Prethodno priopćenje/
Preliminary communication
Prihvaćeno: 4. lipnja 2018.

Tanja Maltar Okun
Sveti Petar Orehovec Primary School, Sveti Petar Orehovec
tanja.maltar@gmail.com

Karolina Doutlik
Ivan Benković Primary School, Dugo Selo
karolina.doutlik@gmail.com

STUDENTS' ASSESSMENT OF NATURE/BIOLOGY TEACHERS' QUALITIES

Summary: *This paper focuses on desirable qualities of teachers from students' perspective. The paper presents the results of research the aim of which was to determine the lower secondary school students' (N = 389) assessment of nature/biology teachers' qualities, both their personal and pedagogical (teaching) qualities, as well as their way of communication and relationship with students. The obtained results indicate that there are gender-related differences in the students' assessment of nature/biology teachers' personal and pedagogical qualities, and their communication and relationship with students. Differences were also detected in students' assessment of nature/biology teachers' pedagogical qualities with regard to area in which the school is located. However, no statistically significant differences were found in the students' assessment with regard to theclass they attend. The students claim that their nature/biology teachers' work would be improved if it involved more frequent practical work done by students, group work, outdoor teaching, the use of (audio) visual material, play, or through clearer explanations and the use of humour in teaching.*

Keywords*: biology, personal qualities, pedagogical qualities, nature, teacher*

INTRODUCTION

Throughout history, a multitude of terms have been used denoting people involved in the area of education. Strugar (1991:13) lists some of them: *umia* (a brother/a friend), *rabin* (a scholar), *scholasticos/didaskalos* (the one who teaches) and *paidagogos* (a pedagogue), the term used in Greece and Rome. Nowadays, the term used is a teacher, a person who has a significant role (and also a completely transformed role in today's age) in children's education. According to Bognar and Matijević (2002: 32), the teacher is "a leader and organizer of the educational process", while Polić (1997: 183) claims that the teacher is not only the person who conducts the teaching process, but someone who actually teaches someone to do something. For Glasser (1999: 27), "being a good teacher" is the most difficult profession in the modern society, while being a successful teacher is the greatest challenge of all. The teaching profession is among the most stressful professions of the modern age (Kyriacou, 2001).

Expectations from teachers in the 21st century have become diverse, while the advances in science, technology and society have contributed to various changes in the classical perception of the teacher's role. The function and role of teachers have not changed solely with regard to the teaching content, but also with regard to teachers' perceptions of students, their relationship with students and the achievement of educational outcomes (Armstrong, 2006; Ilić, Ištvanić, Letica, Sirovatka and Vican, 2012). Therefore, the teacher is not only an information provider, but also a representative of the society, the source of knowledge, the organizers of students' work, a coordinator, a creator of cooperative forms of work and good interpersonal relationships, an innovator, a mentor, etc. (Strugar, 1999: 412).

THE RELATIONSHIP BETWEEN THE TEACHER (AN EDUCATOR) AND A STUDENT (AN EDUCATEE)

Research carried out by Kearney, Plax, Hays and Ivey (1991) revealed that pedagogical relationship presents the essence of efficient learning. As the teacher brings all of his/her qualities into the teaching process, he or she, depending on these characteristics, establishes a good or a bad relationship with the students. In order for a good relationship to be established, a two-way communication has to be enabled (Bašić, 1999: 184), and such a relationship should be established in which the teacher's and students' personalities complement one another (Bratanić, 2002: 67, 88). This quality relationship is built upon mutual respect, honesty, love and trust. Bašić (1999: 183) claims that it is the teacher's duty to lead children towards success and prepare them for lifelong learning. The easiest way to achieve this is to allow students to be co-organizers of the teaching activities, while the teacher's role is to monitor, direct and help students to develop their abilities and make full use of them (Matijević, 2016: 152). Other authors (Evertson, Emmer, Clements, Sanford, and Worsham, 1984; Kearney et al., 1991; Henderson, Fisher and Fraser, 2000) point out that some teachers lack qualities such as warmth, a talent for teaching, affability, strength, assertiveness, responsibility and fair and equal treatment of all students, which can have a negative impact on teacher-student rapport. Students tend to learn more and enjoy lessons in which the teacher relies on prosocial way of communication (Kearney etal., 1991: 311). Therefore, the teachers are expected to teach students, shape their personalities, recognize their needs, problems, interests and inclinations; to be their friend, counsellor and the person they can trust; to encourage and guide them; to contribute to the development of their intellectual abilities and their personality (Ilić et al., 2012: 47). In order for all these requirements to be met, it is important that teachers approach students as collaborators and to create an environment of mutual trust and two-way communication, both between the teacher and students and between students, since that greatly facilitates the educational process, improves the access to information and reduces the number of problems. It is precisely this kind of teacher that on the one hand perceives students as persons and takes into consideration their developmental needs, and on the other hand tries hard to help students acquire key skills which will enable them a quality life in the present and the future.

THE TEACHER'S PERSONALITY

In the early 20th century, pedagogues noticed that the teacher's personality is a salient factor in educational process, so it became the centre of psychological and sociological interest. In this process a special pedagogical discipline was developed, known as *pedeutology*. It focuses on the teacher's personality and all its traits (Strugar, 1999: 410).

The teacher's work, activities, success and behaviour are greatly influenced by their characteristics (Pastuović, 1997: 16-17), while behaviour itself is determined by personality, the current situation and the previous experience of the teacher. Strugar (1914) points out that the teacher's behaviour is an important factor in successful education. It is important that the teacher's behaviour encourages learning and does not hinder either teaching or learning (Schmitz, Voreck, Hermann and Rutzinger, 2006: 10). The teacher's negative behaviour is a type of behaviour that interrupts both the teaching and learning process. In terms of successful learning, it is dysfunctional, and has a wide range which extends from boredom in classes to physical violence, which, of course, leads to negative evaluation and negative attitudes of students, as well as to lower level of activity and participation of students in classes (Kearney et al., 1991: 310-312). Also, Plax and Kearney (1990, according to Kearney et al., 1991: 310) claim that the teacher's monotonous speech, "easy stroll" through lessons, delay in test correction, ambiguity found in tests, early release of students from lessons and fast dictation are only some examples of negative teacher's behaviour, which play an important role in students' motivation, achievement, attitudes and reactions.

THE TEACHER'S QUALITIES

Based on the results of research on teachers, two fundamental and mutually related groups of qualities have been identified: personal (human) and pedagogical (teaching) qualities of teachers (Strugar, 1993: 31-33; Strugar, 2014: 22). Personal or human qualities define the teacher as a human being, accepted or not accepted by students, parents and community, and they enable the teachers to or prevent them from establishing interpersonal relationships, primarily with students and then with their own environment.

