to rethink what they learned in the lesson by accurately naming the learning outcomes	I encourage students reflect on the quality of their learning in writing and/or orally and present their reflections to the audience
I encourage students to rethink their learning strengths and weaknesses and set learning goals based on that	.510**	
I provide opportunities for students to communicate reflections in writing and share them with other students through oral work in groups or teams		.572**

Table 19. Correlations: learning strategies – abstracting/working with information

Statements	I encourage students to choose their own sources of information to complete learning tasks or solve learning problems	I teach students to systemize information related to a learning task or learning situation
I assign targeted tasks to students that require working with a variety of information	.505**	
I teach students how to systematise information related to a learning task or learning situation		.767**

Statistical analysis using the Mann-Whitney criterion and comparing the answers by gender show that there is a statistically significant difference in the statements that women rate better than men:

- *Acting*. “I give students opportunities to know their talents and abilities by working in groups or teams” (p = .008); “I provide opportunities for students to negotiate, persuade and influence working in groups or teams” (p = .022); “I provide opportunities for students to initiate creative solutions to problems relevant to learning instead of the ones I suggest” (p = .016). All other statements do not differ statistically significantly between genders.

- *Applying*. “I enable students to make presentations of creative projects” (p = .003); “I create learning situations in which students have to make decisions that are relevant to specific learning contexts” (p = .017). All other statements do not differ statistically significantly between genders.

- *Reflecting*. “I encourage students to rethink what they learned in the lesson by accurately naming the learning outcomes” (p = .003). All other statements do not differ statistically significantly between genders.

- *Abstracting/working with information*. “I focus on teaching students how to select information related to a learning task or learning situation” (p = .015); “I teach students how to systematise information related to a learning task or learning situation” (p = .017); “I teach students to summarize information related to a learning task or learning situation” (p = .021); “I teach students to present structured information orally” (p = .006). All other statements do not differ statistically significantly between genders.

Table 20. Mann-Whitney criterion and comparing the responses by gender: learning strategies – acting, applying, reflecting, abstracting/working with information

ACTING							
Statement	Teacher's gender	N	Mean rank	Mann-Whitney	Wilcoxon W	Z	Asymp. Sig.
I provide opportunities for students to learn about their talents and abilities by working in groups or teams	Man	40	146.21	5028.500	5848.500	-2.662	.008
	Woman	326	188.08				
I provide opportunities for students to negotiate, persuade, and influence working in groups or teams	Man	40	150.89	5215.500	6035.500	-2.292	.022
	Woman	326	187.50				

I provide opportunities for students to initiate creative solutions to problems relevant to learning instead of what I suggest	Man	40	149.09	5143.500	5963.500	-2.399	.016
	Woman	326	187.72				
APPLYING							
I provide opportunities for students to make presentations of creative projects	Man	40	141.13	4825.000	5645.000	-2,985	.003
	Woman	326	188.70				
I create learning situations in which students must make decisions that are relevant to specific learning contexts	Man	40	149.88	5175.000	5995.000	-2,381	.017
	Woman	326	187.63				
REFLECTING							
I encourage students to rethink what they learned in the lesson by accurately naming the learning outcomes	Man	40	143.40	4916.000	5736.000	-3.006	.003
	Woman	326	188.42				
Abstracting / working with information							
I focus on teaching students how to select information related to a learning task or learning situation	Man	40	151.40	5236.000	6056.000	-2.427	.015
	Woman	326	187.44				
I teach students how to systematise information related to a learning task or learning situation	Man	40	151.63	5245.000	6065.000	-2.396	.017
	Woman	326	187.41				
I teach students to summarize information related to a learning task or learning situation	Man	40	153.11	5304.500	6124.500	-2.311	.021
	Woman	326	187.23				
I teach students to present structured information orally	Man	40	146.10	5024.000	5844.000	-2.735	.006
	Woman	326	188.09				

6. Discussion

Research results answer the research question: “How are the components of the characteristics of ‘learning to learn’ concept interrelated in the context of teacher-students’ educational interactions in the classroom?”

