

A biology teacher – a second career choice

Učitelj biologije – alternativna izbira poklica

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Abstract. For several years now, Slovenia has been facing a shortfall of interest in science studies. Some argue that the principal reason for this lies with inadequately trained science teachers in primary and secondary schools. We set out to find the reasons why double degree students of biology (Chemistry-Biology or Biology-Home Economics) at the Faculty of Education chose to become biology teachers, and outline certain guidelines for pedagogical work with students. The results of our survey show that the number of secondary school graduates whose first choice is either of the two biology teacher study programmes at the Faculty of Education is declining. Students who selected the programme as their second choice are mainly those who did not have enough credit points for their first options, i.e. medicine, dentistry, biochemistry, veterinary sciences or biology at the Biotechnical Faculty. Most of the students who decide to become biology teachers are female. The main motives are the students' fondness for biology and the desire to work with children. Students (regardless of which study programme they select) have fairly similar views on teaching biology. They believe that teachers should introduce practical work in the classroom, have good relationships with students, and are experts in their field (biology). Students in general did not provide innovative ideas about teaching methods which would not be boring or uninteresting. Their ideas reflect their own experience of teachers, which is why it is important that they are included in work with pupils as early as possible. In this way they can gain their own direct experience of teaching, which helps them to build their own unique idea of what a biology teacher should be. Also highly qualified inservice teachers (mentors) should take part in education of future biology teachers. Inservice teachers could according to functioning of future teachers' in the classroom propose to university teacher trainers what knowledge do those future teachers lack and should gain in a faculty setting. On the basis of this information introductory science courses could be better accommodated to the needs of future teachers.

Keywords. student science teacher, teacher's qualities, good biology teacher

Introduction

For several years now, Slovenia has been facing a shortfall of interest in science studies. This is also shown even through the secondary school students' choices of science subjects at

the school-leaving examination (ZUPANC & al. 2006). Likewise, interest in studying to be a science (biology) teacher has fallen. For example, data obtained from the Registration Office of the University of Ljubljana (VPIS 2008) show that the share of science teacher candidates opting

for Chemistry-Biology or Biology-Home Economics programmes at the Faculty of Education in Ljubljana as their first career choice has been decreasing year by year (VPIS 2008). Most telling is the information about students of Chemistry-Biology, as less than half of the students in the academic years 2004/05, 2005/06 and 2006/07 selected this programme as their first choice. These students are potential candidates for teaching biology subjects at primary-school level (grades six to nine) and in vocational secondary schools.

Teachers in primary schools influence (co-shape) pupils' attitude toward science subjects (LEDERMAN 2008). It is important that a student who chooses to work as a teacher makes this decision intentionally and wilfully (DRAPER 2001) and should also be aware that the position of teachers in society is changing (BEN-PERETZ 2001, ROBINSON & MCMILLAN 2006). Therefore, the motive for science teacher candidates selecting this course as their second career choice should be investigated. CENCIČ (2000) finds that the main motives for students choosing to work as teachers are fondness for teaching, the desire to work with children and various altruistic motives. But some would disagree that these reasons are satisfactory (VILHAR 2005). Some might believe that teachers' intelligence is strongly related to their success in teaching. However, a certain minimal level of intelligence is necessary for effective teaching, but beyond this point, the intelligence of teachers may not be significantly related to pupils' learning outcomes (AUSUBEL & al. 1978, SMITH 2008). The important characteristic of a teacher's effectiveness is their ability to adapt the communication of ideas to the pupil's level of intellectual maturity and degree of sophistication of the subject matter (AUSUBEL & al. 1978). In the article of DEMIRBOLAT (2006) some innovative teacher roles are listed.

Often public opinion is that teachers are one of the key determinants of pupils' interest in certain subject. For example VILHAR (2005) believes that the declining interest in science studies (biology) in Slovenia could be attributed to the present science teachers. This argument could be partly supported by findings of JAPELJ & al. (2005). They found that Slovenian high school students are more interested in studying social sciences than science (e.g. biology and chemistry).