The importance of teachers' qualities has been recognized by several authors: Kvaščev (1980), who divides them into three groups, and Đorđević and Đorđević (1988) and Vukasović (1990), who claim that whatever method the teacher uses, it cannot compensate for the teacher's indifference and lack of interest in students.

The teacher's personal qualities are related to development of their teaching qualities, which are the teacher's "educational and teaching activities which consist of a range of didactic and methodological procedures…and which have an impact on students' efficiency" (Strugar, 1991: 20). Strugar (2014: 29) points out that teaching qualities are learned, acquired and developed throughout the basic teacher education, while their further development depends on the teacher's motivation and positive school environment. Strugar (1993) and Kyriacou (2001) list the teaching qualities of teachers. Strugar (2014: 25) points out that the teacher's professional

work depends on the general, pedagogical, didactic, methodological and psychological aspects of teacher education, as well as qualities related to organization of the teaching process and qualities important for establishing good interpersonal relationship between the teacher and students. Kyricou (2001), on the other hand, lists the following teaching qualities: lesson planning, preparation and implementation; conducting a lesson and the flow of the lesson; setting the classroom environment; maintaining discipline; grading students' progress; self-reflection and self-evaluation. A comprehensive list of desirable teachers' qualities is presented in Table 1.

Table 1. Division of desirable teachers' qualities

Author	Desirable teachers' qualities*
Kvaščev (1980)	*Cognitive:*independent thinking, developed sensitivity to problems, sociability, unconventionality, risk-taking in research area, resistance to conformist thinking, willingness to conduct research and explore, preference for synthesis and creative generalizations, associating ideas in extraordinary way, persistent search for diverse problem solutions, ingenuity, resourcefulness.
	Motivational: a highly developed level of curiosity and motivation for achievement, motivation for self-actualisation, a continuous need for creative problem solving, developed creative points of view, preference for new combination of ideas, a high level of aspiration, a high level of ambition and a wide range of interests.
	Personality traits and temper: creativity, self-discipline, consistency, independence, self-reliance, persistence in problem-solving, self-confidence, emotional stability, initiative, lower level of susceptibility to authority, hard work, persistence.
Đorđević and Đorđević (1988)	Genuine inclination to students, honesty, integrity, kindness, tactfulness and appropriate behaviour; a friend one can trust, a counsellor, a person who passes on values to others, a person who facilitates personality development.
Vukasović (1990)	The teacher is a patriot, conscientious, accurate, has a sense of duty and responsibility; has pedagogical and professional education and great general knowledge; is moral, has a positive attitude to work, loves his/her job, has good intellectual and speaking skills, is an optimist, has a positive attitude towards students and ability to approach them, understands students' needs, is ready to help, maintains friendly relationships with students, is strict in demands, is fair to everyone and has pedagogical tactfulness.
Strugar (1993)	*Personal:*helps students with their work and encourages their interests; is in a good mood, kind, approachable; is friendly, patient, calm, understanding; has interest in students; respects students' personalities; avoids sarcasm and bad words; has pleasant appearance and attraction; is consistent, down-to-earth, impartial, fair; has authority and is a role model; has a sense of humour; is witty and has a wide range of interests; is enthusiastic; expresses love for children; is reliable and devoted; shows empathy; believes in students' abilities; is objective and realistic; is self-critical, natural; controls his/her own emotions; is adaptable and cooperates well with others; is democratic.
	*Pedagogical:*enables students an active acquisition of knowledge and conducts active evaluation and assessment of students' knowledge; develops good interpersonal relationships; shows empathy in communication and encourages students' creativity; presents the teaching content clearly and in an interesting way; emphasizes the important parts of the teaching content and correlates them with other school subjects; encourages students to synthetize and apply new knowledge with previously acquired knowledge; organizes group work and pair work; teaches students to learn independently, to do research, to detect and solve problems.

Kyriacou (2001)	*Pedagogical:* confident, relaxed behaviour of the teacher, which encourages interest in lessons; gives clear instructions and explanations, uses the teaching resources and aids well; shows respect for students' ideas and helps them develop these ideas; encourages active students' participation in lessons and provides them with opportunities to organize their own work; encourages students to take part in various, age-appropriate activities; asks different questions and directs them to multiple students.
Schmitz et al. (2006)	Has the ability to motivate students, to encourage positive feelings and attitudes, to teach and shape students, to give them support; provides feedback; praises and encourages students to grow; gives constructive feedback; expects students to obey the rules; encourages readiness for achievement.

* Throughout history, various authors have used different terminology and systematization of teachers' qualities, encompassing the art of teaching,behaviour, etc.

Bilić (2000) believes that the teacher's competence is closely related to the subject they teach, and has an important influence on students' work and success, as well as on acquisition of the teaching content. The author believes that the teacher's competence includes lesson planning, content organization, the selection of suitable tasks and the most effective teaching methods and aids. Moreover, it includes class management and control of classroom environment.

A good teacher will make an effort to interest students in his/her subject and make his/her lessons memorable, positive and interesting. In order to lead the students to the set goal, the teacher's task is to design various teaching activities which will provide efficient motivation for students (Strugar, 1993: 68-69). The positive and active learning atmosphere will encourage the students to study, while the negative atmosphere will smother students' creativity and motivation, which are very important elements in their achievement.

Đorđević and Đorđević (1988) conducted research on a sample of 1,295 students in a lower secondary level of education (5^{th}-8^{th} grade of primary school, aged 10-14) and in a higher level of secondary education (3^{rd} grade of secondary school, aged 17). They concluded that for students, the most important thing is what kind of person the teacher is (good or bad), how they treat students and only then if the teacher is an expert in his/her field. The listed negative qualities have the same rank – how bad the teacher is as a person, how badly he/she treats the students and how bad he/she is as an expert in his/her subject. Therefore, for the teacher it is most important to have great personal qualities in order for the students to develop these same qualities.

Šimunović (2012) also carried out research to determine the qualities that students in a lower secondary level of education, who also attend music school, appreciate and consider important in music teachers. The results revealed that it was extremely important for these students that the teachers are experts who know how to motivate them, communicate with them, are warm and non-violent. The conclusion is that students appreciate those qualities in teachers which are directed towards helping, encouraging and counselling students.

Rogers (1976, as cited by Đorđević and Đorđević, 1988: 36) believes that for a quality relationship between the teacher and the student it is important to: be re-

alistic, appreciate students as people and have empathy (know how to "approach" the student). That is, it is important for teachers to put themselves into students' shoes, because in that way teachers can understand how children perceive the world around them, which learning strategies they use, what they feel and what motivates them (Bašić, 2015: 30). Besides all this, teachers should adapt to students' needs and teaching goals, use various teaching methods, resources and aids, since the teacher's behaviour (lesson planning, class management and teaching) greatly affects the amount of time students spend studying (Brophy, 1986).

