

Educational Attainments of Civil Engineering Students from Their Internships

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ABSTRACT

Civil engineers, who are members of one of the ancient and basic engineering branches, today have a very significant place in the development of the society as they have been in the past. Civil engineers have been taking theoretical and practical training during their 4-year undergraduate studies before becoming a member of the profession. Professional internships, which form a large part of the practice, constitute a significant part of the education and training process. Compulsory professional training is carried out for the students to be able to see the practical of the theoretical information they have received. In this way, it is aimed to see the practical usage and application areas of the knowledge acquired by students. Students have to prepare an internship report and pass the oral examination for the acceptance of their internship in the Department of Civil Engineering at Karadeniz Technical University.

In this study, evaluation of the degree of knowledge acquired by students of Department of Civil Engineering at Karadeniz Technical University during the internship period is evaluated. In this evaluation, oral examination data, which was done by 28 instructors in October 2015, about internship report of 268 students were used. Following the oral examination conducted for each student, a questionnaire was applied to the instructors who conduct the oral examination to evaluate the student's performance in internship report. The results are presented in tables and graphs. It seems that the importance of the internship is not understood sufficiently by the students.

Keywords: Civil engineering, internship, theoretical training, practical training

1. INTRODUCTION

Today the theoretical training given to the civil engineers may be quite different from the construction works in the field, the difficulties of the career, and the constantly developing technology benefited during the construction process. Civil engineers of the future are required to follow the developments in the field in addition to their theoretical training at the university. In consequence of this necessity, the universities, which have the civil engineering

program, have started to require the internship before graduation by creating their own regulations.

The internship is essential for the students in case of reinforcing the theoretical and applied knowledge, learnt at the university by practising in the field. Moreover, the internship provides the engineer candidates with preliminary preparation about the expectations from the newly graduated engineers, their duties during the application, and how to fulfil the duties. During the internship process, the interns become skilful at solving possible problems, communication, report writing, work organisation and knowledge acquisition.

It is observed that there are some differences in the evaluation process of the internships that were done by the civil engineering students when examining the regulations of the internship prepared by corresponding universities. In the regulations of some universities, the compulsory internship is divided into two categories as worksite internship and office internship. Moreover, the minimum numbers of workdays for each category are determined. On the other hand, in some other universities, it is found suitable to fulfil the whole internship process in the worksite without determining the minimum number of workdays. There are also some other universities dividing the compulsory internship as construction internship or optional internship in certain departments such as hydraulics, geotechnics and transportation. Furthermore, while four-semester education is enough for the students of some universities to do their internship, others require the compulsory courses being passed. The minimum numbers of workdays of the internship vary between 40 and 70. Oğuz et al. [1] indicated in their study that the internship process generally takes 60 days. *The internship report* of the student, *the internship evaluation form* of the supervising civil engineer, and *the oral interview* are taken into consideration while evaluating the internship of the students. However, some other universities do not require an oral interview or require only if the associated internship commission considers it necessary. Oral interviews of the students are generally evaluated in terms of their presentations by a two-member jury; the supervisor or any responsible instructor [2-13].

In this study, it is researched how much the civil engineering students of Karadeniz Technical University internalise the knowledge that they have learnt during their internship in fourth and sixth semesters within the scope of the regulations.

2. METHOD AND CONTENT

The required internship workday of Civil Engineering Department in Karadeniz Technical University is determined as 60 days. The internship is divided into two categories as worksite and office internships. The internship is required to be carried out in such activities as earthwork operations, reinforced concrete construction, retaining walls, tunnels, road construction, sewage and water supply network, dam building, project preparation and application, residential and factory construction, steel construction, etc... Intern engineer candidates are required to learn the subjects of activities, organizational structure, sections and the duties; to question the expectations of the employer from the civil engineer; to examine the hierarchy among the employees; to observe and learn the conducted works; to identify the heavy equipment, measuring instruments and to learn how to use them in which

work; and to examine the quality control and testing laboratories. Within this scope, it is necessary for the students to prepare internship file in order to get their internship evaluated. If students do not give their internship files in the due date declared by the internship commission, the internships of these students are not accepted. For evaluation of internship, average the interview grade, internship file evaluation grade, and data sheet success grade are calculated.

The students, whose data sheet success grade is less than 60, are failed in their internship. While determining the number of valid internship workday, the average success grades of all intern students are considered. Students are considered as “Successful” in their internships provided that their grades are over the average of internship success grade. If the internship success grade is lower than the average, accepted number of workdays is determined by decreasing the number of internship workdays with the ratio of “internship success grade / 100”. The obtained number of the workday is rounded down to the integer [11].