Apparently, the main reasons are that science lessons lack experiments and contents that would be connected to everyday life. Primary school students show negative attitude toward science, too. In order to improve enthusiasm for science and technology among the latter some primary school teachers' joined the Pollen project (POLLEN 2008). The main aim of this project is to stimulate and support inquiry based science education in European primary schools.

Not only Slovenia is facing a shortfall of interest in science studies. For example CRAWFORD (2000, 2007) reports that science teachers in the USA have become acquainted with alternative approaches (NATIONAL RESEARCH COUNCIL 2001) to science teaching so that they could overcome the problem of students' disinterest in science subjects. WELD & FUNK (2005) believe that teachers have to take the step from believing that life sciences should be presented as a compendium of facts driven by a textbook to viewing them as essentially related to learners' lives through active investigation. We believe that future science teachers should also make these steps to overcome traditional-oriented conceptions about teaching science and learning. In Slovenia, some changes have been made to both the process of educating science teachers and science curricula in order to overcome disinterest in science subjects among students. So far, no reform has yielded the expected result – increased interest in science. Other countries face similar problems, stressing that teacher's ideas about subject matter, teaching and learning do not change easily or rapidly, while teachers do not tend to risk changing their own practice, which is rooted in practical knowledge built up over the course of their careers (see VAN DRIEL & al. 2001). Therefore, to avoid these problems, science teacher candidates should gain experience in teaching, collaborating with other teachers, parents, the school system, etc. as early as possible, so that they can learn about the challenges of this occupation. When in practice they should work with highly experienced inservice teacher (mentor) in order to get or to improve teaching skills. PARKER-KATZ & BAY (2008) believe that mentors' experiences, observations, and interpretations are very important in understanding the relationship between teaching and learning and also helping a future teacher to see

this relationship as well. Early work with pupils should give a future teacher adequate experiences to overcome his/her school science experiences. LEDERMAN (2008) states, that a properly trained teacher creates the magic, colours the learning, and resonates with the students.

In order to design guidelines for the education of student science teachers in the field of biology in Slovenia so that they would be able to negotiate the challenges of their profession successfully, we studied the students' motives for their decision to study science subjects (Chemistry–Biology and Biology–Home Economics at the Faculty of Education in Ljubljana). In addition to their decision to become science teachers, we focused on how students see themselves in their future role. On the basis of the data we collected, we propose some guidelines for educating prospective biology teachers in Slovenia.

Method

Participants

In our study we focused primarily on first-year students majoring in Chemistry–Biology and Biology–Home economics at the Faculty of Education in Ljubljana who, after graduating, can teach biology subjects at primary-school level (grades six to nine) and in vocational secondary schools.

The research included students studying in 2000/01, 2001/02, 2002/03, 2004/05 and 2006/07 – a total of 247 student teachers. We did not include students in the academic years 2003/04 in 2005/06 in the research.

Procedure

Before the beginning of lectures on the Methodology of biology education, the first-year students of Chemistry–Biology and Biology–Home economics were asked to complete a questionnaire about (1) the reasons that had led them to take these courses, (2) the qualities of a good biology teacher, and (3) how they see themselves in the role of a biology teacher, which ensured that their answers were not influenced by the lectures. The questions were open-ended, in order not to restrict or guide responses in any way. The reason

for this was to obtain a realistic image of students' decisions to study biology. Participants were told that there was no right or wrong answer, but that the focus was on their beliefs, and that their answers should reflect their beliefs as succinctly as possible, and that the length of their responses was up to them (HARITOS 2004). Students were also asked to indicate their age and gender. The questionnaire was anonymous.

We sorted students' answers, following IVANUŠ GRMEK & JAVORNIK KREČIČ (2005), into the following categories: **altruistic reasons** (*I wish to work with children; I wanted to become a teacher; I like children.*); **material reasons** (*attractive working conditions: holidays, opportunities for further education, seminars, salary*); **alternative reasons** (*It's a coincidence that I'm studying this; I couldn't take the course I wanted to*); **reasons of self-fulfilment** (*As a teacher I will be able to use all my abilities; I will be a model for children and young people.*); and **personal aspirations and stereotypes** (*It means a lot to me to have this level of education; Teaching is a woman's profession; I come from a family of teachers.*). We added two additional categories: **fondness for biology** (*I like biology.*) and **teacher's influence** (*My biology teacher inspired me.*).

