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BIOLOGY AND CHEMISTRY TEACHERS ATTITUDES TOWARD EDUCATION FOR PUPILS EVALUATION

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ABSTRACT

The main task was to explore attitudes and opinions considering pupil's evaluation. The research was conducted on a sample of 220 biology and chemistry elementary and high school teachers in Croatia. A survey was constructed by closed, open questions and Likert scale. Teacher involved in research were those who graduated teacher education as well as those who finished science education and later where involved in course of psychological- pedagogical subjects. Purpose was to established teacher's attitudes about quality of their education for pupil's evaluation and assessment. Examinees think that during education they aren't well prepared for evaluation and assessment. They are not satisfied with content and method of teaching (frontal work) during qualification. Course content didn't fulfil their expectations and majority of examined teachers think that they are not well prepared for everyday teaching challenges. The results have shown that there is no significant difference in disappointment between teacher who graduated teacher education and those who later finished short course of psychological - pedagogical subjects.

Keywords: *teacher, methodology of educational activities, biology, chemistry, evaluation, quality*

RESEARCH GOAL

The paper partially analyses results of a larger research of teachers' evaluation system as an educational part of the teaching, ways of monitoring and evaluating pupils and teachers' opinion on their own evaluation competence. Paper also shows teachers' opinion of the quality of their education for the earlier mentioned tasks, which are the most common forms of verification, and what kind of knowledge was evaluated during the training sessions for teachers.

METHODS

Data were collected by an anonymous questionnaire constructed for the purpose of this research, which contained questions of closed and semi-open type and Likert scale. The survey was conducted during 2008 and 2009. One year before the study, a calibration test of 40 subjects was conducted. The reliability test (Cronbach's Alpha) for the whole survey is 0.749. When first 8 variables, which questioning the general data (gender, years of service, etc.), were left aside the result for the reliability test is even better: 0.762.

There were 220 (208 female) who participated the study. There were 208 female teachers and 12 male teachers. The teachers were informed of the purpose of the research and the anonymity was guaranteed. Most participants have 11 to 20 years of experience (27.3%). The most participants in the study were teachers of biology and chemistry (76), biology (71) and chemistry (65 participants). There were eight teachers teaching some subjects similar to biology or chemistry.

Majority of teachers work in an elementary school (125) and grammar school (55) while the rest of teachers (40) work in a vocational high school such as medical, economic or industrial high school.

Most of the teachers have Master degree in Education (187) while 30 of them have a Bachelor degree. Three of the participants have high school education (one of them works in elementary school, two works in high school - teaching chemistry (1) and biology (1)). The most of teachers with Bachelor degree are biology teachers, 13, of which 12 teachers have 30 years of experience. Most of the teachers (79.1%) have a teaching qualification, 10% have a mentorship and 10.9% of counselors (higher degrees of vocation). Relatively high percentage of mentor and counselor teachers is a result of the fact that a good part of the survey questionnaire was collected at the State biology and chemistry competitions and at professional conferences for the same subjects. Of the 220 respondents, 72% completed education for biology and/or chemistry teachers (Master of Education, MOE) and 28% completed science education (Master of Science, MOS) and were later involved in course of psychological-pedagogical subjects. Most of the teachers of biology and chemistry completed teacher education (31%), 26 % are biology teachers with teacher education, while the majority of teachers who tutor only chemistry have completed science education (18% of the total number of respondents; 62% of respondents who teach only chemistry attended the pedagogical-psychological group of subjects after their initial education). 41% of participants work in schools in large cities, 43% of them work in urban suburbs or less urban areas while the 16% of participants work in schools in small villages outside the urban or suburban area.

RESULTS AND DISCUSSION

An integral part of the educational process is evaluation and the assessment of knowledge. Pupils are valued from the moment they start their education. Those grades reflect on to their entire lives and are the basis for making various decisions. Schools thus implicitly direct their development and shape their goals. Are the teachers well trained for proper evaluation? The contribution of initial education and supplementary pedagogical education to teacher competencies was evaluated on the Likert scale of five degrees (I strongly disagree - 1; disagree - 2; hesitant - 3; agree - 4; strongly agree - 5). The results were processed by SPSS software program.

