

*Research Article*

# Engineering Education Elements and their Assessment by the Labor Market

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## Abstract

*Albania has a significant number of wood-processing entities, which constitute one of current and future employment potential for the Wood Processing Engineers. The main purpose of this study is the Perception of these subjects of some of the elements of the curriculum that affect the wood processing engineers' education, in accordance with the labor market. The data collected through a structured questionnaire for this purpose, are thrown into a database (Excel) from where they are analyzed to generate the results given in this paper. The selection of respondents is made by purposeful sampling, as access to a non-probability sample. The selected mode of surveying process is the "face to face" one. The material prepared refers to 100 surveys carried out throughout Albania. There have been selected those production subjects that operate in the field of production and trading of furniture and which are well-known in the market. The study shows that respondents evaluate as very important the scientific and vocational education of the Wood Processing Engineers. The Professional Practice of students is considered as very important by 90% of respondents. Respondents also think that Professional Practice is better to be organized by payment. Practices should be implemented in the manufacturing, designing and the relationship with the client. Rubrics also are considered of vital importance; Exercises, Course Assignments and Projects. Knowledge on new technologies by Wood processing Engineers and foreign languages are considered very important by respondents. Professional practice and Diploma thesis are thought to be developed simultaneously.*

**Keywords:** manufacturing entity, professional practice, wood-processing.

## 1. Introduction

This study is based on surveys carried out throughout Albania. In Albania a significant number of Wood Processing entities exercise their activity distributed across the country, particularly in major centers like; Tirana, Durres, Shkodra, Elbasan, Vlore, FusheKruje etc. They range from small craft shops to powerful production units. The greatest number consists of well-managed "Custom Furniture" businesses with 3-5 employees.

In Albania there are about 800 manufacturing entities with approximately 9000 employees. In conducting the research were selected the most popular entities, essential in the market. These entities have employed a significant number of specialists, workers and wood processing engineers. They have the machineries, the technological lines as well as the current and future employment potential for engineers. This study is based on analysis of surveys conducted on 100 most prominent subjects spread throughout Albania.

Data collection was conducted through structured questionnaires for this purpose, wherein all manufacturing entities express their opinion regarding their needs for Wood Processing engineers and their field of specialization.

Surveys conducted are a good sample of representation, to create a clear picture and to meet the main study objectives as follows:

- Verification of the main Wood Processing entities in Albania.
- Market research to attest the real needs for Wood Processing engineers and their qualities.
- Some elements of vocational training scientific and wood processing engineers as estimated production subjects.

## 2. Materials and Methods

The methodology used for the implementation of this study is:

- The identification of entities operating in the Wood Processing field in Albania.

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- Drafting of the questionnaires necessary for this purpose, by which, all manufacturing entities provide their assessment regarding elements of engineering education.
- Direct contact of manufacturing entities.
- Completion of the questionnaires through interviews / face to face surveying.
- Data Analysis

**3. Data Collection**

The questionnaire designed for the data collection is a structured questionnaire.

It includes both open-ended and filtering questions.

The questionnaire is aimed at approaching a common format / usable for enabling the establishment of an engineer profile as perceived by the manufacturing entities / THE MARKET.

The data collected are filed into a database (Excel) to be further analyzed and in order to meet the objectives of the study.

**4. Surveying Data and their Analysis**

**This document includes the results of surveys on 100 main businesses.**

Surveys were conducted primarily with entrepreneurs / managers of these entities, but in some cases with employed engineers, managers or economists. In order to receive a clearer picture, also the engineers who run the activity themselves, are considered as employed. Table 1 provides the data on the entities surveyed

**Table 1.**Summary data of the entities surveyed

No	Code of the respondents	Total employed	Workers Specialists	Employed Engineers	Needs for Engineers
1	A001	7	6	1	0
2	A002	7	7	0	1
3	A003	4	4	0	0
4	A004	4	4	0	0
5	A005	10	10	0	1
6	A006	4	4	0	0
7	A007	8	8	0	1
8	A008	6	6	0	1
9	A009	4	4	0	0
10	A010	6	6	0	1
11	A011	5	5	0	0
12	A012	50	48	2	0
13	A013	18	17	1	0
14	A014	8	8	0	1
15	A015	8	7	1	1
16	A016	6	6	0	0
17	A017	4	4	0	0
18	A018	7	7	0	1
19	A019	4	4	0	0