We arranged the answers to the questions "What makes a good biology teacher?" and "How do you see yourself in the role of a teacher?" in the following categories: **relationship to nature and organisms** (*a person who loves nature, who likes plants and animals, who 'breathes' with nature, etc.*); **professional commitment** (*wholeheartedly committed to the profession, enjoys work, lives for his/her profession, etc.*); **personal characteristics** (*kind, interesting, fun, happy, has a sense of humour, strict, but not too strict, consistent, ambitious, etc.*); **expertise** (*knows a lot, proficient in his/her subject, discusses current topics, very experienced, etc.*); **teaching proficiency** (*teaches a great deal, gives students a lot of general knowledge, arouses students' interest in living organisms, his/her students are successful in competitions and national examinations, etc.*); **relationship to children** (*has a great feeling for working with children, listens to pupils, pupils can trust him/her, they are not afraid of him/her, always prepared to assist or help his/her pupils, considers his/her pupils' needs, etc.*); **teaching**

approaches (*explains well, includes practical work in the classroom, works with concrete materials, etc.*)

We analysed all data with SigmaStat, Version 3.1. Since the research included more females than males, we did not make comparisons according to gender.

Results and Discussion

Gender of science teacher candidates

Since the mid-1990s, concern has been expressed about the feminisation of the labour force in teaching. Some experts argue that in recent years the number of male students interested in becoming teachers has decreased (WHITE & al. 2006). Our data support these findings, in all academic years included in the research, only 8% of the 247 science teacher candidates were male, compared to the 92% share of female students (Tab. 1). This may signal that this occupation has become less attractive to men because of greater potential earnings or status in other comparable professions (WYLIE 2000). However, ROTS & al. (2002), find that society does not seem to perceive the growing number of female teachers as a problem for the quality of education. Their findings are significant, as it is known that a teacher's effectiveness is usually estimated through the

learning outcomes of students (AUSUBEL & al. 1978, SMITH 2008). The findings of ROTS & al. (2002) are also backed by DRIESSEN (2007), who confirmed that a teacher's gender has no effect on the achievement, attitudes or behaviour of pupils (boys and girls).

Selecting teaching as a career

In order to draw up teaching methodology guidelines for the biology study programme, we studied the choices made by secondary school students (who have passed the school-leaving exam) to take up biology teaching. A comparison between the number of students enrolling in the two study programmes and their wishes shows discrepancies between the data obtained from VPIS (VPIS 2008) and the data obtained in our research (Tab. 1).

Both show that the share of students whose first choice were Chemistry-Biology or Biology-Home Economics courses is falling, the decline in the academic years included in our research is not as substantial as indicated by the VPIS data. According to all the data, the percentage of students who originally opted for these two study programmes was lowest in the 2006/07 academic year. Our research also recorded fewer students per academic year than VPIS. The reason for this was most possibly the fact that not all students recorded by VPIS actually attended lectures,

Table 1: Selecting the double degree biology study programme at the Faculty of Education in Ljubljana by years

Tabela 1: Izbira študija biologije z vezavama na Pedagoški fakulteti v Ljubljani po letih

Academic year	N _t	(N _m)	Selecting the double degree biology study programme					
			first choice		second choice		indeterminate	
			(%)	N	(%)	N	(%)	N
2000/01	53	(7)	17,0	9	28,3	15	54,7	29
2001/02	52	(4)	19,2	10	28,8	15	51,9	27
2002/03	44	(4)	25,0	11	29,5	13	45,5	20
2004/05	45	(2)	8,9	4	28,9	13	62,2	28
2006/07	53	(2)	24,5	13	35,8	19	39,6	21
Total	247	(19)		47		75		125

N_t – total number of students, N_m – number of male students.

N_t – število vseh študentov, N_m – število študentov moškega spola.

seminars and practical work, for which reason we could not have included them in our survey. It is also possible that some students dropped out, while some resumed their studies in a following year.

