Düzce Üniversitesi Bilim ve Teknoloji Dergisi

Araştırma Makalesi

Opinions of Forest Industrial Engineering and Vocational School of Forestry Students on Online Computer Aided Design Learning

Sedanur ŞEKER [a], Zübeyde BÜLBÜL [b], E. Seda ERDİNLER [a,*]

[a] *Orman Endüstrisi Mühendisliği Bölümü, Orman Fakültesi, İstanbul Üniversitesi-Cerrahpaşa, İstanbul, TÜRKİYE*

[b] *Mobilya ve Dekorasyon Programı, Ormancılık Meslek Yüksek Okulu, İstanbul Üniversitesi-Cerrahpaşa, İstanbul, TÜRKİYE*

* *Sorumlu yazarın e-posta adresi: seda@iuc.edu.tr*

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ABSTRACT

This study aims examining the opinions of the students of Vocational School of Forestry and Forest Industry Engineering Department of Istanbul University-Cerrahpasa, about their computer aided design education, general development and future. The survey form was applied during the fall semester of the academic year 2020-2021 in the online. Surveys from 60 students were taken into assessment with first year and second year students for both departments. The survey form had questions about demographic characteristics of the students, their opinions on their education and their professional future. During the analysis, first the variables were coded, a database was created and assessed with MS Excel software. As the result; demographic characteristics of the students, opinions of Forest Industry Engineering Department students on Forest Industry Engineering Department and Vocational School of Forestry Students on their departments, opinions of the students about computer aided design programs were evaluated. In addition, the sectors in which the students want to work in after graduating are evaluated and interpreted.

Keywords: *Distance education, computer aided design, Professional future, AutoCAD.*

Orman Endüstri Mühendisliği ve Orman Meslek Yüksekokulu Öğrencilerinin Çevrimiçi Bilgisayar Destekli Tasarım Öğrenimi Hakkındaki Görüşleri

ÖZ

Bu çalışmada İstanbul Üniveristesi-Cerrahpaşa Ormancılık Meslek Yüksekokulu (VSF), Mobilya ve Dekorasyon ve Orman Fakültesi, Orman Endüstri Mühendisliği (FIE) Bölümü öğrencilerinin bilgisayar destekli çizim eğitimleri, genel gelişimleri ve gelecekleri hakkındaki görüşleri araştırılmıştır. Anket formu 2020-2021 akademik yılının güz döneminde online olarak uygulanmıştır. Her iki bölümün birinci ve ikinci sınıf öğrencileri ile 60 öğrenciden anketler değerlendirmeye alınmıştır. Anket formunda öğrencilerin demografik özellikleri, eğitimleri ve mesleki gelecekleri ile ilgili görüşleri hakkında sorular yer almıştır. Analiz sırasında önce değişkenler kodlanmış, bir veri tabanı oluşturulmuş ve MS Excel yazılımı ile değerlendirilmiştir. Sonuç olarak; öğrencilerin demografik özellikleri, Orman Endüstrisi Mühendisliği Bölümü öğrencilerinin Orman Endüstri Mühendisliği Bölümü ve Ormancılık Meslek Yüksekokulu Öğrencilerinin Bölümlerine ilişkin görüşleri, öğrencilerin bilgisayar destekli tasarım programlarına ilişkin görüşleri değerlendiirlmiştir. Ayrıca öğrencilerin mezuniyet sonrası çalışmak istedikleri sektörler değerlendirilerek yorumlanmıştır.

Anahtar Kelimeler: *Uzaktan eğitim, bilgisayar destekli tasarım, iş hayatı, AutoCad*

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I. INTRODUCTION

The rapid development of technological information and communication creates many teaching and learning opportunities. Technological learning environments bring different lesson plans than classical education [1]. Recently, online applications used for education and training purposes have emerged. The most used sample programs are zoom, skype, discord, teamlink, google hangouts, adobe connect etc. According to a study conducted by Belcheir and Cucek [2] on 254 students having distance education from Boise State University, students' ideas about distance education were examined and the participants showed that distance education's most positive aspect, is its independence from time and place; while the most negative aspect is that it takes more time than classical education and that there are more learning errors. In addition, it has been determined that the participants are generally satisfied with distance education.