In this research, most teachers disagree with the statement that they are well trained in the evaluation of pupils' achievements during the course of their education or are disagreeable (63%). In their research Marinković and Davidović-Mušica (2005) achieved even a lower score: the average value of the teacher for the initial assessment of learning outcomes and student achievements in their research was 2.61, 2.56 employees and the employer's director 2,79.

In a group of teachers who consider themselves to be well trained to value pupils achievements during their education, 9% have 21-30 years of experience and 10% more than 30 years of work experience. Some thirty years ago in Croatia the P*edagogical Academy* and the *Teacher's Training School* (equivalent to today's' Bachelor degree in Education) were active. These results stand in line with of Klapan's (1990) research of the attitudes and opinions of 160 classroom teachers on their practical preparation for the teacher's vocation. Her research has shown that teachers were most satisfied with education in the former teaching schools. Considering their abilities to evaluate pupils' achievements there is no statistically significant difference between teachers who have completed the teacher education and those who have completed science studies, (M_{MOE} = 3,06, M_{MOS}= 2,92, t = 0,822, p = 0,412). T-test variables were treated as an independent sample. Among surveyed teachers, 44% were dissatisfied with the monitoring and evaluation skills (97 out of 158 teachers with Master of Education) and 18% of science (40 out of 61 teachers with Master of Science), which in their groups gave a very

similar percentage of the dissatisfied (61% or 66%). It is interesting that teachers dissatisfied by their qualifications come from those with a university degree, while 10% who comes are satisfied with their ability to evaluate students with secondary or higher qualifications. 58% of teachers disagreed with the statement *'I apply the method of assessment I have learned during education*' or uncertain. In a group that applies the assessment method they have learned during their own education, 12% have more than 21 years of experience and 8% over 30 years. We see that satisfied teachers come from a group of older colleagues again. Teachers with Master of Education and teachers with Master of Science, equally, don't apply the assessment method they learned during the teacher education or in course of psychological-pedagogical subjects.

With the statement, *'the subjects needed for teacher training are very well organized and instructed'* as many as 63% of teachers disagree or are uncertain. The fact that there is no statistically significant difference between trained teachers who have completed the teaching studies and those who subsequently passed the pedagogical-psychological group of subjects (M_{MOE} = 3,12, M_{MOS} = 3,07, t = 0,387, p = 0,699) questions the quality of teaching studies, both in terms of the curriculum of pedagogical subjects and the quality of their performance.

The statement *'subject curriculum has completely met my expectations*' 75% of teachers could not confirm. And in these statements, there is no statistically significant difference between the teachers who have completed the teaching studies and those who have finished the non-teaching studies (M_{MOE}= 2,82, M_{MOS}= 2,84, t = -0,139, p = 0,890).

Even 71% of teachers cannot agree with the statement *'the curriculums needed to train the teachers have prepared me well for the actual situation in the teaching practice'*. About 60% of teachers who disagree with this statement have up to 20 years of experience. 11% of teachers who think that they are well prepared for teaching during their education have more than 30 years of experience. Teachers from both, the teaching and those with supplementary pedagogical education, are thinking the same.

With the statement *'I am very satisfied with the relied content of teaching methodology'* 60% of teachers either disagree or ambivalent. 12% of teachers who agree with this statement have more than 30 years of experience. There is no statistically significant difference between teachers with Master of Education and teachers with Master of Science.

72% of teachers disagree or are indecisive with the statement 'in the subject content of the methodology the area of the evaluation was well represented' (M = 2.75, SD = 1.084). 22 teachers who consider the rating well represented have more than 30 years of experience. There is no statistically significant difference between teachers with the teacher education or with course of psychological-pedagogical subjects (M_{MOE} = 2,78, M_{MOS}= 2,79, t = -0,051, p = 0,959).