Finally, the best school does not exist, nor are there the best teaching methods (Matijević, 2016: 170). However, nowadays we know that if the teacher offers great support in the classroom (in terms of friendship and understanding), the students will exhibit a greater level of engagement, creativity, emotions, intrinsic motivation, psychological benefits, better understanding of concepts and greater academic achievement (Reeve and Jang, 2006).

ON NATURE AND BIOLOGY

Nature as a school subject is taught to students in 5th and 6th grades, with the annual total of 53 lessons. The aim of the subject is to develop students' interest in nature as a whole, as well as its exploration and understanding based on the available scientific knowledge and achievements. In addition, these lessons help student create the whole picture about the world around us (The Syllabus, 2006: 261). Biology as a school subject is taught to students in grades 7 and 8 throughout 70 lessons per school year. The main aim of the subject is to gain knowledge about the fundamental laws of biology, as well as the structure and function of living organisms; development of scientific thought; getting acquainted with the methods of research in nature; taking responsibility for applying the gained knowledge in everyday life (Ibid., 266). Biology, as well as Chemistry, Physics and Mathematics, belongs to the group of natural sciences subjects.

In terms of being an interesting subject, Biology is among the most interesting school subjects, and therefore, among the favourite ones in Croatia. Croatian students think that Biology is easy to understand and is moderately difficult, but also useful for their future lives. A quarter of students claim they invest a lot of effort in learning Biology and that they are supposed to acquire too much content knowledge. Furthermore, a quarter of students believe that Biology instruction encourages them to research its topics further, using various sources of information (TV, NET, professional literature) and 40% of them believe that Biology correlates with other subjects. As far as the influence on the very teaching process is concerned, a relatively low percentage (5%) of students believe they have influence on the selection of topics and/or forms of work (Marušić, 2006: 212).

The issue of natural sciences teachers' behaviour should be given more attention, since some research results (Kim, Fisher and Fraser, 2000; She and Fisher, 2002) point to the relation between teachers' behaviour and students' achievements and

their attitudes to science. Furthermore, it has been detected that students' personal (individual) attitudes can be improved if they believe that the teachers' behaviour (that is, qualities such as helping, understanding the students and kindness) is positive (see: Henderson, Fisher and Fraser, 2000; Kim et al., 2000).

Also, a vast body of research confirms significant gender differences in students' attitudes to natural sciences subjects. Boys seem to have more positive attitudes to science in comparison with girls (Ramsden, 1998; Dawson, 2000; Schreiner and Sjøberg, 2004); that is, boys seem to prefer Physics and Chemistry to other natural sciences subjects (Francis and Greer, 1999). Girls seem to be more interested in Biology (Keeves and Kotte, 1992; Jones, Howe and Rua, 2000). Moreover, numerous studies (Fraser, Giddings and McRobbie, 1995;Fisher, Fraser and Rickards, 1997; Rawnsley and Fisher, 1997) have shown that girls seem to perceive the learning environment in a more positive way than boys do. In Croatia, more girls than boys perceive Biology as interesting, useful, easy and easy to understand. Boys, on the other hand, claim they need to invest more effort in mastering the Biology content knowledge than girls. Furthermore, 45% of students like Biology because they find it interesting, while 25% of students like it because of its content, activities and flexibility of the teaching process. Among the lower percentage of students who do not like Biology, 49% say it is so because they dislike their biology teachers, while 20% think it is not interesting. As far as Croatian students are concerned, they generally do not seem to like natural sciences subjects, which is related to various teaching methods applied in Biology instruction (Marušić, 2006: 190).

In regard to students' age, Ramsden (1998), Osborne, Simon and Collins (2003) and Hussaini, Foong and Kamar (2015) noticed that as the students' age increases (from the beginning of lower to the end of higher secondary education), the level of their interest in natural sciences subjects decreases. Contrary to that, Spall, Stanisstreet, Dickson and Boyes (2004) noticed that as the age of students increases, their interest in Biology as a school subject does not decrease. Research carried out by Stark and Gray (1999) revealed that as the age of male students increases, they redirect their attention from Biology-related topics to those in the field of Chemistry and Physics, since they find them more interesting. Girls, however, maintain interest in Biology-related topics. Some authors claim that students' age does not influence their attitudes to Biology; instead, these attitudes are influenced by the teaching content of this subject and their parents' influence. At the same time, the teacher is considered the most influential factor in formation of students' attitudes to natural sciences subjects, and therefore it is of utmost importance for their achievements (Todd and Wolpin, 2003; Hanushek and Rivkin, 2010). If teachers create a positive classroom environment and actively encourage learning and students' motivation, they in return show greater interest in learning and are more focused on the learning process itself (Meece, Herman and McCombs, 2003; McCombs, Daniels and Perry, 2008). A number of authors (Dawson, 2000; Barber and Mourshed, 2007; Darling-Hammond, 2007; Adams, 2012) claim that a competent teacher is more important than any other classroom factor, and that he/she has a great influence on students' attitudes to a natural sciences subject.

As far as schools situated in rural and urban areas are concerned, it can be noticed that in rural schools there are fewer expert teachers who also find it more difficult to teach, since they do not have at their disposal as many material resources as there are in urban schools. That is why these teachers have to invest more effort in order to transfer the appropriate knowledge to students, so these rural schools often "lag behind" urban schools (Treagust and Treagust, 2004: 455).

Regarding urban schools, they do not usually lack material resources, so teachers are not forced to invest as much effort in the immediate transfer of knowledge to students. Instead, they rely on the teaching materials and aids such as posters, models, collections, etc. which they usually can afford. What urban schools view as a problem is the minimum contact of their students with nature around them, so McGregor Petgrave (2006) lists some development strategies like action research, projects, workshops, etc. which can help biology teachers develop scientific literacy in their students.

Numerous authors also point out the inequality in teachers' characteristics and quality of teaching. It has been noticed that more competent teachers are employed in urban schools (Paine, 1998; McEwan, 1999;Adams, 2012). Lankford, Loeb and Wycoff (2002) claim that in the USA the situation is reversed - the teachers with lower level of qualifications work in urban schools, while those with better qualifications are employed in the suburbs, where salaries are higher and classes are smaller in size. Related to this issue is the fact that students taught by teachers with lower qualifications achieve lower results (Lankford et al., 2002; Hanushek, Kain and Rivkin, 2004; Jackson, 2009).

It has also been noticed that urban schools generally offer a wider range of extracurricular activities to their students. Besides that, these schools stress the importance of building strong interpersonal relationships in the school environment, and teachers seem to be under the scrutiny of parents to a lesser extent since one school employs many teachers. On the other hand, in rural schools, teachers are closer to the community and they are acquainted with their students' personal lives. However, students are offered a limited number of activities, and parents' expectations from teachers are higher (Preston, 2006).

As has already been mentioned, students' attitudes to natural sciences subjects and their achievements in these subjects to a great extent depend on the teacher (Dawson, 2000; Barber and Mourshed, 2007; Darling-Hammond, 2007), so it would be useful to determine how students assess their nature/biology teachers' qualities.