A verbal self-defence is made with civil engineering students of Karadeniz Technical University after their summer-term internship. The verbal self-defence is fulfilled by the assigned instructors. In this study, it is researched how much the students internalise the knowledge that they have learnt during their internship through the answers of the surveys which were applied to the instructors after each defence.

268 students participated in the survey made in Karadeniz Technical University. In the first part of the survey includes questions about the number of internship workdays, internship fields and the construction work in the field. The second part of the survey belongs to the instructors who fulfil the verbal self-defence of the internship. In order to fill the second part of the survey, the instructors questioned the students about their knowledge in their internship field and construction work (Technical terms, construction material, construction phase, current technology and construction work description). After the interview, grades were given out of 100 by evaluating the verbal self-defences of the students. If the grades are below 100, the grades and the reasons of low grades were stated in the second part of the survey. After the internship evaluations, fields of students, construction works and their deficiency issues were quantitatively identified by inputting the survey data and their accepted number of workdays into SPSS software.

3. SURVEY ANALYSIS

3.1. Output of the Survey Questions for the Students

The internship field selection was optional for the students of Civil Engineering Department in Karadeniz Technical University with the condition of selecting suitable work sites for the regulations. In an internship term, 81% of the students preferred doing their internship in a single field while 19% preferred doing their internship in more than one field (Figure 1). According to the data, most of the students did their internship in the construction field. The number of students, who made their internship in other fields, are much less than the ones in the construction field. Moreover, 12% of the students serving their internship in more than one field also preferred doing their internship in the construction field. The percentage of the students doing the internship in more than one field can be sorted as: 29% in road

construction and one other field, 21.8% in tunnel construction and one other field, 17% in bridge construction and one other field, 9.7% in retaining structures and one other field, 0,8% in dam building and one other field, and 9.7% in other fields. The students, who made their internship in more than one field, generally preferred doing their internship in road and bridge, road and tunnel, or road and bridge and tunnel.

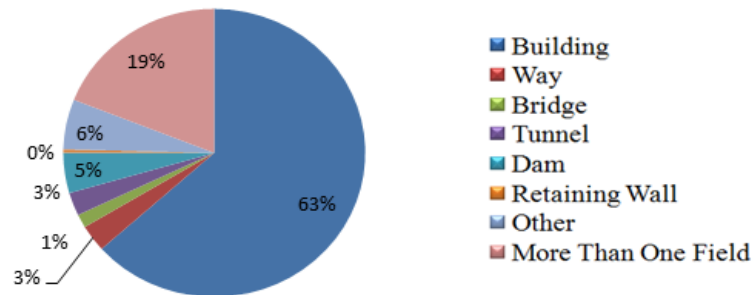


Figure 1. Internship fields of the students

The construction work ratios of the students during their internship are quantitatively given in Figure 2. Only 1.9% of the students did their internship in a single work such as excavation, concrete work and roof work. The other students participated in more than one construction work. Respectively, the students participated mostly in concrete works, reinforcement works and formworks; infrequently in roof works and ground control works. Out of 268 students, 253 students participated in concrete work, 236 students participated in reinforcement work and 230 students participated in formwork. Only 43 students got the chance of participating in roof work and only 80 students participated in ground control work.

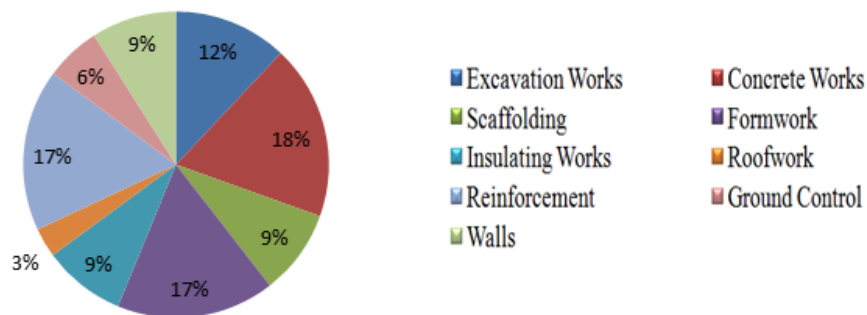


Figure 2. Construction Works of the Students

3.2 Output of the Survey Questions for the Instructors

According to the data on Figure 3, the students mostly have difficulties about the knowledge of technical terms and describing the construction works. The least difficulty was faced about the construction materials. Only 8,6% of the students were able to answer all of the questions about their internship correctly.