Erdoğan et al. [3] examined the attitudes of open high school, open education faculty and some university students in Istanbul towards distance education. According to the findings, in order to obtain sufficient and effective results in the distance education systems designed by universities, the demographic characteristics of the target audience, their interests and attitudes towards distance education should be well determined and the system should be designed in accordance with the needs of the student.

Furthermore, it would be prudent to state that technological developments also affect the structure and functions of educational institutions. Many social systems such as industry, economy and communication expect educational institutions to train individuals who can utilize technology. This expectation includes not only teaching the use of technology but also aplying it in teaching activities [4].

One of the most important features of the dynamic century we live in is the changes that occur in the field of technology during the transition from an industrial society to an information society. These areas of use make themselves felt in the field of education, and as technology develops, the methods used for education change rapidly. Today, since traditional teaching methods are thought to be inadequate, computer technology and software have been used in education, and for this purpose, traditional technology education has been switched. [5].

The first commercial CAD programs developed in the 1970s and provided functions for 2D-drawings and data archival. The transition from 2D drawings to 3D models started in the early 80s, but commercially successful 3D-CAD programs were first introduced about 5 years later. The introduction of 3D surface and solid models resulted in an evolution of design methods from static, two-dimensional drawings in several views and sections to dynamic, three-dimensional virtual geometric product models. Besides a detailed and near-real-life representation of product geometry, these models included a variety of additional information and characteristics [6].

Therefore, the use of computers in an educational environment, even for different purposes, is often referred to as computer-assisted education. Due to the rapid increase in the number of university students, insufficient time, increase in the amount of information, the complexity of the content, insufficient number of academicians, and the importance of individual abilities and differences, the requirements for using computers in education are increasing [7]. The three-dimensional nature of the world increases the 3D requirements of computer drawings. Nowadays, three-dimensional models attract more attention and make visualization closer to reality [8].

Creating a three-dimensional CAD model is the starting point for visualization, and the database containing the model can be realized as two-dimensional presentations such as plan, section, view, perspective [9]. Computer aided visualization and modeling programs used today have significant advantages over traditional techniques (sketch, perspective, model, etc.) [10]. These computer-based

programs contribute to both the design process and the evaluation of the spatial relationships that reflect the ideas of the designer [11].

In addition to the state-of-the-art CAD systems provide functional ities for knowledge-based engineering to support the integration of template models, automated computation routines and even programs into CAD models. These possibilities offer a good basis for shortening development time and increasing productquality at the same time [12]. To that end Goldermens and Hoogenboom [13] defined the visualization as follows: “the transformation of a spatial object into two or three dimensional models that can be perceived by the human mind”.

The fact that visualization contributes to the designer at every stage of the design causes the products to come out as close to the desired results. Visualization software, on the other hand, is preferred more because of its advantages such as fast, low cost, easy storage, revision, zero error rate and easy production [14].

Future CAD platforms will provide enhanced objectoriented programming with integrated functions and operations for the efficientcreation of problem-specific solutions. Design processes will increasingly change from purely geometry creation to integrated development cycles including efficient lay out and simulation. This will be enabled not only by use of integrated standard simulation packages, but also by specialized CAD automatisms, which support design engineers in their work with out over loading them with management of confusing software packages. In addition, future CAD systems will be able to learn from previous development to support the engineers with optimization processes in the background. In this way, the engineers will be supplied with suggestions for their actual design problem, which are based on knowledge delivered by automated algorithms and data bases. In this way, future CAD programs will be able to provide an enhancement of state-of-the-art knowledge based engineering [6], [15],[16].

In addition to ongiong Erdinler et al. [17] examined the opinions of the students of Forest Industrial Engineering Department of Istanbul University, pertaining to their education and future. The survey form was conducted during in 2016 with 102 students. The survey form had questions concerning demographic characteristics of the students, their opinions on their education and their professional future. Accordingly, Erdinler et al. [17] determined that the satisfaction degree of one third of the students was 60% and more. Furthermore, Erdinler et al. [17] revealed that 53.9% of the students were satisfied with their department while 44.1% of the students stated that they consider themselves as sufficient for working in the private sector; and the areas they preferred to work after graduation were project-design, marketing, production planning, R&D, quality control and procurement.