METHODOLOGY

RESEARCH INSTRUMENT

The students filled out *The Questionnaire on Nature/Biology Teachers' Qualities*, which was designed for the purpose of this research on the basis of Strugar's (1991:265-268) questionnaire *The Scale for the Assessment of Pedagogical Qualities of Teachers*. The questionnaire consists of three parts: the first one is related to so-

ciodemographic characteristics of respondents (gender, grade, school); the second one contains 25 items in which the respondents used a 5-point Likert scale (1 = I completely disagree; 2 = I mostly disagree; 3 = I neither agree nor disagree; 4 = I partially agree and 5 = I completely agree) to assess the level of their teachers' positive/desirable qualities; and in the third part, they answered an open-ended question: *In your opinion, what could your teacher do to make her/his teaching process even better?*

THE AIM OF RESEARCH

The research was carried out in three primary schools in Koprivnica-Križevci County, Varaždin County and the City of Zagreb in the school year 2017/2018. Sveti Petar Orehovec Primary School in Koprivnica-Križevci County and 3rd Primary School Varaždin[4]in Varaždin County are rural schools, while Brezovica Primary School in The City of Zagreb is an urban school.

The aim of the research was to determine the lower secondary level (5th to 8th grade of primary school) students' assessment of their nature/biology teachers'[5] qualities. The following research hypotheses were formed:

Hypothesis H1: Students' assessment of their nature/biology teachers' qualities differ with regard to their gender.

Hypothesis H2: Students' assessment of their nature/biology teachers' qualities differ with regard to the grade they are in.

Hypothesis H3: Students' assessment of their nature/biology teachers' qualities differ with regard to the area in which the school is located (urban/rural school).

THE SAMPLE OF RESPONDENTS

The research involved 389 students altogether. A detailed overview of respondent sample structure is given in Table 2.

Table 2. The structure of respondent sample with regard to gender, grade and area

Sociodemographic characteristics of respondents		N	%
Gender	boys	177	45,5
	girls	212	54,5
	TOTAL	389	100
Grade	5th	84	21,6
	6th	104	26,7
	7th	78	20,1
	8th	123	31,6
	TOTAL	389	100

4 Since 3rd Primary School Varaždin is located on the edge of town and that its students live in the nearby suburbs, in this paper it was classified as a rural school.

5 In this research the students assessed only female teachers.

School	Brezovica Primary School	106	27,2
	Sveti Petar Orehovec Primary School	145	37,3
	3rd Primary School Varaždin	138	35,5
	TOTAL	389	100
Area in which the school is located	Rural area (Sveti Petar Orehovec Primary School and 3rd Primary School Varaždin)	283	72,8
	Urbanarea (BrezovicaPrimary School)	106	27,2
	TOTAL	389	100

RESULTS AND DISCUSSION

STUDENTS' ASSESSMENT OF THEIR NATURE/BIOLOGY TEACHERS' QUALITIES

Table 3 presents descriptive statistics of the particles in *TheQuestionnaire on Nature/Biology Teachers' Qualities*.

Table 3. Descriptive statistics of the particles in *TheQuestionnaire on Nature/Biology Teachers' Qualities*

Particles	**M**	**SD**
The teacher respects students.	4,67	,039
The teacher helps students with their work.	4,66	,034
The teacher presents the teaching content in a clear, understandable and interesting way.	4,61	,038
The teacher's explanations and instructions are clear and easy to understand.	4,59	,040
The teacher stresses the important parts of the teaching content and draws attention to the basic biological concepts and processes.	4,59	,041
The teacher encourages students to think and correlate the new content knowledge in biology with the previously acquired knowledge.	4,58	,039
The teacher shows respect for students' ideas and helps them develop these ideas.	4,58	,042
The teacher uses diverse activities to improve the learning process.	4,56	,043
The teacher is easy to communicate with.	4,55	,039
The teacher has a friendly relationship with students.	4,54	,043
The teacher is fair.	4,54	,041
The teacher believes in students' abilities.	4,53	,041
The teacher is objective.	4,52	,042

The teacher adapts easily.	4,51	,040
The teacher is consistent.	4,48	,042
The teacher uses various methods and forms of teaching to help students understand the teaching content in biology better.	4,48	,045
The students actively participate in the teaching process.	4,47	,044
The teaching materials and aids are used well.	4,46	,043
The teacher's behaviour is confident, relaxed and increases interest in lessons.	4,45	,046
The teacher encourages students' interest.	4,43	,044
The teacher organizes the learning process in such a way as to teach students to learn independently, to investigate and solve problems in biology.	4,41	,045
The teacher's questions are diverse and are directed to many students.	4,39	,043
The teacher is in a good mood.	4,33	,048
The teacher controls his/her emotions.	4,28	,049
The teacher organizes and encourages group work and pair work during the lesson.	4,25	,051

When the table is analysed, it can be seen that students assess positively the qualities of their nature/biology teachers, but in order to obtain a detailed assessment, factor analysis was performed via principal components analysis, applying the Guttman-Kaiser criterion and varimax rotation. In data analysis three factors were extracted which have characteristic root larger than one (the Guttman-Kaiser criterion) and which, together, explain 53,95% of variance. It should be mentioned that both the highest and lowest result values for all particles were in a range from 1 to 5. Table 4 shows the factor structure matrix of nature/biology teachers' qualities.

Table 4. The factor structure matrix

Factors and particles	**Factor saturation**		
	1	2	3
TEACHERS' PERSONAL (HUMAN) QUALITIES			
The teacher is easy to communicate with.	**,749**		
The teacher has a friendly relationship with students.	**,721**		
The teacher encourages students' interest.	**,654**		
The teacher helps students with their work.	**,646**		
The teacher's behaviour is confident, relaxed and increases interest in lessons.	**,632**	,441	
The teacher respects students.	**,620**	,478	

The teacher is in a good mood.	**,620**	,477	
The teacher shows respect for students' ideas and helps them develop these ideas.	**,501**	,440	,398
The teacher is consistent.	**,465**	,433	
TEACHER – STUDENT COMMUNICATION AND RAPPORT			
The teacher presents the teaching content in a clear, understandable and interesting way.		**,710**	
The teacher's explanations and instructions are clear and easy to understand.		**,665**	
The teacher's questions are diverse and are directed to many students.		**,644**	
The teacher is fair.	,482	**,569**	
The teacher controls his/her emotions.		**,543**	
The teacher believes in students' abilities.	,406	**,501**	
The teacher adapts easily.	,372	**,492**	,304
The teacher is objective.	,317	**,433**	,358
TEACHERS' PEDAGOGICAL (TEACHING) QUALITIES			
The teacher organizes and encourages group work and pair work during the lesson.			**,749**
The teacher uses diverse activities to improve the learning process.			**,691**
The teaching materials and aids are used well.			**,640**
The students actively participate in the teaching process.			**,636**
The teacher uses various methods and forms of teaching to help students understand the teaching content in nature/biology better.		,465	**,610**
The teacher organizes the learning process in such a way as to teach students to learn independently, to investigate and solve problems in nature/biology.	,317		**,556**
The teacher stresses the important parts of the teaching content and draws attention to the basic biological concepts and processes.	,387		**,452**
The teacher encourages students to think and correlate the new content knowledge in nature/biology with the previously acquired knowledge.		,604	**,394**