Reasons for students selecting the double degree biology study programme at the Ljubljana Faculty of Education

Students studying between 2000 and 2007 expressed similar reasons for studying biology together with either of the two other subjects (Tab. 2). The most common reason was that they

choice. We found that 43 of them had listed a natural science subject as their first choice, while 13 had originally wanted to study social sciences. The natural sciences included medicine, dentistry, biochemistry, microbiology, veterinary sciences and biology at the Biotechnical Faculty, while social sciences included geography, psychology, art education, elementary education, social psychology or sociology. Some students mentioned that although studying to become a teacher was an alternative, they had always found biology very interesting. Some stated that they wanted to become teachers (*author's note*: geography, art, elementary education).

Table 2: Students' reasons for selecting the teaching profession
Tabela 2: Razlogi študentov za izbor učiteljskega poklica

Categories	Academic years									
	2000/01		2001/02		2002/03		2004/05		2006/07	
	(%)	N _s =70	(%)	N _s = 76	(%)	N _s = 66	(%)	N _s = 67	(%)	N _s = 93
Fondness for biology	40,0	28	40,8	31	36,4	24	40,3	27	37,6	35
Alternative reasons	21,4	15	23,7	18	19,7	13	22,4	15	22,6	21
Altruistic reasons	17,1	12	27,6	21	31,8	21	26,9	18	34,4	32
Reasons of self-fulfilment	15,7	11	5,3	4	4,5	3	6,0	4	4,3	4
Teacher's influence	5,7	4	1,3	1	6,1	4	3,0	2		0
Personal aspirations and stereotypes		0		0		0		0	1,1	1
Material reasons		0	1,3	1	1,5	1	1,5	1		0

N_s = number of statements. Students were allowed to mention more than only 1 reason for selecting the teaching profession at the Faculty of Education in Ljubljana.

N_s = število navedb. Študenti so lahko navedli več kot 1 razlog za izbor študija na Pedagoški fakulteti v Ljubljani.

were interested in biology. The second and third most common reasons were either altruistic, or as an alternative to their first choice. Twenty or more per cent of students of each study year stated alternative reasons for taking up the study of biology. This, however, does not correspond to the data on the selection of study programmes included in Tab. 1. We presume that some indeterminate students stated their real reasons (including alternatives) for choosing to teach. We then asked students who stated that teaching biology was their alternative choice about their first choice. 56 of the 75 students stated their first

The number of answers classified as altruistic reasons increased two-fold between the study years 2000/01 and 2006/07, with the most common being "I wish to work with children". The case with the 'self-fulfilment' group was quite the opposite, however, as their number fell by over three times between 2000/01 and 2006/07. Personal aspirations or material reasons, however, did not play a decisive role in students' decision to study biology at the Ljubljana Faculty of Education, as they were the least commonly stated motives in each study year. None of the students mentioned the 'benefits' of working as a teacher,

Table 3: Students' beliefs of what makes a good biology teacher
 Tabela 3: Mnenja študentov o tem, kakšen je dober učitelj biologije

Categories	Selecting the double degree biology study programme						Chi-Square Test	
	first choice		second choice		indetermi-nate		sig. χ^2 (2)	<i>p</i>
	(%)	N _s	(%)	N _s	(%)	N _s		
Relationship to children	2,0	5	4,0	10	8,5	21	1,175	0,556
Relationship to nature and organisms	0,4	1	1,6	4	4,5	11	2,743	0,254
Personal characteristics	3,6	9	5,3	13	11,3	28	0,788	0,674
Teaching approaches	17,4	43	21,9	54	42,9	106	8,677	0,013
Teaching proficiency	2,4	6	3,6	9	6,1	15	0,021	0,990
Expertise	4,0	10	3,2	8	6,1	15	3,214	0,200
Professional commitment	1,6	4	2,4	6	3,6	9	0,097	0,953

N_s – number of statements.

N_s – število navedb.

such as working hours, public exposure, more family time, holidays, further training, etc. as having influenced their choice. In fact, RICHARDSON and WATT (2005) found something completely different in their research: prior considerations, career fit, time for family and financial reward were the most important factors for selecting teaching as a career. The reason for such opposite views may lie in the social differences between students of different countries and also in their expectations regarding employment.