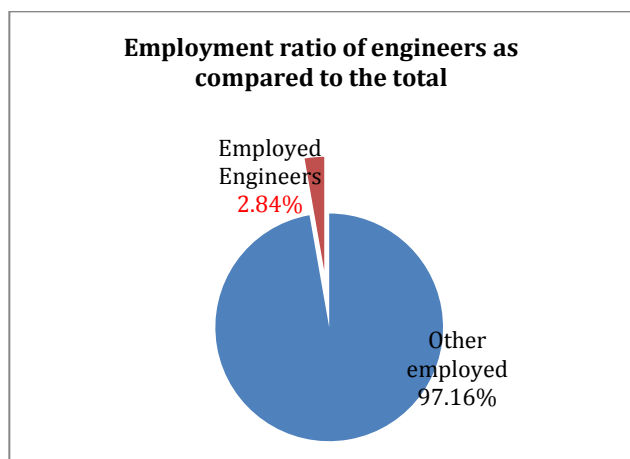
20	A020	7	6	1	0
21	A021	23	23	0	1
22	A022	8	8	0	0
23	A023	60	58	2	0
24	A024	13	13	0	1
25	A025	6	6	0	0
26	A026	12	11	1	1
27	A027	4	4	0	0
28	A028	4	4	0	0
29	A029	4	4	0	0
30	A030	5	5	0	0
31	A031	13	12	1	1
32	A032	6	6	0	1
33	A033	12	12	0	0
34	A034	11	11	0	0
35	A035	4	4	0	1
36	A036	60	56	4	0
37	A037	30	30	0	1
38	A038	13	11	2	0
39	A039	40	39	1	0
40	A040	20	19	1	1
41	A041	10	10	0	1
42	A042	17	17	0	1
43	A043	12	11	1	0
44	A044	14	13	1	0
45	A045	40	37	3	0
46	A046	40	39	1	1
47	A047	20	19	1	0
48	A048	7	7	0	0
49	A049	40	40	0	1
50	A050	8	8	0	1
51	A051	12	11	1	0
52	A052	8	7	1	0
53	A053	6	6	0	0
54	A054	14	14	0	0
55	A055	5	5	0	0
56	A056	8	8	0	0
57	A057	7	7	0	0
58	A058	6	6	0	1
59	A059	15	14	1	0
60	A060	5	5	0	0
61	A061	12	12	0	0
62	A062	10	9	1	0
63	A063	11	11	0	1
64	A064	6	5	1	0
65	A065	7	7	0	1
66	A066	6	6	0	0
67	A067	8	8	0	0
68	A068	52	51	1	0
69	A069	43	43	0	0
70	A070	6	6	0	0
71	A071	8	8	0	1
72	A072	5	5	0	0
73	A073	5	5	0	0
74	A074	7	7	0	1
75	A075	20	20	0	0
76	A076	4	4	0	0
77	A077	11	11	0	0
78	A078	17	16	1	0
79	A079	6	6	0	0
80	A080	13	13	0	0
81	A081	16	15	1	0
82	A082	7	7	0	0
83	A083	8	8	0	0
84	A084	14	14	0	0
85	A085	15	15	0	1

86	A086	10	9	1	0
87	A087	4	4	0	0
88	A088	5	5	0	0
89	A089	15	15	0	1
90	A090	10	9	1	0
91	A091	8	7	1	1
92	A092	9	9	0	0
93	A093	5	5	0	0
94	A094	5	5	0	0
95	A095	5	5	0	0
96	A096	30	30	0	0
97	A097	8	8	0	0
98	A098	5	5	0	0
99	A099	5	5	0	1
100	A100	5	5	0	0
TOTAL		1265	1229	36	30

**Surveying data on**

*a. Employment ratio of engineers*

In relation to other employees as; specialists with long work experience, assistants, workers etc. Wood Processing Engineers result in a small percentage compared to the total number of employees in this sector. The data obtained from the questionnaires show the following employment ratio (figure 1.1).