In a similar study conducted out by Sevim Korkut et al [18], 89.8% of the students stated that the materials, tools, equipments, and machinery provided by the department is insufficient for university education, while 71.4% indicated that computer facilities are also not sufficient.

Furthermore in their study, Bülbül et al., [19] assessed the opinions of the graduates from the associate degree program on Furniture and Decoration of the Vocational School of Department of Material and Material Processing Technologies studies through a survey on the education they received. The study was comparing the opinions of the students and their thoughts on the education they receive with the actual problems of the sector. Considering student satisfaction, it has been determined that 77% of the students are satisfied with their program, while 23% of them are not. The majority of the students enrolled in the program (82%) is consisted of Industrial Vocational High School graduates. After Industrial Vocational High School, it's been determined that the second highest student group is the graduates of general high school (6,6%). In addition, according to the study conducted by Keskin et al. [20] in National Vocation Schools Student Symposium 2010; while generally the students from vocational high schools are expected to enroll to the vocational schools, it was also observed that students mainly studied in general high school and not enrolled to any four-year teaching faculty were enrolled in the vocational school. The study reveals that this rate is significantly high with 73%.

II. MATERIAL & METHODS

The content of the study is designed as follows;

-Use of computer aided design programs.
-Survey study conducted between 1st and 2nd year students of the Istanbul University-Cerrahpasa Vocational School of Forestry Furniture and Decoration Program.
-Survey study conducted for 1st and 2nd year students of the Istanbul University-Cerrahpasa, Forest Faculty, Forest Industry Engineering Program.
-Interpretation and comparison of the survey results of the students of both departments

To that end, the study consists of four stages namely: literature review, survey study, evaluation of questionnaires and reporting of the results.

In this study, it is aimed to reveal the satisfaction levels of the students of the Forest Industry Engineering Department of Istanbul University-Cerrahpasa Faculty of Forestry and Istanbul University-Cerrahpasa Vocational School of Furniture and Decoration Program related to their departments. The study was conducted at the end of November during fall 2020-2021. The AutoCAD course is available in the 2nd year of Industrial Engineering students and in the 1st and 2nd year for the vocational school students. The total number of 2nd year students registered in AutoCAD course in Forest Industry Engineering Program was 36. Survey results were obtained from 30 of these students. In addition, the number of registered students in the 1st and 2nd year AutoCAD course in the Vocational School of Forestry Furniture and Decoration Program was 30. Survey results were obtained from all of them. The survey used in the study consisted of 31 questions.

III. THE RESEARCH FINDINGS

The survey form was prepared by using the existing studies in the literature, and the survey form covered questions related to some demographic characteristics of the students, their opinions on the education they receive and their professional future, the problems they encounter related to the department and their recommendations on the solutions. Questionnaires were prepared and sent to students by e-mail. The questionnaire was applied to the students who actively participated in the lessons. The universe of study consisted of total 60 students in the Forest Industry Engineering and Furniture and Decoration Program. Microsoft Office Excel program was used to evaluate the results in the study.

A. DEMOGRAPHIC CHARACTERISTICS OF THE STUDENTS

Data related to the class of the students participating to the survey is provided in Table 1.

Table 1. *Participating students.*

Class	Frequency	Percentage
1	41	68.33
2	19	31.6
Total	60	100

50% of the students participating in the study are male students, and 50% are female students (Table 2).

Table 2. *Genders of the students*

Gender	Frequency	Percentage
Male	30	50
Famele	30	50
Total	60	100

The age range of the students varies between 18 and 25 and the average age is set as 22.

Types of high schools where the students of Forest Industrial Engineering and Furniture and Decoration Program are coming from are provided in Table 3.