The research results showed that ‘learning to learn’ components in the context of teacher-students’ educational interactions in the classroom are the following:

Self-assessment of teacher’s learning to learn skills. Teachers are capable to assess their skills when they connect their leadership and mentorship within the educational interactions with students. Shillingstad et al. (2014) argue that teachers as mentors need to grow into leadership and these two roles through teacher’s practices in a classroom is a processual experimentation and this incorporates school cultures, various instructional practices, and formative assessment. Also, teachers’ capability to self-assess their skills is related to their collaboration with fellow teachers by working on school plans, improvement of curriculum which stimulates the collective cooperation

processes in teachers' community (e.g., collective implementation of school plans). This empirical fact from our research coincides with results of Voogt et al. (2016) findings that teachers collaboration influences their knowledge and practice, impacts implementation of curriculum change and develops collaborative community of practice. Our research findings prove that improvement of teaching is related to individual efforts of the teacher to use scientific resources in teaching, but this requires from the teacher self-empowerment to choose, analyse, and systematise the scientific sources. This process is a part of teacher's efforts to improve teaching and learning in a classroom. This means that acquiring this sophisticated knowledge and developing a practice that is different from what teachers themselves experienced as students requires learning opportunities for teachers that are more powerful than simply reading and talking about new pedagogical ideas (Cohen et al., 2003).

Teacher principles for implementing learning to learn. Results of our research showed that teacher's positive attitudes toward students and students' positive academic achievements/outcomes are interrelated. Thus, teacher's positive attitudes are associated with students' personalities, their personal and academic development, and students' academic success as well as teacher's positive attitudes positively influence students' personality as well as their life performances (Uluga et al., 2011).

Learning to learn skills developed in lessons. Our research findings proved that teacher's communication and collaboration skills strengthen students' collaboration skills in the classroom. This could be explained that collaborative learning is useful in developing students' ability to learn to work as a team while getting them engaged in the learning activities and students then believe that they really gain know knowledge and new skills (Sulaiman, Shahrill, 2015).

Student involvement. Our study allows to assume that students' own positive emotions are particularly important for achievements of their learning goals. However, the empirical fact we have obtained does not explain the details of the "how" and "why" questions - these are the answers that can be investigated in the future. This statement is also communicated by Izard et al. (2008) who has neglected, that research can explain when and why emotion is associated with students' academic success, even though emotions contain useful information that can guide cognition and action.

Teacher-student learning co-creation. Results of our study highlighted the fact that teachers pay attention to students' emotions and motivations when working with them in a classroom. Méndez-Aguado et al. (2020) agree that positive emotion positively influences academic motivation of students in a classroom. Also, academic motivation is positively related to students' academic performance and their adaptive behaviours and habits related to the learning. This shows that in the educational relationship between teacher and students, the teacher is observing, listening to, and constructing a teaching process through learning co-creation in which the student is not only accepting knowledge in one direction from the teacher, but that the student is an emotional being whose emotions are relevant (Bovill, 2020).

Creating educational environments according to students' learning differences. Our research findings revealed that the teacher must consider the individual differences of the students in creating learning environments that motivate and enable the student to learn. Because in teaching-learning processes here are interrelated learning styles and expectations, interests and motivation, differences in cultural and social learning. So individual differences are important for determining the learning styles of students. In order teachers would be able to design the learning-teaching process appropriate to the individual differences of students, the students should make active participation in the lesson and the individual differences of their learning not to be ignored (Kubat, 2018).

Opportunities for students to control their learning. From our study is clear that teachers understand that when they work with students in a classroom it is important to provide them with the opportunity to form their own learning goals and link them to learning outcomes. Goal setting is a form of student-involved data use (Jimerson, Reames, 2015). It gets students involved in reviewing their learning processes. This allows students to collaborate with teachers and to set goals for their learning improvement and directing their learning to towards the targeted learning goals. When implemented well, these goal-setting practices have a significant positive influence on student learning outcomes (Leithwood, Sun, 2018).