**Figure 1.1:** Employment ratio of engineers as compared to the total number of employees

*b. The need for engineers*

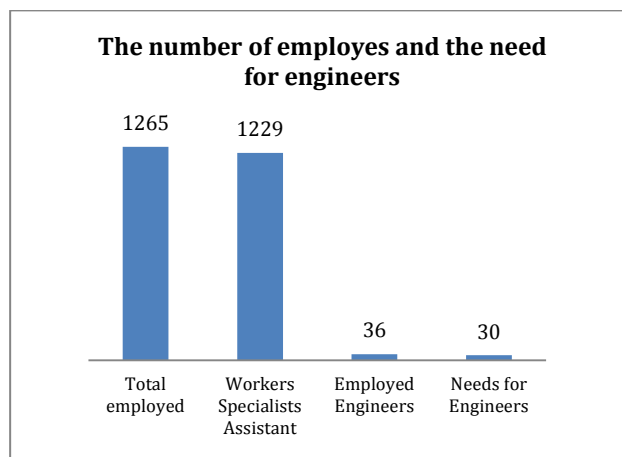
The data show; that only to surveyed entities the needs for Wood Processing engineers are also for 30 versus 36 engineers employed.

- Assessment of Engineers' Skills according to the perceptions of the Respondents

In the Department of Wood Industry at the Faculty of Forest Sciences except education subjects / disciplines, dealing with the theoretical aspect, the curriculum also includes:

- Exercises, Course Assignments and Projects

- Practical Classes and field Excursions
- Professional Practice
- Diploma Thesis



**Figure 1.2:**The number of employees and the need for engineers

The above elements are considered as a component of university education (engineering) and constitute an important part of the curriculum in the Bachelor and Master levels.

Through questionnaires we have requested an opinion from manufacturing entities related to the importance of each of these components in the professional and scientific education of Wood Processing engineers.

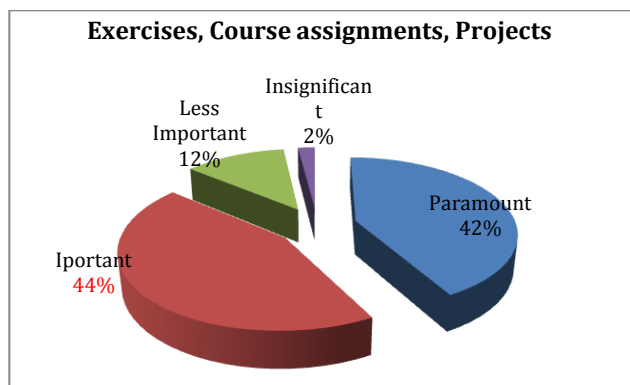
The data collected from the survey are filed into a database and it is made their analysis. For each of the groupings, it is received an assessment showing that they have been quoted by importance, as perceived by the respondents. The assessment in the questionnaire is taken in words and specifically; **Paramount / Important / Less Important / Insignificant.**

1. The results are given in the tables and graphs that follow.

**Table 2:** Assessment by Respondents, for the Rubrics; Exercises, Course Assignments and Projects

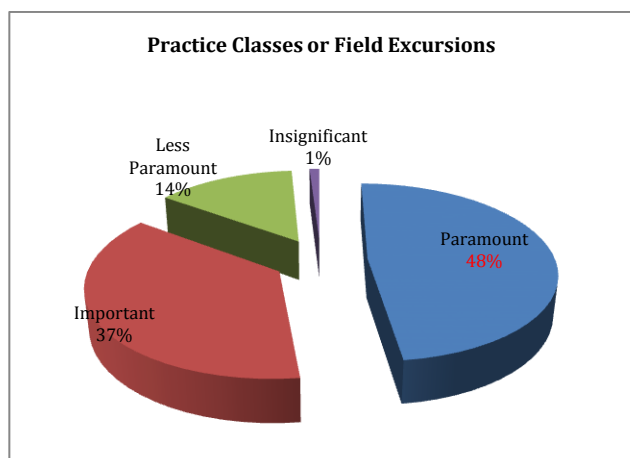
Assessment	Exercises, Course Assignments and Projects	Practice Classes or field Excursions	Professional Practice	Diploma Thesis
Paramount	42	48	90	33
Important	44	37	9	48
Less Important	12	14	1	13
Insignificant	2	1	0	6
TOTAL	100	100	100	100

Results in Table 2 are reflected in the graphs below.