Table 3. *Types of high schools where the students have graduated from*

Types of High Schools	Frequency	Percentage
General High School	7	11.66
Anatolian High School	31	51.66
Anatolian Teacher High School	0	0
Industrial Vocational High School	3	5
Religious Vocational High School	6	10
Science High School	0	0
Technical High School	3	5
Anatolian Technical High Schools	6	10
Health Vocational High School	1	1.6
Other	3	5
Total	60	100

51.66% of the students enrolled in the program consisted of Anatolian High School graduates. This is followed by the students who graduated from General High School (11.66%). On the option other (31.6%), the students stated that they have graduated from Anatolian Teacher High School, Industrial Vocational High School, Religious Vocational High School, Science High School, Technical High School Anatolian Technical High Schools, Health Vocational High School.

To that end, 20% of the students graduated from technical high school while 50% of them have taken the computer-aided design program course in technical high school. Students who attended the program in high school stated that the infrastructure was created for the university.

Considering the of the students' English language ability, it has been determined that 5% are very good, 28.3% are good, 41.6% are mid, 18.3% are poor, 6.6% are very poor.

Students were asked to express their math level with a value between 1-5. The average value of the 60 students who answered was 3.1. regarding the question "Does the level of mathematics have an effect on the design program?", 60% of the students said “Yes”, 40% said “No”.

B. STUDENTS OPINIONS ON THEIR DEPARTMENT OF EDUCATION

To begin with, 55% of the students stated that they were satisfied with online education. 51.6% of the students, on the other hand, indicated that they were not stated that satisfied with the online courses on the design program (AutoCAD). Furthermore, 66.6% of the students stated that the computer facilities of the program were sufficient for design courses while 56.6% of the students stated that class hours and practice sufficient in the course within the design program. Nevertheless, 76.6% stated that homework and projects in the course within the design program help to combine your imagination with design. The majority (90%) of the students stated that the student and educator's dialogue effective in learning the design program. Although 46.6% of the students are not stated that need any other resources other than the resources and practical demonstrations used in the course. 55% of the students stated that they did not need to take a design course other than the one taught in their program. Students who answered this question as “no” stated that they would lke to learn additional programs such as 3d max, sketch up, photoshop, top solid, etc. (Table 4).

Table 4. *Opinions of Students on Their Department*

Opinions	Yes		No	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Are you satisfied with online education?	33	55	27	45
Are you satisfied with the online courses on the design program?	29	48.33	31	51.66
Do you think the computer facilities of your program are sufficient for design courses?	40	66.6	20	33.3
Do you think class hours and practice are sufficient in the course within the design program?	34	56.66	26	43.33
Do you think homework and projects in the course within the design program are helpful to combine your imagination with design?	46	76.6	14	23.3
Do you think the student and educator's dialogue effective in learning the design program?	54	90	6	10
Do you need any other resources other than the resources and practical demonstrations used in the course?	28	46.6	32	53.33
Do you need to take a design course other than the one you take in your program?	27	45	33	55
Do you think design programs can be learned enough in online education?	27	45	33	55

Table 5. *Students' thoughts about their program in the field of design.*

Opinions	Enough		Not enough	
	Frequency	**Percentage**	**Frequency**	**Percentage**
What do you think about the adequacy of the professional trips and observations organized by your program?	30	50	30	50
What do you think about the adequacy of the design, technical drawing, etc. course type and content given in your program for the private sector?	42	70	18	30

As seen above, 50% of the students stated the adequacy of the professional trips and observations organized by their program as good enough, while 50% of them disagreed. Furthermore, 'What do you think about the adequacy of the design, technical drawing, etc. course type and content given in your program for the private sector?' was asked to the participants. Accordingly, 70% of the students stated enough but 30% are not (Table 5). Students who think they are not proficient stated that they will complete the deficiencies with additional courses, more practice, internship, research, etc.

Table 6. *Students comparing their department with a department in another university*

Opinions		Frequency FIE	Percentage FIE	Frequency VSF	Percentage VSF
Are you aware of the education provided by your depatments of other universities?	Yes	7	23.3	5	16.6
	No	23	76.6	25	83.3
If your answer is Yes, can you please compare your department in terms of education quality with the departments of other universities?	Good	3	42.85	2	40
	Average	2	28.57	1	20
	Bad	2	28.57	2	40

In terms of the question about the awereness of the education provided in Table 6, 23.3% of the forest industrial engineering department students answered "Yes" while 76.6% answered "No" to the question. In addition to that, 23.3% of the students who answered this question as "yes" indicated that the quality of education in their departments was average, 42.85% said "good" and 28.57%" bad" (Table 6).

