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REFLECTED SKILLS OF THE SCIENCE STUDENT TEACHERS IN TEACHING PRACTICES

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Abstract

The aim of this study is to determine the level of opportunities given to science student teachers by practice schools in order to reflect their skills they acquired through curricula in their faculty. This study has been carried out by using case study approach. As the first step, the curricula of the teaching professional courses offered in numerous teacher education faculties are tabulated, using document analysis. Then, the expected behavioral skills for student teachers are listed in accordance with interviews with four professors. With the help of these data, to determine both the degree of opportunity and the level of success, the professional activities of six science-student-teachers in these schools are observed using an observation chart. As a final step, semi-structured interviews are conducted to get ideas, expectations and comments of six student teachers and mentors.

Key words: *Teaching skills, science student teacher, teaching practice*

1. Introduction

The function of the teacher in the traditional atmosphere of teaching-learning has shifted gradually from simply offering the existing knowledge to a position of active counseling for students in acquiring necessary behavioral skills. In order to reflect such expectations and new roles efficiently in the classroom it is necessary to adapt new teacher education programs to meet these trends. The major driving force behind these new developments is the idea that mere theoretical knowledge cannot be effective unless it is underpinned by practice. It has been widely stated that such tutoring or practicing can both offer necessary experience to student teachers and give them a chance to feel comfortable in their future professional teaching careers [1]. So, teaching practice aims to prepare student teachers to professional career by using their knowledge, skills and behaviors obtained during teaching seminars in real settings.

It is known in Turkey that aspiring future science teachers also face a multitude of problems during teaching practices and school experience courses. These problems stem specifically from factors such as insufficient and unplanned simulative exercises, insufficient proficiency level of tutoring staff, and unsatisfactory teaching materials in terms of number, functionality and technology [2]. At last but not least, there are many academic studies stressing the fact that some newly graduated teachers are not able to utilize these skills they gained during their education programs effectively [3-7].

The lack of success during teaching practice which is thought to provide future teachers an environment to test and improve their both personal and professional knowledge and skills, necessitates further academic studies targeting such encountered problems. In this context, the major reasons leading those academic studies can be summarized as follows:

i) Student teachers typically encounter with a problem of demonstrating their proficiency and behavioral skills effectively as well as efficiently regarding their professional curricular knowledge, extracurricular knowledge, and pedagogical formation, which are acquired during pre-service teaching program [8].

ii) Student teachers try to overcome their behavioral or psychological problems such as nervousness, indecisiveness, anxiety and lack of self-confidence during their training at local schools [9].

iii) Student teachers can not receive sufficient assistance and cooperation from the practice school staff where training takes place. Furthermore, these staff are usually neither aware of their responsibilities, nor they have experience and knowledge to grasp the goals and methodology of the training, which results over the lack of necessary work environment for a successful training [10,11].

iv) As the experienced teachers do not have necessary knowledge about how to carry out tutoring trainees, they perceive such applications unnecessary and they think that they are both time consuming and not exciting [12].

The aim of this study is to determine the level of opportunities that are given to science student teachers as trainees by practice schools to allow them to reflect their skills developed through teaching programs.

2. Methodology

This study has been carried out by employing case study approach [13]. This approach allows us to explain cause and effect relationships regarding variables of data gathered by different techniques from a correlative point of view [14]. As the first step, the curricula of the teaching professional courses offered in numerous teacher education faculties are tabulated using document analysis. Then, expected behavioral skills for student teachers are listed in accordance with the data derived from interviews with four professors instructing those courses at Amasya University, Faculty of Education. With the guidance of these data, in order to determine both the degree of opportunity given to student teachers in practice schools to apply the professional skills they gained during the academic program and the level of success achieved by student teachers to employ their skills, the professional activities of six science student teachers in these schools are observed for 8 hours using structured behavioral observation chart. In the last step, semi-structured interviews are carried out to obtain the ideas, expectations and comments of six student teachers and two mentors who are responsible for these student teachers.

In addition, this study was bounded into a limitation which was aware by the author. This limitation is necessary to know of student teachers, who were selected from Amasya University. Therefore, these findings can not be generalized to the whole science student teacher population in Turkey. However, the results of this study will be of interest to educators and scientific pedagogical society.

3. Discussion and Results

In the first step of the survey, the names and syllabi of the new core educational courses, which have been integrated into the curriculum after recent transformation of the educational system, together with the already existing undergraduate mass courses are listed by using document analysis technique. These courses can be put into three groups:

1) The educational studies courses;
- Introduction to the Teaching Profession
- Development and Learning
- Planning and Assessment in Teaching
- Educational Technology and Materials Development
- Classroom Management
- Guidance
- Subject Area Textbook Review

2) Subject method courses;
- Methodology I
- Methodology II

3) Courses in School;
- School Experience I
- School Experience II
- Teaching Practice

The last group of courses is of particular interest here. During these practices in schools students try to reflect their skills to the mentors and students in real classrooms. Student's supervisor from the university also visits each student in school, observes teaching and assesses student progress with the mentor. The contents of these courses are presented in related documents in detail [2,15].