**Figure 2.1:** Graphical presentation of the assessment for the rubrics; Exercises, Course assignments and projects.

The graph shows that the above sections are considered by respondents from important to very important in the education of engineers.



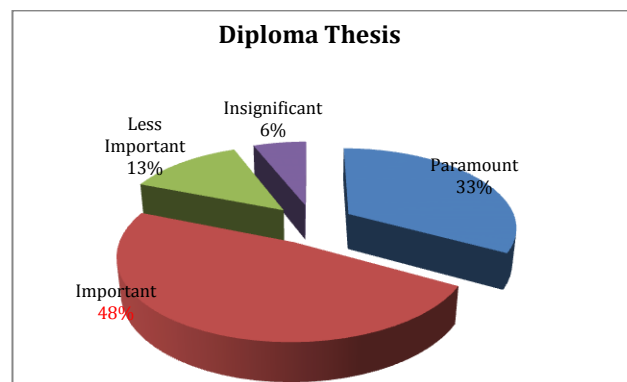
**Figure 2.2:** Graphical presentation of the assessment for the rubrics; Practice Classes or Field Excursions.

The graph shows that in the education of engineers, the above sections are considered by respondents from important to paramount. Respectively, 48% of them say that they are paramount and 37% think that they are important.



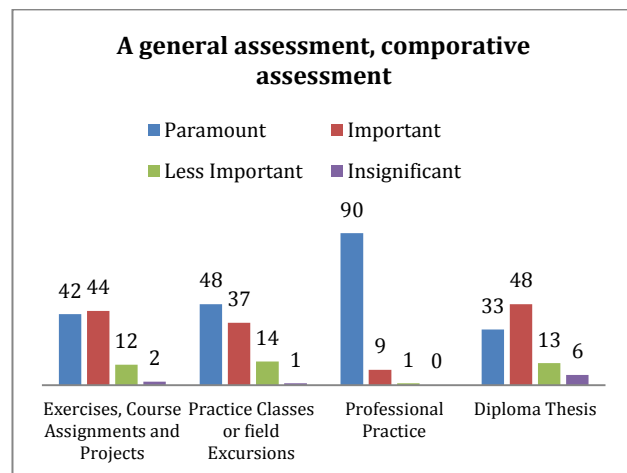
**Figure 2.3:** Graphical presentation of the assessment for the Professional Practice

The majority of respondents think that the Professional Practice plays a paramount role in the education of engineers. Respectively, 90% of them have quoted it as paramount.



**Figure 2.4:** Graphical presentation of the assessment for the Diploma Thesis

The majority of respondents, respectively 48%, say it is "important" and 33% think that it is paramount.



**Figure 2.5:** Graphical presentation of the general assessment.

*A comparative assessment*

The graph shows a higher rating for the Professional Practice. The second in importance to respondents are ranked the Practise Classes and field excursions that again they tend towards practice. Then, they consider the exercises, projects and coursework. Diploma Thesis is less quoted.

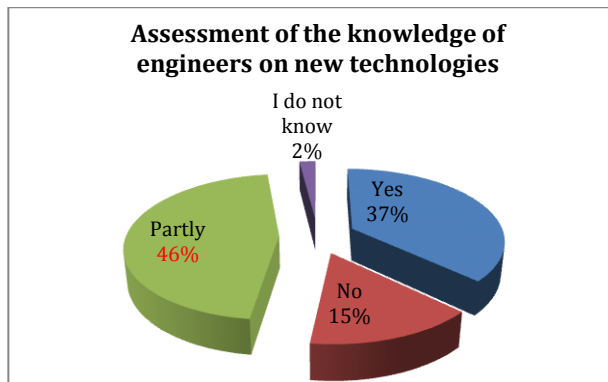
- Assessment of the following question by respondents;

*In your opinion, wood processing engineers suit to the new technologies used?*

Results are given in the table below.