As can be seen in Table 4, the obtained factors could best be described as personal (human) and pedagogical (teaching) qualities of teachers, as well as communication and rapport with students. The reliability of the obtained subscales, which was checked with the Cronbach's alpha reliability coefficient, is satisfactory. Reliability for the particles relating to the factor *personal (human) qualities of the teacher* is ,902. The particles relating to the factor *teacher-student communication and rapport* have reliability value of ,852, while the reliability of the factor pedagogical (teaching) qualities of the teacher is ,838.

EXAMINING THE DIFFERENCE IN THE STUDENTS' ASSESSMENT OF NATURE/ BIOLOGY TEACHERS' QUALITIES

One of the aims of this research was to examine if there are statistically significant differences in students' assessment of nature/biology teachers' qualities in regard to gender, grade and area in which the school is located.

DIFFERENCES IN THE STUDENTS' ASSESSMENT WITH REGARD TO THEIR GENDER

The normality of variable distribution was tested with the Kolmogorov-Smirnov test which showed that distribution on all variables was significantly different from normal ($p \leq 0.05$), so non-parametric tests were used. In order to determine if there was statistically significant difference in students' assessment of nature/biology teachers' qualities with regard to gender, the Man-Whitney U-test was performed (Table 5).

Table 5. The Mann-Whitney U-test of differences in students' assessment of nature/ biology teachers' qualities and the mean value of ranks with regard to gender

Factors	Gender	N	M rank	Σ rank	Mann -Whitney	Z	p
Teachers' personal (human) qualities	F	212	210,94	44718,50	15835,50	-3,095	,002
	M	177	175,91	31136,50			
Teacher-student communication and rapport	F	212	210,89	44709,00	15393,00	-3,079	,002
	M	177	175,97	31146,00			
Teachers' pedagogical (teaching) qualities	F	212	211,00	44732,00	15370,00	-3,098	,002
	M	177	175,84	31123,00			

Results analysis showed that there is a statistically significant difference in the assessment given by boys and girls of teachers' personal (human) qualities, teacher-student communication and rapport and teachers' pedagogical (teaching) qualities. Female students tend to assess in a more positive way personal (human) and pedagogical (teaching) qualities of nature/biology teachers, as well as communication and rapport with these teachers. The obtained results have been obtained in line with research carried out by She and Fisher (2002), in which female students assessed some qualities (understanding the students and friendly relationship with them) and behaviour of their biology and physics teachers in a more positive way than male students. Also, it was revealed that male students believed that teachers controlled them more. Goh and Fraser (1996) also found that female students rated more positively the teacher's interpersonal behaviour (understanding and helping students, having friendly relationship with them), and more negatively the bad teacher's behaviour (teacher's insecurity, discontent and warning students).

DIFFERENCES IN THE STUDENTS' ASSESSMENT WITH REGARD TO THEIR GRADE

In order to determine if there were any statistically significant differences in the students' assessment of nature/biology teachers' qualities with regard to the grade they were attending, the Kruskal-Wallis test was performed (Table 6).

Table 6. The Kruskal-Wallis test of differences in students' assessment of nature/biology teachers' qualities and the mean value of ranks with regard to the grade the students were in

Factors	Grade	N	M rank	χ^2	df	p
Teachers' personal (human) qualities	5th	84	210,74	5,985	3	,112
	6th	104	178,62			
	7th	78	210,76			
	8th	123	188,11			
Teacher-student communication and rapport	5th	84	205,46	1,376	3	,711
	6th	104	187,46			
	7th	78	198,42			
	8th	123	192,07			
Teachers' pedagogical (teaching) qualities	5th	84	197,80	7,161	3	,067
	6th	104	206,25			
	7th	78	210,65			
	8th	123	173,65			

The analysis of the results shows that students, regardless of the grade they were in, assess the nature/biology teachers' qualities more or less in the same way, which is positive. On the other hand, the obtained results differ from the results of research conducted by Prokop, Tuncer and Chuda (2007) on a sample of 655 Slovakian students. In this research, statistically significant differences were found in students' attitudes to biology teachers with regard to their grade. Fifth-, sixth- and ninth-grade students had statistically more positive attitudes to biology teachers in comparison with seventh- and eighth-grade students. In research carried out by She and Fisher (2002) on a sample of Chinese (N=1,138) and Australian (N=307) students in seventh, eighth and ninth grades, statistically significant differences were determined in students' attitudes to biology/physics teachers with regard to their grade.

DIFFERENCES IN THE STUDENTS' ASSESSMENT WITH REGARD TO THE AREA IN WHICH THE SCHOOL IS LOCATED (URBAN/RURAL SCHOOL)

In order to determine statistically significant differences in students' assessment of nature/biology teachers' qualities with regard to the area in which the school is located (rural/urban), the Mann-Whitney U-test was performed (Table 7).

Table 7. The Mann-Whitney U-test of differences in students' assessment of nature/biology teachers' qualities and the mean value of ranks with regard to the area in which the school is located

Factors	Location	N	M rank	Σ ranks	Mann-Whitney	Z	p
Teachers' personal (human) qualities	rural	283	194,65	55085,50	14899,50	-,102	,919
	urban	106	195,94	20769,50			
Teacher-student communication and rapport	rural	283	192,12	54370,50	14184,50	-,833	,405
	urban	106	202,68	21484,50			
Teachers' pedagogical (teaching) qualities	rural	283	214,33	60654,00	9530,00	-5,586	,000
	urban	106	143,41	15201,00			

As has already been mentioned, various factors in urban schools, including the teachers' expertise, are of better quality than in rural schools (McEwan, 1999; Jackson, 2009; Adams, 2012). However, the results obtained in this research indicate the opposite, since students in rural schools statistically more significantly assess the pedagogical (teaching) qualities of nature/biology teachers in comparison with students in urban schools. That is in line with the claims of Treagust and Treagust (2004), who found that stronger internal factors (the teacher's previous knowledge, beliefs and characteristics) of teachers who teach natural sciences subjects in rural schools have influence on the improved quality of the teaching practice in the area of natural sciences. Therefore, although urban schools have better material resources, a competent and quality teacher with great pedagogical skills can compensate for the lack of those material resources in rural schools.