Afterwards four professors instructing these courses at Faculty of Education are asked the following two questions to get their opinions on the subject:

i. What concepts do you usually discuss with students while covering the curriculum?

ii. What do you think the students learn or which behavioral objectives are achieved at the end of the course?

The responses are rephrased as the objective behavioral skills for each course and tabulated, (Table 1). In the next step, on the other hand, the professional activities of six science student teachers in practice schools are observed using an observation chart, which is developed in the light of data gathered in the first step, in order to determine the degree of opportunity given to student teachers in practice schools in applying their professional skills that are gained during the academic program, and the level of their success in employing these new skills. The observed professional behavioral skills of science student teachers are shown in Table 1.

Table 1. Observation findings of professional skills of six science student teachers (N=6)

BEHAVIORS	NO		O			Explain
	A	B	NR	PR	RDL	
1.Explaining basic principles and concepts about science subjects	-	-	-	1	5	...
2.Exhibiting the roles and behaviors required in teaching profession	-	-	-	1	5	...
3.Determining individual differences from the point of learning and development among students, and building effective communication with them	-	-	-	2	4	...
4.Selecting and using special teaching methods and techniques appropriate to the performed course	-	-	-	1	5	...
5.Good use of time and board by preparing suitable atmosphere to learning	-	-	1	2	3	...
6.Benefit from model imitation, laboratory and teaching technologies to make abstract subjects more concrete	1	3	-	1	1	...
7.Developing simple tool-equipment providing gained behaviors, directed towards performance test (experiment)	1	1	1	2	1	...
8.Preparing activities towards teaching theoretical knowledge and concepts, and presenting them in the classroom environment	-	-	-	2	4	...
9.Preparing evaluation-material appropriate to the students‘ level of understanding	-	1	-	1	3	...
10. Making course, unit and daily plans that aimed and target behaviors are clearly stated	-	-	-	-	6	...

NO: Not Observed, **O:** Observed, **A:** Not observational behavior in spite of the fact that student teacher has opportunity at practice school, **B:** Not observational behavior because of the fact that practice school does not give student teacher an opportunity because of several reasons, **NR:** Not reflected, **PR:** Partly reflected, **RDL:** Reflected to the desired level

As shown in the table, student teachers are not offered ample opportunity in practice schools particularly in demonstrating their skills about utilizing laboratory and education technology, preparing evaluation-material, and creating simple tool-equipments. Almost a half of those who are offered ample opportunity, on the other hand, are not successful enough to demonstrate such professional skills.

In the final step, the findings from the interviews with six student teachers whose professional skills at the practice schools are observed throughout the semester and two mentors responsible for them are formulated in question-answer format as follows with an emphasis on the most repeated subjects in the sampling.

3.1. Interviews with mentors;

Question 1- What are the expected behavioral gains, you think, for the student teacher during this tutoring process? To what degree are you able to reach these goals; what are the most typical problems you face during the process?

Mentors said the main objectives as follows: knowing well all the curriculum related to the subjects, adjusting themselves to teacher-student relationship, appropriate treatment to students according to their psychological differences, giving information about the necessary tools if a curriculum-related experiment performed, bringing all related documents to the class, preparing himself to the class, preparing exam questions, preparing an answer key before exams, using time and blackboard properly, utilizing laboratory and education technology tools as far as possible, encouraging students to gain experimental skills, and to make sure the students are focused during the class.

Mentors expressed that some of the intended goals could not be reached mostly because of time constraint. These problems include lack of authority in the classroom, causing reluctance and disbelief. The tutoring process is shortened by the fact that student teachers have a heavy burden of other ongoing classes and exams of their own. Furthermore, school students have a tendency not to take the new teacher seriously as they assume that the real grades are given by their own class teacher, which, in turn, exacerbates already existing anxiety. In addition, some student teachers attend classes without making necessary preparations in spite of all the recommendations.

Question 2- How do you evaluate the necessary roles and behaviors that student teachers obtained during their formal education from the perspective of their demonstration capabilities later on?

Student teachers are generally able to adapt themselves to the professional environment and they show necessary effort to accomplish the tasks they are required to. They are also very keen on demonstrating professional behavioral skills as student teachers. However, some of them may still bring their personal problems into the classroom atmosphere. For example, some student teachers suffer from lack of enthusiasm and motivation, which usually stem from the anxiety of not being hired upon graduation as well as personal matters such as family problems and economic difficulties. In addition, physical shortcomings of practice schools have a negative impact on student teachers in demonstrating their professional skills efficiently.