The results of this study show that although some teacher candidates did not select teaching

as their first choice, some of them have a positive attitude towards biology or teaching.

What are the characteristics of a good biology teacher?

One looks back with appreciation to the brilliant teachers, but with gratitude to those who touched our human feelings. The curriculum is so much necessary raw material, but warmth is the vital element for the growing plant and for the soul of the child. (CARL JUNG)

Table 4: How a good biology teacher teaches?
 Tabela 4: Kako poučuje dober učitelj biologije?

Categories	Selecting the double degree biology study programme					
	first choice		second choice		indetermi-nate	
	(%)	N _s	(%)	N _s	(%)	N _s
Practical work (experiments, hands-on approach to learning)	17,0	8	0	0	0	0
Interesting lessons	4,3	2	4,0	3	4,0	5
Draws students' attention	6,4	3	9,3	7	7,2	9
Students like to take an active part in lessons.	4,3	2	2,7	2	4,8	6
Usage of concrete materials (plants, animals ...)	10,6	5	21,3	16	20,0	25
Explanations (interesting, good, simple...)	61,7	29	40,0	30	49,6	62
Field work	4,3	2	2,7	2	2,4	3

N_s – number of statements.

N_s – število navedb.

In the study, we attempted to sum up the qualities of a good biology teacher on the basis of students' opinions. We sorted students' answers into categories (Tab. 3)

Regardless of their choice of study programme, students provided answers that fit any of the categories, except for the 'teaching approaches' category. The most frequent response in the latter was that a good biology teacher provides good, interesting and simple explanations (Tab. 4).

The most frequent answers in this category, from students for whom biology was the first choice, were those that emphasised the importance of good explanations, and they often stressed the importance of practical work. We find it interesting that none of the students who stated that they had selected biology as their second choice or were indeterminate about career choice, mentioned the importance of practical work (e.g. conducting live experiments, offering a hands-on approach to learning) for the teaching process. They did, however, state that a good teacher is one who uses concrete materials in the classroom. Other statements are shown in Tab. 4. In addition to a variety of teaching approaches, students also pointed out several character traits of a biology teacher. In their view, a good teacher should be kind, interesting, relaxed, fair, fun, authoritative and a good disciplinarian. They also stressed two other qualities of a good teacher: good relations with students and expertise (Tab. 3). Although we assume that our data reflect the respondents' actual beliefs, it is possible that they gave "socially

correct answers" (HARITOS 2004). The similarities between the answers of the 'first choice' and 'second choice' groups could be attributable to the fact that they had not had any direct experience of teaching, but had only experienced 'good' teachers as pupils themselves. We believe that when students described the qualities of a good teacher, they probably drew on their experience of biology teachers in primary and/or secondary schools, pointing out what they most liked about them or felt they lacked.

To summarise: a good biology teacher does not present dull information; includes practical work in the classroom; has good relationships with students, and possesses a high degree of expertise.

How do you see yourself in the role of a teacher?

Regardless of their choice of study programme, students saw themselves as teachers in similar ways, and there were no statistically significant differences between the groups. The majority of answers from both groups fell into the 'teaching approaches' and 'personal characteristics' categories (Tab. 5). Their answers were similar to responses to the question "What makes a good biology teacher?". They claimed that they would provide interesting, easy to understand and simple explanations. Given the fact that in their analysis JAPELJ & al. (2005) find that secondary school students believe science lessons do not have enough experiments and that lessons

Table 5: How teacher students see themselves in the role of a teacher?

Tabela 5: Kako študenti vidijo sebe v vlogi učitelja?