STUDENTS' ANSWERS TO OPEN-ENDED QUESTIONS

Research carried out so far has shown that teachers have a more positive assessment of their own work, qualities and behaviour than students do (Fraser, 1998; Fisher and Rickards, 2000;She and Fisher, 2002). All good teachers try to evaluate their own work, so one of more objective ways to do so is feedback given by students. Feedback helps teachers identify the areas of work they could change and/or improve, and it can also highlight problems or flaws that the teachers failed to notice or were not even aware of.

One section of research deals with the open-ended question: *In your opinion, what could the teacher do to improve his/her work?* Only 17,48% of students were completely satisfied with their nature/biology teacher's work. Other students' remarks were related to personal (human) qualities of their teachers (such as her mood and behaviour, rapport with students) and pedagogical (teaching) qualities (such as class management, discipline, teaching methods, strategies and aids she uses, organization of classroom activities, examination, presentation).

The most frequent students' observations were: it is necessary to have more practical work in the classroom, such as research, using microscopes, making posters, herbariums, projects, presentations (N=27); lessons should include more pair work and group work (N=25) and more fieldwork and outdoor teaching (N=18) and more visual and audiovisual media such as animated films, presentations, short videos, films related to the teaching content, documentaries, etc. (N=14); more learning through play, such as quizzes for revision of the material before the test (N=14); presentation of new knowledge in a clear way which is easy to understand (N=14); the teacher should be funnier, that is, have more sense of humour (N=12).

Students' answers call for the necessary modernization of nature/biology instruction, and suggest that in the process of knowledge acquisition active learning strategies should be emphasized; that is, those methods which involve intense and diverse forms of students' engagement and participation in various methods which emphasize learning by doing and active learning (Matijević and Radovanović, 2011). Despite the fact that by watching multimedia materials students still learn in a passive way, even that kind of knowledge acquisition is better than pure reception of verbal messages transferred in frontal instruction, which is supported by students' observations. Also, play is an extremely important aspect of children's lives, so it is logical that many students would like to have more play in the teaching process. Play is a teaching strategy whose pedagogical sense lies in knowledge acquisition, development of abilities and taking responsibility for one's own work (Bognar and Matijević, 2002: 403). Furthermore, in this kind of teaching strategy, which enables the achievement of important educational goals, students are expected to participate actively in sensory, expressive, intellectual or practical activities. Unlike in other teaching strategies, play can be repeated several times with satisfactory motivation and concentration level of students (Matijević and Radovanović, 2011: 130).

Apart from the need for greater student engagement in classes, students also stressed the need for more social interaction in nature/biology classes, in forms of pair work and group work. Marušić (2006) carried out research on a sample of 2,674 eighth graders in which she examined the rate of active participation of Croatian students in classes. It was determined that about 62% of students most frequently participate in discussions with other students in classes and that the same percentage of students interact and cooperate with other students in the teaching process. However, the following results indicate the passivity of Croatian students in classes: more than 56% of students very often take notes while the teacher speaks; more than 50% claim they rarely participate in group discussions with the teacher; more than 60% of students rarely or never write down their comments, observations and reports, which indicates a low level of engagement in activities which involve various forms of independent work and expression; more than 80% of students never or rarely take part in fieldwork; 75% of students have never or rarely presented a part of the teaching content in classes; more than two thirds never or rarely make posters, objects or pictures; almost 50% of students rarely, and 20% never ask questions about the teaching content during classes; more than 50% of students never

or rarely express their ideas or thoughts and discuss them; more than 60% of students never or rarely solve problems related to the teaching content, and more than 60% of students rarely or never revises the materials they have already covered. According to these results, Marušić (*ibid*, 202-204) concludes that more than 40% of Croatian students are passive during the teaching process.

The most reliable sources of knowledge are the primary ones, especially in the area of natural sciences subjects. Bezić (1984) stressed the importance of outdoor nature/biology lessons and fieldwork in primary school. He also pointed out that learning of nature/biology content knowledge should be taking place outside the classroom. Therefore, the experience students gain in their immediate surroundings and participation in related activities are important motivating factors which also increase both students' and teachers' interest in learning/teaching (Bognar and Matijević, 2002). Matijević (1994: 16) pointed out that humour should be an integral component of everyday activities, both for teachers and students, since it increases motivation level, enriches communication, relaxes students and creates a pleasant work environment. Further on, according to Kyriacou (2001) and Strugar (1993), the way the teacher explains the teaching content is one of the fundamental pedagogical qualities. In order for the teacher to successfully transfer the content knowledge to students and that they could understand what the teacher is explaining, his/her explanations need to be appropriate for children, so it is not surprising that students remarked that their nature/biology teachers should be more competent in explaining the new teaching content.

Apart from this, seven students observed that the teachers should ask fewer logical questions and ask easier ones when students have oral exams, and explain things more slowly. Six students observed the teacher should be in a better mood. Five students observed that the teacher should shout at them less frequently and laugh more often, and reward students by allowing them to go outside to play football/basketball, and that students should write less during the lesson. Four students observed that the teacher should have fewer oral exams in lessons, be more friendly, be more fair when grading students, help students more in lessons, speak more loudly when she explains something, be less strict, that both the teacher and lessons should be more interesting and that homework should be reduced or abolished. Three students observed that the teacher should not have mood swings, that she should control her feelings, be more calm and relaxed, and notify students in advance when they will be examined. Two students observed that the teacher should leave her personal problems at home, have more understanding for students and respect them more, have workshops, be objective and fair to all students, provide more interesting facts when teaching, talk less so students could discuss certain topics with her during lessons. One student observed that students should choose the activities themselves, that the teacher should give students more time to think about the answers during oral exams, that tests should contain the questions listed in students' book, that tests should not contain tricky questions and facts allegedly mentioned in the class, that short tests should be reintroduced, that

the teacher should give more information in her presentations, that the teacher should thrill the students with her work, be more serious in her work, give them more worksheets, always do what she says she will do, encourage students to study more, write the new content in a more comprehensive way, pick different students to answer her questions, talk to students more and be more interested in their questions, ask for their opinion more often, explain the new knowledge first so they could write it down in their notebooks and revise it at the beginning of a new lesson. There were also students who had different requests: the teacher should punish and write down the names of those students who talk during the lesson and give them bad marks; she should conduct more oral exams; she should not give bad grades; she should abolish oral exams; she should give students more excellent grades and ask them to use the microscope less frequently.

CONCLUSION

Every teacher should be aware of his/her responsibility for the quality of the teaching process that can be achieved through two-way communication, belief in students' abilities, positive pedagogical environment and cooperation. The teacher should be perceived as a person of trust, should respect the students, be consistent, set clear rules and have authority in the classroom. A quality teacher regularly attends various forms of professional development, introduces innovative teaching methods suited to students' needs in order to achieve the set goal; builds great rapport with students, based on honesty, empathy, listening, guidance, discipline and responsibility, and never on coercion or punishments. If students are satisfied with the teacher and if they work in a pleasant environment, they invest more effort in studying and in that way they have more opportunities to achieve better results. That precisely is the ultimate goal of education, and indicates that the teacher's task has been fulfilled.