Furthermore, to the same question about awareness of the education, 16.6% of the forest industrial engineering department students answered "Yes" and 83.3% answered "No" to the question. 16.6% of the students who answered this question as "Yes" stated that the quality of education in their departments as follows: 40 % "average", 40% "good" and 20% "bad" (Table 6).

Finally, with respect to the opinions of the students related to the compliance of the education in the department to the private sector, 58.3% of the students stated that the program is behind the private sector, 15% stated that the program is at par with the private sector, and 28.7% stated that the program is ahead of the private sector.

C. OPINIONS OF THE STUDENTS ABOUT COMPUTER AIDED DESIGN PROGRAMS

To the question 'Do you keep track of newly released computer hardware, software and programs?' 21.6% of the students answered "Yes", 41.6% of the students stated sometimes and 81.6% answered "No".

Table 7. *Opinions of the Students About Computer Aided Design Programs*

Opinions	Yes		No	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Do you think the language of the design programs in English or another foreign language limit your design skills?	16	26.6	44	73.3
Do you have any information about the machine-design relationship?	17	28.3	43	71.6
Do you think it is important to know before beginner level in design program use?	55	91.6	5	8.3
Do you think the installation, procurement and software updates of design programs easily available?	37	61.6	23	38.3

As seen in table 7, 73.3% of the students stated the language of the design programs in English or another foreign language does not limit their design skills. In modern production techniques, machines work integrated with design programs. Nevertheless, 71.6% of the students also indicated that they do not have any information about the machine-design relationship. Furthermore, to the question of 'Do you think it is important to be familiar with the software before beginner level in design programs?'91.6% of the students answered "Yes" and 8.3% answered "No".

Ease of access is important to users for the use of common computer programs. For the related question, 61.6% of the students stated that the software provides easy access, while 38.3% of the students stated that it was not easy to access (Table 7). The students who stated that the programs were easy to find stated that they were generally able to find them on the internet.

D. SECTORS THAT THE STUDENTS WANT TO WORK IN AFTER GRADUATING

The sectors that the students want to work in after graduating related to the forest industry engineering program they are currently studying are provided in Table 8.

When the sectors which the students want to work after graduating are examined, it is observed that 46.6% wants to work in furniture, 6.6% in particleboard, 20% in public, 6.6% in timber, 3.3% in fiberboard, and 10% in door-window sector. In addition to this, 6.6% of the students stated that they want to work in plywood, wooden structure, parquet, composite, recycling, academician, business, and other non-department sectors.

Table 8. *Sectors that the Forest Industrial Engineering Program students want to work in after graduating*

Sector	Frequency	Percentage
Furniture	14	46.6
Particleboard	2	6.6
Public	6	20
Paper	0	0
Timber	2	6.6
Fiberboard	1	3.3
Door, window	3	10
Others	2	6.6

The sectors that the vocational students would like to work after graduating related to the program that they are currently studying are provided in Table 9.

When the sectors which the students want to work after graduating are examined, it is observed that 53.3% want to work in furniture, 13.3% in public and 13.3% in door-window sector. In addition to this, 20% of the students stated that they want to work in plywood, wooden structure, parquet, composite, recycling, academician, business, and other non-department sectors.

Table 9. *Sectors which Vocational School of Forestry, Furniture and Decoration Program students want to work in after graduating*

Sector	Frequency	Percentage
Furniture	16	53.3
Particleboard	0	0
Public	4	13.3
Paper	0	0
Timber	0	0
Fiberboard	0	0
Door, window	4	13.3
Others	6	20

The sectors that the students want to work in after graduating related to the forest ındustry engineering program and Vocational School of Forestry, Furniture and Decoration Program they are studying are provided in Figure 1.