Categories	Selecting the double degree biology study programme						Chi-Square Test	
	first choice		second choice		indetermina-te		sig. χ^2 (2)	p
	(%)	N _s	(%)	N _s	(%)	N _s		
Relationship to children	1,4	3	5,3	7	10,0	8	0,667	0,716
Relationship to nature and organisms		0	0,8	1		0	2,303	0,316
Personal characteristics	6,1	13	14,3	19	30,0	24	1,829	0,401
Teaching approaches	8,5	18	18,0	24	60,0	48	0,916	0,633
Teaching proficiency	2,8	6	3,8	5	8,8	7	2,657	0,265
Expertise	0,5	1		0	3,8	3	1,789	0,409
Professional commitment	0,9	2	0,8	1	2,5	2	1,747	0,479

should be more connected with everyday life, we expected that most of the respondents would state that they would foster learning through experimental work; however, only 12.6% of them mentioned this. The most common answer from the majority was that they wish to provide good explanations. Very few mentioned the importance of the teacher's expertise, commitment to the job, qualification to work with children, etc. (Tab. 5). We therefore believe it is important that during their university years, teacher candidates should acquire experience in teaching methods which are not based only on instruction, since it is well known that as teachers they will tend to teach in the way they were taught when they were students (DANA & al. 1997, TSAI 2002). Student science teachers acquire a wide range of experience in working with children; therefore we believe that they should start training in a school environment as soon as possible. During training, trainers should consider the students' 'idealised' image of teaching, and help them create a real one. Therefore it is important that a trainer (mentor) who works with a student science teacher is highly experienced (PARKER-KATZ & BAY, 2008).

Two respondents (biology as the second choice and undecided) did state, however, that they do not intend to work as teachers after completing their studies and, surprisingly, 26 respondents (6 first choice, 10 second choice, 10 indeterminate) stressed that they could not yet see themselves as teachers. Very few students gave answers related to marking, preparation, administration, working with parents, upbringing, or working with difficult children and children with special needs, which is understandable, since students have not had any teaching experience.

According to MORAIS & al. (2005), we should not overlook the fact that teachers' development depends not only on the characteristics of the teacher training processes, but is influenced by many personal, social and occupational factors. Personal characteristics, the working environment at school, relations between colleagues, relations with parents and the community influence teachers' development.

Conclusion

In Slovenia, there has been much debate about the declining interest in science studies. The lack of interest is shown clearly in secondary school students' choices of optional subjects at the school-leaving examination (at the end of secondary school), where the share of science subjects has been falling by about one per cent per year (ZUPANC & al. 2006). Despite changes in the science and biology curricula in primary and secondary schools and efforts (seminars, training courses, etc.) to make teachers adopt alternative teaching methods, science subjects are losing popularity.

It is alarming that the share of students whose first choice university course was either Chemistry-Biology or Biology-Home economics is falling (Tab. 1). Among the main reasons for the lack of interest in science studies is not only that young people prefer jobs which enjoy a higher social status, and promise a better starting salary and mass media interest, but also the fact that the teaching profession has largely lost the reputation it once had. The position of teachers in society is changing (BEN-PERETZ 2001). We found that the number of male students interested in becoming teachers has decreased, probably because of greater potential earnings or status in other, comparable occupations (WYLIE 2000). However, increasing number of female science teacher candidates shouldn't pose a problem, since it is known that a teacher's gender has no effect on the pupils' achievement (ROTS & al. 2002, DRIESSEN 2007).

We found encouraging that some secondary school students who opt for science studies after having failed to qualify for their first choice subject answered that they like either teaching or biology. Despite their ideas about teaching being a more or less one-way communication process, they too could one day become good science or biology teachers, provided they acquire the necessary knowledge in a good, well-structured course. It should be considered that these students should have additional lessons with university teacher trainers in order to evaluate progress gained during the study and practice.

We asked prospective teachers what qualities a good biology teacher should have. Their

answers surprised us, as they replied that a good teacher was one who can explain subject matter in an interesting way. Despite having experienced the school system at primary and secondary levels, students failed to provide innovative ideas about teaching which are not merely dull and uninteresting. However students' answers could be supported by DANA & al. (1997) and TSAI (2002) who stressed that such view could stem from students' own school science experience.

In the light of students' answers, one could conclude that university teacher training courses adapt much too slowly and inadequately to the needs of pupils and students.