The results of this research confirm that students assess their nature/biology teachers' qualities positively, which shows the teacher that students accept her as a person and that they also appreciate her work. The identified statistically significant differences in students' assessment with regard to gender are in line with the existing body of research. On the other hand, this research did not confirm the results of the previously conducted research which indicate differences in students' assessment of nature/biology teachers' qualities with regard to the grade students are in. Furthermore, it is necessary to conduct further research in order to determine the reasons for differences in students' assessment of nature/biology teachers' qualities with regard to the area in which the school is located (urban/rural).

Therefore, it is necessary that the teacher possesses the qualities which will cater for individual needs of all students. That is why Strugar (1999: 407) emphasizes that if the teacher does not have certain character traits and lacks understanding for students, even the best teaching materials and aids will not be of much use, since the mentioned qualities are a "key to successful curriculum implementation."

LITERATURE

1. Adams, J. H. (2012). Identifying the Attributes of Effective Rural Teachers: Teacher Attributes and Mathematics Achievement among Rural Primary School Students in Northwest China (work document). *Gansu Survey of Children and Families*, 1-37.
2. Armstrong, T. (2006). *Višestruke inteligencije u razredu.* Zagreb: Educa.
3. Barber, M. and Mourshed, M. (2007). *How the world's best-performing school systems come out on top*: McKinsey & Company. /online/. Retrieved on 9th March 2018 from: https://www.mckinsey.com/industries/social-sector/our-insights/how-the-worlds-best-performing-school-systems-come-out-on-top
4. Bašić, S. (1999). Odgoj. In: A. Mijatović (ed.), *Osnove suvremene pedagogije* (pp. 175-201). Zagreb: Hrvatski pedagoško književni zbor.
5. Bašić, S. (2015). Svrha i osnovna obilježja pedagoškog odnosa. In: S. Opić, V. Bilić and M. Jurčić (ed.), *Odgoj u školi* (pp. 11-41). Zagreb: Učiteljski fakultet Sveučilišta u Zagrebu.
6. Bezić, I. (1984). *Metodika prirode i društva.* Zagreb: Školska knjiga.
7. Bilić, V. (2000). Nastavnikov utjecaj na učenikovo školsko postignuće. *Napredak,* 141 (1): 54-65.
8. Bognar, L. and Matijević, M. (2002). *Didaktika.* Zagreb: Školska knjiga.
9. Bratanić, M. (2002). *Paradoks odgoja.* Zagreb: Hrvatska sveučilišna naklada.
10. Brophy, J. (1986). Teacher influences on student achievements. *American Psychologist,* 41 (10): 1069-1077.
11. Darling-Hammond, L. (2007). The Flat Earth and Education: How America's Commitment to Equity will Determine Our Future. *Educational Researcher,* 36 (6): 318-334.
12. Dawson, C. (2000). Upper primary boys' and girls' interests in science: have they changed since 1980? *International Journal of Science Education,* 22 (6): 557-570.
13. Đorđević, B. and Đorđević, J. (1988). *Učenici o svojstvima nastavnika.* Beograd: Prosveta.
14. Europska komisija (2011). *Prirodoslovno obrazovanje u Europi: Nacionalne politike, prakse i istraživanja*. Bruxelles: Eurydice. /online/. Retrieved on 10thMai 2018 from: https://www.scribd.com/document/357771325/Prirodoslovno-Obrazovanje-u-Evropi
15. Evertson, C. M., Emmer, E. T., Clements, B. S., Sanford, J. P. and Worsham, J. E. (1984). *Classroom management for elementary teachers*. Englewood Cliffs. New Jersey: Prentice-Hall.
16. Fisher, D. L., Fraser, B. J. and Rickards, T. (1997). *Gender and cultural differences in teacher-student interpersonal behaviour*. /online/. Retrieved on 28th November 2017 from: https://files.eric.ed.gov/fulltext/ED407400.pdf
17. Fisher, D. L.and Rickards, T. (2000). Teacher-student interpersonal behaviour as perceived by science teachers and their students. In: D. L. Fisher, J. and H. Yang (ed.), Proceedings of the Second International Conference on Science, Mathematics and

Technology Education (pp. 391-398). Perth: Curtin University of Technology.
18. Francis, L. J. and Greer, J. E. (1999). Attitude toward science among secondary school pupils in Northern Ireland: relationship with sex, age and religion. *Research in Science and Technological Education,* 17 (1): 67-74.
19. Fraser, B. J. (1998). Science learning environments: Assessment, effects and determinants. U: B. J. Fraser i K. G. Tobin (ur.), International handbook of science education (str. 527-564). Dordrecht: Kluwer.
20. Fraser, B. J., Giddings, G. J. and McRobbie, C. J. (1995). Evolution, validation and application of a personal form of an instrument for assessing science laboratory classroom environments. *Journal of Research in Science Teaching,* 32:399-422.
21. Glasser, W. (1999). *Nastavnik u kvalitetnoj školi.* Zagreb: Educa.
22. Goh, S. C. and Fraser, B. J. (1996). Validation of an elementary school version of the questionnaire on teacher interaction. *Psychological Reports,* 79: 515-522.
23. Hanushek, E. A., Kain, J. and Rivkin, S. G. (2004). Why Publics Schools Lose Teachers. *Journal of Human Resources,* 39: 326-354.
24. Hanushek, E. A. and Rivkin, S. G. (2010). Generalizations about using value-added measures of teacher quality. *American Economic Review,*100 (2): 267–271.
25. Henderson, D., Fisher, D. and Fraser, B. J. (2000). Interpersonal behaviour, learning environments and student outcomes in senior biology classes. *Journal of Research in Science Teaching,* 37: 26-43.
26. Hussaini, I., Foong, L. M. and Kamar, Y. (2015). Attitudes of Secondary School Students towards Biology as a School Subject in Birninkebbi Metropolis, Nigeria. *International Journal of Research and Review*, 2 (10): 596-600.
27. Ilić, I., Ištvanić, I., Letica, J., Sirovatka, G. and Vican, D. (2012). *Upravljanje razredom.* Zagreb: Agencija za strukovno obrazovanje i obrazovanje odraslih u suradnji s British Councilom.
28. Jackson, C. K. (2009). Student Demographics, Teacher Sorting, and Teacher Quality: Evidence From the End of School Desegregation. *Journal of Labor Economics,* 27 (2): 213-256.
29. Jones, M. G., Howe, A. and Rua, M. J. (2000). Gender differences in students' experiences, interests, and attitudes toward science and scientists. *Science Education,* 84(2): 180-192.
30. Kearney, P., Plax, T. G., Hays, E. R. and Ivey, M. J. (1991). College teacher misbehaviors: what students don't like about what teachers say and do. *Communication Quarterly,* 39 (4): 325–340.
31. Keeves, J. and Kotte, D. (1992). Disparities between the sexes in science education: 1970-84. In: J. Keeves (ed.), *The IEA study of science III* (pp. 141-164). New York: Pergamon.
32. Kim, H., Fisher, D. and Fraser, B. J. (2000). Classroom environment and teacher interpersonal behaviour in secondary science classes in Korea. *Evaluation and Research in Education,* 14: 3–22.
33. Kyriacou, C. (2001). *Temeljna nastavna umijeća.* Zagreb: Educa.
34. Kvaščev, R. (1980). *Podsticanje i sputavanje stvaralačkog ponašanja ličnosti*.