**Table 3:** Assessment by the respondents of the knowledge of engineers on new technologies.

Assessment by the respondents of the knowledge of engineers on new technologies.				
Assessment	Yes	No	Partly	I do not know
Number	37	15	46	2
Percentage	37%	15%	46%	2%



**Figure 3:** Graphic presentation of assessment of the knowledge of engineers on new technologies.

As seen from the graph above, by perception of manufacturing entities, knowledge of Wood Processing Engineers regarding new technologies needs improvement

- Assessment of the following question by respondents;

*How important is knowledge of foreign languages for a wood processing engineer?*

Results are given in the table below.

**Table 4:** Assessment of 100 respondents in relation to engineers' knowledge on foreign languages.

Assessment of respondents in relation to engineers' knowledge on foreign languages.				
Assessment	Paramount	Important	Less Important	Insignificant
Number	30	59	8	3
Percentage	30%	59%	8%	3%

The perception of manufacturing entities for Wood Processing Engineers related to the knowledge of foreign languages shows that they give a considerable importance to this knowledge. This can be explained by the fact that new technology is imported from EU countries and on the other hand it has a tendency to be released with export products.

- Assessment of the following question by respondents;

*How can the Students' Professional Practice be better realized ?*

Results are given in the table below.

**Table 5:** Assessment by the respondents on the development of Students' Professional Practice.

Professional practice Implementation from students				
Assessment	Method of employment		Method of organization	
	Payment	No payment	In a group of students	Individually
Number	70	30	40	60
Percentage	70%	30%	40%	60%

So, respondents feel that the professional practice that students develop at the end of their studies is better to be conducted through paid employment. They think that such a way motivates students to be more committed to learn more and also makes them more responsible in their work position where they simultaneously develop the practice as well.

Respondents think that professional practice is more effective if developed individually. This assessment is given by 60% of them, versus 40% who are in favor of the organization of Professional Practice in groups of students.

- Where can students' Professional Practice be better accomplished?

Results are given in the table below.

**Table 6:** Assessment by the Respondents of the position where Practice can be developed.

Position where possible with good professional practice				
Assessment	Under Manufacturing Process	In relationship with the client	In the designing process	In all jointly
Number	44	2	3	51
Percentage	44%	2%	3%	51%

Regarding the position where professional practice can be developed 51% of respondents think that the students should develop the practice in manufacturing, in design and in the relationship with the client, ie all these together.

While 44% of them think that students should be exercised only in manufacturing and very few are for its development only in designing and only in communication with the client.

- Assessment of the following question by respondents;

*Do you think Diploma Theses and Professional Practice should be developed together or separately (in terms of time)?*

Results are given in the table below.

**Table 7:** Assessment by the Respondents of the Diploma Theses and the Professional Practice.

Diploma theses and the Professional Practice should be developed jointly or separately (in terms of time)			
Assessment	Jointly	Separately	I do not know
Number	59	38	3
Percentage	59%	38%	3%

Most of the respondents, 59% of them, think that students should develop both professional practice and the diploma theses simultaneously, versus 38% of which claim to develop them separately.

**Conclusions**

- In Albania, Wood Industry sector appears to be employing a relatively low percentage of engineers. Meanwhile, the market needs more.
- Among components of university education (engineering), professional practice is considered as paramount by the respondents.
- Second in importance the respondents list the Practice Classes and Field Excursions.
- Then, they list the Course Exercises, Projects and Tasks, that play an essential role in the education of engineers.
- Knowledge that wood processing engineers have on new technologies need improving. The market is very interested in various technological innovations.
- The majority of respondents think that Professional Practice must develop free and individually.

- Students have to develop practice in manufacturing, in the design and in the relationship with the client but manufacturing is at the top.
- Professional Practice and Diploma Thesis are supposed to be developed simultaneously.
- For the Wood Processing Engineers knowledge of foreign languages is considered very important by respondents.
- It should be intensified the interaction between the University and business.
- It should be aimed at improving the curriculum to increase the practicality of the implementation of the knowledge gained.
- There should be found the mechanisms that set in motion the coordination of the market for the development of the Professional Practice.
- To consolidate the knowledge gained from the period of study, it is more efficient for students to develop Professional Practice through paid employment.

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