Last but not least, mentors have drawn the attention to the negative influence of the awkward educational system, which forces students to attend private test preparation courses before higher education. As they have gone through the same dual education, they argued, student teachers tend to teach the short-cuts rather than discussing the crux of the matter.

Question 3- What are the subjects and concepts that science student teachers find hard to explain to students?

Mentors stressed that science student teachers especially have difficulty in teaching concepts as frictional force, mass and weight, magnetism, solution and solubility, photosynthesis.

Question 4- What are your personal recommendations to the student teachers to reflect or demonstrate their professional knowledge and skills in a real setting?

Firstly, education faculties should not admit students through centralized exam; instead, admit students according to the behavioral criteria required for the profession. They should love and

respect their profession, they should make the utmost effort to benefit from the knowledge and experience of the mentors. Practice schools should have up-to-date library resources, which are easily accessible by student teachers; these schools also should not have administrative problems. Mentors should be experienced, enthusiastic about conveying their experience; they should have exceptional communication skills. These mentors should be very competent in all curriculum related topic and they should always update themselves about new developments in their field.

Student teachers should be provided with certain amount of allowance for motivation and to make sure they attend school regularly. They should teach in smaller classes and their professional development should be evaluated by asking for progressive reports required. Importantly, student teachers should feel confident that they will assume permanent professional positions upon graduation.

3.2. Interviews with student teachers;

Question: What do you think the necessary environment and possibilities required for you to properly demonstrate those knowledge, professional and behavioral skills in the field of 'science' that you developed at the school of education are?

They pointed out the followings to demonstrate their professional and behavioral skills more efficiently: Practice schools should have a fully-equipped technology room with overhead projector, computers and data-show, laboratories should have all necessary equipment, and the walls should be covered with all kinds of diagrams and other science-related posters, class sizes should not exceed 25 students who are smart and willing to learn. In addition, student teachers stated that the school classrooms should be well taken care of and they should be organized for U-shape lecturing.

On the other hand, they stated that mentors should have the capacity and skill to utilize education technology equipment and they should frequently use such skills during classes. Practice schools should have very experienced mentors who show outstanding effort to communicate with student teachers. Mentors should be very confident about employing different educational techniques and also willing to let student teachers participate in measuring and evaluating the performance of the pupils.

4. Conclusions and Recommendations

A thorough examination of the observation results shows that student teachers are not given enough opportunity to demonstrate their skills in utilizing laboratory and educational technology, preparing evaluation forms and creating simple experimental sets in professional development schools by the mentors. The observation results reveal that less than half of those who have a chance to demonstrate their skills are performing at an acceptable level. Meanwhile, it has been noted that almost all subjects successfully demonstrated professional skills such as properly explaining fundamental rules and concepts in the field of science, developing necessary behavioral skills, and preparing a concise yearly curriculum plan. In the observation chart the purpose of the explanation column reflects the thought of the observer why he/she marks that item. But, this column is partly insufficient to obtain the expected data.

Interviews with the mentors concluded that they try to develop the student teachers' behavioral skills such as how to overcome their anxiety, how to fine-tune the relationship between teacher and student, how to cover all curriculum- related topics properly, how to use time and the board properly and how to display full authority in the classroom. However, the shortness of tutoring period, the physical insufficiency of schools and the general anxiety and pessimism about not being hired upon graduation have a negative impact on the success level of the tutoring period and does not give student teachers a full chance to demonstrate their skills. Even though it cannot be derived directly from the observations, mentors mentioned that student teachers have difficulty to develop professional level skills especially in subjects like frictional force and photosynthesis.

Mentors recommend students to show the utmost effort learning from their professional experience during the program. They also encourage school administrations to try to improve the physical possibilities of their schools for the benefit of student teachers and urge them to make sure that they have perfect attendance during the program. Students, on the other hand, confidently state that they are able to demonstrate best of their capacity if they have a chance to attend practice schools, which offer the best available technology, have a fully-equipped laboratory, small class sizes and experienced mentors who are knowledgeable and excellent in communicating with students.

All the observations and interviews also point to the fact that mentors have a big role in the process. Even if the school has the cutting edge technological and laboratory equipments, some mentors are in a false thinking which can be phrased as *I never need such equipment and neither does the student-teacher*. Such mistakes translate into the minds of student teachers either as the sign of unacceptable professional capacity of their tutors, or the sign of their own unacceptable capacity to handle that delicate and expensive equipment. Nevertheless, no matter how unfavorable the physical conditions of the schools are, there are still many mentors struggling to give their best to student teachers, who have a very positive approach to tutoring exercises. It is also fair to conclude that the observed lack of skills development may be the result of the insufficient level of success by student teachers in utilizing the experience of their mentors as well as physical shortcomings of schools. The results of the present study show the importance of teaching practice experience. Furthermore, the results of this study are supported by the other studies in literature [16-23].