Sarajevo: Svjetlost.
35. Lankford, H., Loeb, S. and Wyckoff, J. (2002). Teacher sorting and the plight of urban schools: A descriptive analysis. *Educational Evaluation and Policy Analysis,* 24: 37–62.
36. Marušić, I. (2006). Nastavni programi iz perspektive učenika. In: B. Baranović (ed.), Nacionalni kurikulum za obvezno obrazovanje u Hrvatskoj: Različite perspektive (pp. 181-217). Zagreb: Institut za društvena istraživanja u Zagrebu.
37. Matijević, M. (1994). *Humor u nastavi: Pedagoška i metodička analiza.* Zagreb: UNA-MTV.
38. Matijević, M. (2016). Načela, strategije i metode odgoja. In: M. Matijević, V. Bilić and S. Opić (ed.), *Pedagogija za učitelje i nastavnike* (pp. 150-181). Zagreb: Školska knjiga.
39. Matijević, M. and Radovanović, D. (2011). *Nastava usmjerena na učenika*. Zagreb: Školske novine.
40. McCombs, B. L., Daniels, D. H. and Perry, K. E. (2008). Childrens' and teachers' perceptions of learner-centered practices and student motivation: implications for early schooling. *Elementary School Journal,* 109: 16-35.
41. McEwan, P. (1999). Recruitment of rural teachers in developing countries: an economic analysis. *Teaching and Teacher Education*, 15: 849-859.
42. McGregor Petgrave, D. M. (2006). *Professional development strategies for teaching urban biology teachers to use concept maps effectively* (*Doktorska disertacija*). Walden University.
43. Meece, J. L., Herman, P. and McCombs, B. L. (2003). Relations of learner-centered teaching practices to adolescents' achievement goals. *International Journal of Educational Research,* 39: 457-475.
44. Nastavni plan i program za osnovnu školu (2006). Zagreb: Ministarstvo znanosti, obrazovanja i športa.
45. Osborne, J., Simon S. and Collins S. (2003). Attitudes towards science: a review of the literature and its implications. *International Journal of Science Education*, 25 (9): 1049–1079.
46. Paine, L. (1998). *Making Schools Modern: Paradoxes of Educational Reform.* In: A. Walder (ed.), *Zouping in Transition: The Process of Reform in Rural North China. Cambridge* (pp. 205-236). MA: Harvard University Press.
47. Pastuović, N. (1997). *Osnove psihologije obrazovanja i odgoja.* Zagreb: Znamen.
48. Polić, M. (1997). *Čovjek-odgoj-svijet: malafilozofijskoodgojna razložba.* Zagreb: Kruzak.
49. Preston, J. P. (2006). *Rural and Urban Teaching Experiences Of Eight Prairie Teachers*. /online/. Retrieved on 17th January 2018 from: https://ecommons.usask.ca/bitstream/handle/10388/etd-10042006120930/THESIS. pdf? sequence=1&isAllowed=y
50. Prokop, P., Tuncer, G. and Chuda, J. (2007). Slovakian Students' Attitude toward Biology. Eurasia*. Journal of Mathematics, Science & Technology Education,* 3*:* 287-295.
51. Ramsden J. M. (1998). Mission impossible? Can anything be done about attitudes to science? *International Journal of Science Education*, 20 (2): 125–137.
52. Rawnsley, D. and Fisher, D. (1997). Teacher–student relationships: Do they affect

student outcomes? *EQ Australia*, 3: 34–35.
53. Reeve, J. and Jang, H. (2006). What Teachers Say and Do to Support Students' Autonomy During a Learning Activity. *Journal of Educational Psychology,* 98 (1): 209-218.
54. Schmitz, E., Voreck, P., Hermann, K. i Rutzinger, E. (2006). *Positives und negatives Lehrerverhalten aus Schülersicht*./online/. Retrieved on 9th January 2018 from: http://www.lernen-ohne-angst.de/indexateien/positivesundnegativeslehrerverhalten. pdf
55. Schreiner, C. and Sjøberg, S. (2004). *Sowing the seeds of ROSE. Background, Rationale, Questionnaire Development and Data Collection for ROSE (The Relevance of Science Education) - a comparative study of students' views of science and science education* (Acta Didactica 4/2004). Oslo: Dept. of Teacher Education and School Development, University of Oslo.
56. She, H. C. and Fisher, D. (2002). Teacher communication behavior and its association with students's cognitive and attitudinal outcomes in science in Taiwan. *Journal of Research in Science Teaching*, 39: 63-78.
57. Spall, K., Stanisstreet, M., Dickson, D. and Boyes, E. (2004). Development od school students' constructions of biology and physics. *International Journal of Science Education*. 26(7): 787-803.
58. Stark, R. and Gray, D. (1999). Gender preferences in learning science. *International Journal of Science Education*, 21 (6): 633-643.
59. Strugar, V. (1991). *Opće i pedagoške osobine nastavnika kao determinante efikasnosti obrazovanja (Doktorska disertacija)*. Rijeka: Pedagoški fakultet.
60. Strugar, V. (1993). *Biti učitelj.* Zagreb: Hrvatski pedagoško-književni zbor.
61. Strugar, V. (1999). Učitelj – temeljni nositelj sustava odgoja i obrazovanja. In: A. Mijatović (ed.), *Osnove suvremene pedagogije* (pp. 401-421). Zagreb: Hrvatski pedagoško-književni zbor.
62. Strugar, V. (2014). *Učitelj između stvarnosti i nade*. Zagreb: Alfa.
63. Šimunović, Z. (2012). Poželjne osobine učitelja nastave instrumenta u glazbenoj školi. *Život i škola,* 58(1): 167-176.
64. Todd, P. E. and Wolpin, K. I. (2003). On the specification and estimation of the production function for cognitive achievement. *The Economic Journal*, 113 (485): F3–F33.
65. Treagust, W. and Treagust, D. F. (2004). An Investigation of Science Teaching Practices in Indonesian Rural Secondary Schools. *Research in Science Education,* 34: 455-474.
66. Vukasović, A. (1990). *Pedagogija.* Samobor: Zagreb.