Learning strategies: applying. Research findings allow to make statement that if the learning situations are created for students in specific learning contexts, then students are tended to

apply the methods in practice by discussing or working in groups and/or teams. This means that the value of students' cooperation and working in groups/teams is evident in teaching practice in the classroom. The ways teachers help students to set their learning goals are related to students' collaboration in a classroom and teacher's instruction (Janssen, Wubbels, 2018). Also, research findings showed that learning situations that are created for students, making specific decisions, and overcoming various problems, then the students easier adapt to learning contexts and situations. Collie, Martin (2016) argue that effective instruction requires adaptation of instructional content and lesson pacing to be responsive to students' differentiated learning needs, changes in the levels of learning support provided to students as they develop expertise in the content.

Learning strategies: acting. Our findings revealed that here are relationships between the opportunities for students to act and take responsibility for solving assigned learning tasks and the opportunities for them to initiate creative solutions to problems through their learning. Designing activities that foster student independence is essential because they invite students to engage more thoughtfully with the content (Sulaiman, Shahrill, 2015). Student choice makes students active participants in their own learning. Such autonomy is associated with greater personal satisfaction in educational environments in a classroom. When students oversee their own learning, they feel a sense of belonging—the classroom becomes a space defined by them (Kubat, 2018).

Learning strategies: reflecting. Based on the results of the study, it can be stated that encouraging students to rethink their learning is related with encouraging them to rethink what they learned in the lesson. Reflection helps students remember lessons learned and gives them a sense of accomplishment. When they consider their challenges and experiences deeply, they can identify gratifying experiences and things that they can aspire to do differently going forward. reflection builds confidence and fosters pride in new skills (Veine et al., 2020).

Learning strategies: abstracting/working with information. The research results revealed the important of teacher's encouragement of students to independently search for answers to the questions, systematise, summarize, and use various sources of information, plan their activities, and encourage the student to choose the sources of information. These results clearly support the student autonomous learning in the classroom. Student autonomy is necessary for her/his encouragement, the opportunity of learning the subject and skills, and student's responsibility of her/his learning achievements (Jora, 2020). The student's autonomy should be gradually implemented through teaching and learning processes in a classroom (Almusharraf, 2020).

7. Conclusion

Learning to learn characteristics include self-assessment of teacher's learning to learn skills, teacher's principles for implementing learning to learn, learning to learn skills developed in a lesson, student involvement, teacher-student learning co-creation, creating educational environments according to students' learning differences, opportunities for students to control their learning, and learning strategies – applying, acting, reflecting, abstracting/working with information.

The content of each learning to learn characteristic is related to teacher-student educational interactions in the classroom with a focus on teacher's particular abilities: ability to cooperate and collaborate with fellow teachers at school, mentorship and leadership, and capability to use scientific sources to teaching; considering positive attitudes toward student's personalities and their learning; having communication and collaboration skills for creating the atmosphere of collaborative learning in a classroom; maintaining students' positive attitudes toward their learning in the classroom; implementing learning co-creation in the classroom; not ignoring students' emotions in the learning process and being adaptive through teaching to students' learning; take into account the individual differences of students in creating learning environments that motivate and enable the students to learn; providing students with the opportunities to form their own learning goals and link them to learning outcomes; creating learning situations for students in specific learning contexts; providing opportunities for students to take actions and responsibilities for solving learning tasks and initiate creative problem solving through learning; designing students' independence and autonomy in their learning; encouraging students to reflect on their learning; encouraging students to search for answers through working with variety of information, which could be not provided in advance by the teacher.

Learning to learn requires teaching and learning that are interrelated processes, which include many variables. These variables interact as students learn toward their learning goals and incorporate new knowledge, behaviours, and skills that add to their range of learning experiences. Both teaching and learning processes are navigated by the teacher through educational interactions with students in a classroom. Teacher's understanding about relevance of learning to learn for students's learning and implementing it within the educational interactions with students in a classroom effects the students 'learning through their reciprocal teacher-student communication, collaboration, cooperation, co-creation. Learning to learn is particularly important when teachers are no longer a main source of information and knowledge. The findings show how the gap can be addressed between current and future teaching-learning performances in a classroom.

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