The statement 'education for teachers would be more effective if the curriculum of teaching methods is more adapted to actual school work' is supported by 93% of teachers, and with statement that 'education for teachers would be more effective if the curriculum of teaching methods performed differently from frontal, lecture teaching methods' 83% of teachers. Only 1.4% of teachers disagree, and 6% disagree with the statement that teacher education would be more effective if the methodology adapted to actual jobs, of which six have more than 30 years of service. In this statement there is a statistically significant difference between teachers with Master of Education or with Master of Science. Teachers from teacher education are more inclined to adapt teaching curricula and

programs from the teaching methods to actual jobs at school. During the education, the knowledge of subjects required for teacher training was verified by oral examination and written assignments in 75% of respondents. Knowledge of 22% of teachers was tested only by oral examination. There is a statistically significant difference between teachers with teacher education and science education (M_{MOE} = 2,65, M_{MOS} = 2,31, t = 2,726, p = 0,007). Teachers from teaching programs have more often had both ways of examination of knowledge - oral examination and written assignments.

The knowledge of facts is most often checked (36% of respondents), while 33% of respondents claim that four knowledge variables (knowledge of facts, understanding, applying knowledge in known situations and applying knowledge in new, unknown situations) have been checked. There is no statistically significant difference between teachers with teaching and non-teaching education.

Nearly one third (27%) of respondents passed education in the field of teaching methods through *ex-cathedra* form of teaching, 4.5% through group work, 4.0% through individual work, 11.4% through practical teaching, and 53% combination of all or some forms of teaching (mostly frontal teaching and practical work). There is a statistically significant difference between teachers from educational and science studies (M_{MOE} = 3,88, M_{MOS}= 2,90, t = 3,8636, p = 0,000).

The biology and chemistry teachers differ from each other in two statements concerning the way of education during the study. Biology teachers are more often questioned by oral and written lessons, while chemistry teachers are more often asked only by oral examination. Chemistry teachers are largely educated in teaching methods in the frontal form comparing with biology teachers. One fact should not be neglected - a large number of chemistry teachers did not complete their teacher education (62%) but the required qualification for work at school was gained through supplementary pedagogical education (Petričević 1997).

CONCLUSION

Results indicate that teachers don't consider themselves well-trained during their teacher education to monitor and evaluate pupils' achievements. They also resent that the curricula for teacher education do not well prepare teachers for the actual situation in the teaching practice. Similar results were obtained by research carried out by Radeka and Sorić (2005), which showed that teachers are considered well-trained for teaching work but, in their opinion, this is not a merit of teacher education or supplementary pedagogical education but of their additional education after employment organized by professional associations and spontaneous exchange of experiences and managed primarily by personal motives (Radeka, Sorić, 2005a). Participants believe that the methods of evaluation of pupils' achievement are not sufficiently well represented during teacher education as the content of the teaching methodology. The vast majority of teachers do not apply, later in their work, evaluating methods learned during education. This is not surprising since they have not gained much knowledge about evaluation during the study. During the decades, the teaching studies were changed by the years of study (from two to four years, and three to five), by type of subjects and their representation in the curriculum (mostly the number of courses and lessons increased). It seems, however, that older teachers are more satisfied with their pedagogical education than their younger colleagues. Teacher education is basically a contradictory pedagogical model that is required of classroom teachers where the teachers should actively learn, encourage critical thinking, creativity, which they themselves have not experienced in the process of their own education. Teachers were educated mostly through the frontal form of lecture work, passively, and most often had to memorize

the data. Likewise, the experience of evaluating teachers' knowledge during the education of the teaching profession is inconsistent with the new paradigm of knowledge testing. In order for a teacher to effectively connect diagnostic and formative testing, and to cover different situations, the teacher must master the techniques of observation, testing, and description and must have developed skills in planning and organizing such learning situations in which pupils can play the role of active creators of their knowledge. If most educators are not an evaluation literate at the beginning of their teaching work, we can imagine the loss for pupils whose teachers cannot help in developing their achievements; then how can we expect the coordination of internal and external evaluation; how to expect our public to understand the questions related to the assessment an evaluation?

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