DEMIRBOLAT (2006) suggests that individualistic approach in teacher training should be emphasized because the development of future teacher values are more influenced by factors like personal attributes and environment in which person grew-up than the programmes that train teachers. Individualistic approach is intensely implemented in biology part of programmes of Chemistry-Biology and Biology-Home Economics. However, in the past years more intention was emphasised on the form of students' participation in the practice and less on selection of teacher trainers (mentors), who can influence teaching skills of a future teacher (PARKER-KATZ & BAY, 2008). Therefore, it should be considered to reestablish a network of highly qualified teacher mentors who would present the linkage between the faculty (study programme) and schools (teaching and learning in practice). Highly qualified inservice teachers could according to function of future teachers' in practice propose what knowledge do those future teachers lack and should gain in a faculty setting. Teachers who draw up teacher training could on the basis of this information re-examine and redesign introductory science courses to better accommodate the needs of future teachers (NATIONAL RESEARCH COUNCIL 2001, p. 118).

Furthermore, teacher trainers preparing new teachers for schools should be aware that schools today are very different from the schools they themselves experienced as young people (ROBINSON & McMILLAN 2006). Curricular reforms do not present a bright future for prospective biology teachers unless they focus on the pedagogical understanding of teaching based on solid scientific

foundations. On the one hand, expertise alone does not guarantee good teaching, and on the other, good teaching skills coupled with a lack of expertise cannot develop knowledge based on understanding. Perhaps well-trained teachers are the key to dispelling the myth that science (biology) is merely a set of dull facts, but is based on understanding phenomena and life that surround us.

In addition to this, probably some system changes would be welcome in order to make the profession truly desirable for teacher candidates (DEMIRBOLAT 2006) and to attract good students to make a decision to become teachers and even more to become a good and perspective science (biology) teachers.

Povzetek

V Sloveniji se že nekaj let zapored soočamo z upadom zanimanja za študij naravoslovnih ved. Po mnenju nekaterih k takšnemu stanju prispevajo neprimerno usposobljeni učitelji naravoslovnih predmetov v osnovnih in srednjih šolah. Pri študentih dvopredmetnega študija biologije z vezavama na Pedagoški fakulteti v Ljubljani smo v študijskih letih (2000/01, 2001/02, 2002/03, 2004/05, 2006/07) preverili razloge za odločitev za poklic učitelja biologije in izpostavili nekatera izhodišča za pedagoško delo s študenti pri predmetu Metodika biološkega izobraževanja. V raziskavo smo vključili študente 1. letnika ($n = 247$). Študenti so izpolnili vprašalnik o delu učitelja biologije in naravoslovja pred začetkom predavanj, ki so povezana z metodiko biološkega izobraževanja. S tem smo zagotovili, da so študenti na vprašanja odgovarjali neodvisno od vsebin, ki jih slišijo na predavanjih ali vajah.

Rezultati raziskave so pokazali, da upada število tistih dijakov, ki po končani maturi pod prvo željo izberejo program učitelja biologije z vezavama na Pedagoški fakultete. Med tistimi, ki se odločijo za ta študij pod drugo željo pa je večina takih, ki se ni uspela vpisati na medicino, stomatologijo, biokemijo, veterino ali na študij biologije na Biotehniški fakulteti. Za poklic učitelja biologije se večinoma odločajo dekleta. Prevladujoča motiva za izbor študija sta navdušenje študentov do biologije in želja po

delu z otroki. Študenti (ne glede na izbor študija) imajo zelo podobne predstave o poklicu učitelja biologije, ki naj bi po njihovem mnenju v pouk uvajal praktično delo, se razumel z učenci in bil strokovnjak na svojem (biološkem) področju. Študenti praviloma niso navajali inovativnih idej o poučevanju, ki ni zgolj dolgočasno in nezanimivo. Njihove predstave so odraz lastnih izkušenj z učitelji, zato je pomembno, da se

študenti dovolj zgodaj vključijo v delo z učenci. Tako lahko pridobijo lastne in neposredne izkušnje o poučevanju, ki jim pomagajo graditi samosvojo (realno) podobo učitelja biologije (naravoslovja). Namreč, učitelju obvladovanje stroke še ne omogoča kvalitetnega dela v razredu. Prav tako pa dobra učiteljeva pedagoška podlaga brez strokovnih kompetenc ne more pri učencih razvijati znanja z razumevanjem.

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