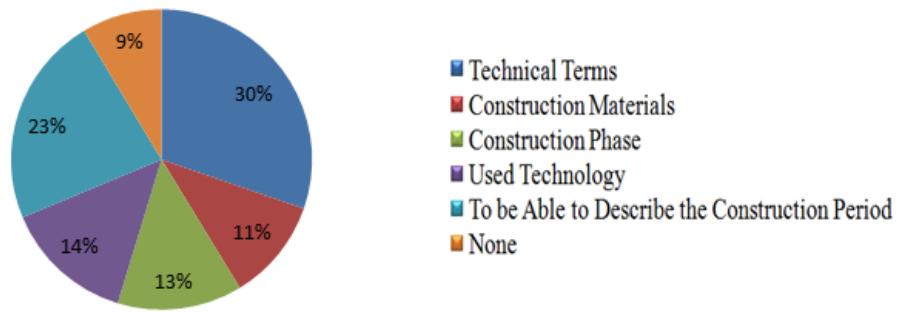


Figure 3. The inadequacies of the students

According to the data on Figure 4, while only 13,4% of the students have the full grade (100), grades of the rest of the students decreases from 100 to 50 according to the quantities of their inadequacies. Two students have grades of 50.

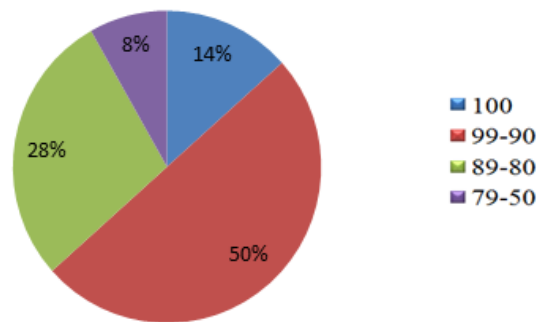


Figure 4. The grades of the students

3.3 Results of the Internship Evaluations of the Students

According to the internship regulations of Civil Engineering Department in Karadeniz Technical University, the students are graded with success points after the oral interview about their internship file and also by evaluating their internship record book and internship data sheets. This grade is the average of the points of the oral interview, internship record book and internship data sheets. If the success grade of a student is higher than the average of all interns, the student is considered as successful and all of his/her workdays are accepted. However, if the success grade is lower than the average, accepted numbers of workdays are determined by decreasing the number of internship workdays with the ratio of “internship success grade / 100”.

Figure 5 shows that %38,4 of the students were considered as successful in their internship. Accepted numbers of workdays of the rest of the students were determined by decreasing the number of internship workdays with the ratio of “internship success grade / 100”.

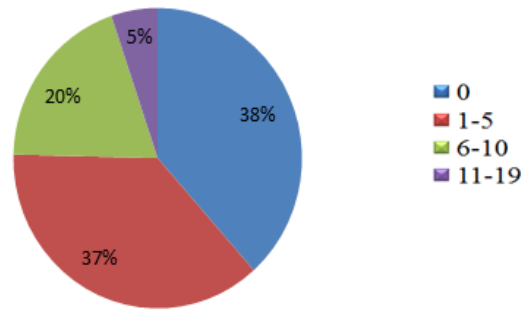


Figure 5. The number of unaccepted internship workdays of the students

4. RESULTS AND DISCUSSION

It is quite difficult for the civil engineers, who service in a wide range of field, to learn everything about their occupation. However, if the internship, which covers most of the practical training, is planned in detail, the students may graduate with the minimum inadequacy.

1. Since universities have not separated compulsory internships to different fields such as transportation, hydraulics and geotechnics, it has been seen that the majority of the students do their internship in constructions. The working area of the civil engineers is not limited to the construction works. Therefore, it is suggested that students should be made their internship in different fields, or they may be also directed to the other fields.

2. It is found out that almost all of the students participated in concrete works, reinforcement works and formworks. However, in addition to these basic construction works, students must be promoted to participate in the other fields such as roof work, ground control, insulation and wall works.

3. The instructors questioned the students in order to examine their knowledge gained by the internship. However, only 8,6 of the students were able to answer all of the questions about their internship correctly. This fact shows that majority of the students are not aware of what to learn during the internship. If a student finalized the internship, which he/she participated during the summer term, without being aware of the construction process, the construction technology, the materials and the technical terms of the field, it is quite difficult for student to manage and plan the worksite with the same assimilation after the graduation from the university. For this reason, it should be well informed about what they should learn in their internship.

4. Even if the students have some inadequacies in some issues, it is observed that all of their workdays were accepted because their internship record books and internship registry success grades are evaluated in addition to the oral interview. This fact promotes the term “fake internship” for the students. A successful internship record book and a full-grade success data sheet allow the students to have fully accepted workdays even if they have some inadequacies. In order to avoid this situation, the students must be required to take a written exam, which may examine their knowledge.

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