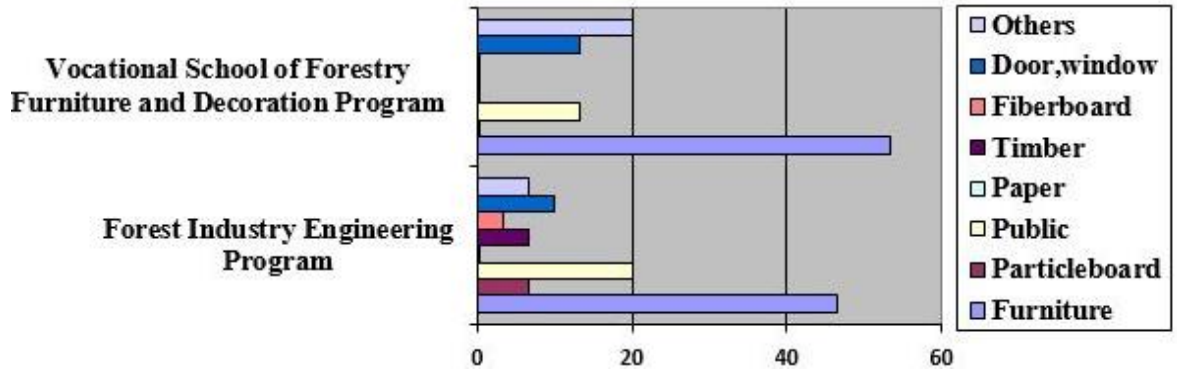

Figure 1. *The Students Want to Work in After Graduating.*

E. FIELDS THAT THE STUDENTS WANT TO WORK IN AFTER GRADUATING

When the fields which the Forest Industry Engineering Program students want to work after graduating are examined, it is determined that 26.6% of the students want to work in production planning, 16.6% in production, 16.6% in marketing, 20% in the project-design field. In addition to this, 10.8% of the students stated that they also want to work in fields such as civil service, banking, police officer etc (Table 10).

Table 10. *Fields to work in after graduating from Forest Industry Engineering Program students*

Work Area	Frequency	Percentage
Production Planning	8	26.6
Production	5	16.6
Marketing	5	16.6
Project-Design	6	20
Other	4	13.3

When the fields which the Forestry Vocational School of Forestry, Furniture and Decoration Program students want to work after graduating are examined, it is determined that 26.6% of the students want to work in production planning, 20% in production, 13.3% in marketing, 26.6% in project-design field. In addition to this, 13.3% of the students stated that they also want to work in fields such as civil service, banking, police officer etc. (Table 11).

Table 11. *Fields to work in after graduating from Vocational School of Forestry, Furniture and Decoration Program students*

Work Area	Frequency	Percentage
Production Planning	8	26.6
Production	6	20
Marketing	4	13.3
Project-Design	8	26.6
Other	4	13.3

The fields which the students would like to work after graduating related to the Forest Industry Engineering Program and Vocational School of Forestry, are provided in Figure 2.