In conclusion, to use effectively professional skills in a real school environment a student teacher should fully concentrate on the profession, consider himself as a teacher, work with his mentor in harmony. Practice school class sizes should be optimum and consist of above-average pupils. School administrations and mentors should be helpful to student teachers as far as possible; they should be given opportunity to utilize every available materials and laboratory equipment. A parallel coordination should be reached between different practice schools so that necessary technological tools or laboratory equipment can be provided by another school if necessary. Education faculties should offer more mass courses in the field of science. Education faculties should keep track of the practice school schedules of the students. There should be a coordination and cooperation between education faculties and practice schools. Lastly, each mentor should be assigned no more than two student teachers during teaching practices.

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5. References

[1] World Bank/The Council of Higher Education of the Republic of Turkey. (1998). *Faculty-School partnership*, Ankara.
[2] Karamustafaoğlu, O. & Akdeniz, A.R. (2007). Demonstration of the fundamental behavioral skills improvement by prospective physics teachers in practice schools. *Education*, 127 (4), 591-599.
[3] Furlong, J., Whitty, G., Whiting, C., Miles, S., Barton, L., & Barrett, E. (1996). Re-defining partnership: Revolution or reform in initial teacher education? *Journal of Education for Teaching*, 22 (1), 39 – 55.
[4] Ashton, P.T. (1996). Improving the preparation of teachers, *Educational Researcher*, 25 (9), 21-35.
[5] Needles, M.C. (1991). Comparison of student, first-year and experienced teachers' interpretations of a first-grade lesson, *Teaching and Teacher Education*, 7 (3), 269-278.
[6] Veenman, S. (1984). Perceived problems of beginning teachers, *Review of Educational Research*, 54 (2), 143-178.
[7] Anderson, R.D. (2002). Reforming science teaching: What research says about inquiry. *Journal of Science Teacher Education*, 13 (1), 1-12.
[8] Shaw, R. (1992). *Teacher training in secondary schools*, Kogan Page, London.

[9] Evertson, C.M. & Smithey, M.W. (2000). Mentoring effects on protégés' classroom practice: an experimental field study, *The Journal of Educational Research*, 93 (5), 294-304.
[10] Newman, E. (1997). Primary teacher dilemmas in initial teacher training, *Teacher Development*, 1 (2), 253-268.
[11] Shen, J. (2002). Student teaching in the context of a school-university partnership: a case study of a student teacher, *Education*, 122 (3), 564-580.
[12] Caruso, J.J. (1999). Professional preparation and certification: teacher education, *European Journal of Teacher Education*, 34 (1), 63-65.
[13] Yin, R. (2003). *Case study research: design and methods*, 3rd Ed. Thousand Oaks, CA: Sage Publications.
[14] Merriam, S.B. (1998). *Qualitative research and case study applications in education (Rev. ed.)*, San Francisco, CA: Jossey-Bass. (Translated into Japanese, 2004.)
[15] Sands, M. (2003). Teacher education at Bilkent University, *Proceedings of the 2nd International Conference- Support and Development for the Beginning Teacher-*, 37-40, Bilkent University, Ankara.
[16] Hayes, M.T. (2002). Assessment of a field-based teacher education program: implications for practice, *Education*, 122 (3), 581-586.
[17] Dexter, G.G. (2000). *Mentors and protégés: the impact of the mentoring relationship on beginning teachers and mentor teachers*, Unpublished doctoral dissertation, Johnson & Wales University.
[18] Johnson, C.C. (2007). Technical, political, and cultural barriers to science education reform. *International Journal of Leadership in Education*, 10 (2), 171-190.
[19] Barrow, L.H. (2006). A brief history of inquiry: From Dewey to standards. *Journal of Science Teacher Education, 17*, 265-278.
[20] Anderson, R.D., & Helms, J.V. (2001). The ideal of standards and the reality of schools: Needed research. *Journal of Research in Science Teaching*, 38 (1), 3-16.
[21] Karaman, A. (2007). *Exploring the meaning of practicing classroom inquiry from the perspectives of national board certified science teachers*, Unpublished doctoral dissertation, the Florida State University.
[22] Furtak, E.M. (2006). The problem with answers: An exploration of guided scientific inquiry teaching. *Science Education*, 90, 453-467.
[23] Hofstein, A., & Lunetta, V.N. (2004). The laboratory in science education: Foundations for the twenty-first century. *Science Education*, 88, 28-54.