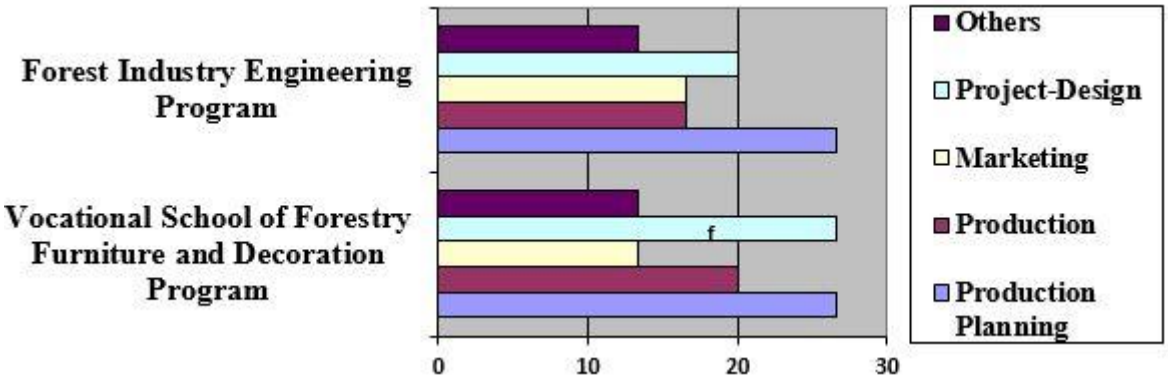

Figure 2. *Fields which the Students Want to Work In After Graduating*

Finally, to the question of 'Do you consider yourself qualified to work in the private sector?' was addressed to the participants and accordingly, 40% Vocational School of Forestry, Furniture and Decoration Program students answered "Yes" while 60% answered negative. Furthermore, 40% of Forest Industry Engineering Program students answered "Yes", 60% answered "No" to the same question. Thus, it is observed that while 40% of the total 60 students were ready to work in the private sector, 60% of them stated that they were not.

IV. CONCLUSION & DISCUSSION

The study was applied as a questionnaire to 60 students studying at Istanbul University-Cerrahpasa Forest İndustry Engineering Program and Vocational School Furniture And Decoration Program. Students' general views of the computer-aided design course about distance education, their general development and their future were investigated. Survey questions are examined under 5 main headings.

Due to the current pandemic, distance education has been started quickly. This situation has made most students anxious for some practical lessons. Contrary to the fact that distance education is available anytime and anywhere, it has become a problem for students due to some technological materials (computer, camera, microphone, etc.) that they cannot provide, reducing their interest in the lesson. For lessons that require both an advanced computer and a program such as AutoCAD, distance education may be weak in learning. On the other hand, distance education videos of these courses could be purchased before the pandemic. In this case, it has been observed that students are psychologically stuck as they have to switch to distance education quickly due to the pandemic. In the study conducted to evaluate this situation through the eyes of the students, the effect of distance education on students whether to learn or not CAD design programs was investigated using a questionnaire method. It has been interpreted by the lecturers.

- 55% of the students stated that they are satisfied with online education. 51.6% of the students stated that they are not stated that satisfied with the online courses on the design program. 66.6% of the students stated the computer facilities of their program as sufficient for design courses for both programs. Accordingly, findings from Demuyakor, J. [21] show that the implementation of online learning programs is a very good idea, as the majority of the sampled students support the initiative.

- 56.6% of the students stated that class hours and practice are sufficient in the course within the design program, while 76.6% stated that homework and projects in the course within the design program help to combine your imagination with design. The majority (90%) of the students stated that the student and educator's dialogue effective in learning the design program. Although 46.6% of the students are not stated that need any other resources other than the

resources and practical demonstrations used in the course. 55% of the students are not stated that need to take a design course other than the one you take in their program. Students want to learn the design programs they want to learn from outside; they exemplified programs such as 3d max, sketch up, photoshop, top solid, etc.

- 50% of the students stated that the adequacy of the professional trips and observations organized by their program is sufficent, while 50% are dissatissfied. Furthermore, the question 'What do you think about the adequacy of the design, technical drawing, etc. course type and content given in your program for the private sector?' was asked to the participants and. 70% of the students stated as enough. Students who think they are not proficient stated that they will complete the deficiencies with additional courses, more practice, internship, research, etc. In a similar study carried out by Erdinler et al. (2016), majority (76.5%) of the students stated that they willexperience a concern for finding a job after graduating [17].

- In modern production techniques, machines work integrated with design programs. Nevertheless 71.6% of the students are not any information about the machine-design relationship. 'Do you think it is important to know before beginner level in design program use?'91.6% students answered Yes and 8.3% answered No to the question.

- When the fields which Vocational School of Forestry Furniture and Decoration Program students want to work after graduating are examined, it's been determined that 26.6% of the students want to work in production planning, 20% in production, 13.3% in marketing, 26.6% in project-design field. In addition to this, 13.3% of the students stated that they also want to work in fields such as civil service, banking, poliçe officer etc. In a similar study carried out by Bülbül et al., majority (69.9%) of the students stated that they consider themselves as sufficient for working in the private sector after graduating.

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