25 YEARS OF THE ENGINEERING DESIGN PROGRAM: CHALLENGES AND SUCCESSES

Regina Raycheva
University of Forestry, Sofia, Bulgaria
e-mail: r_raycheva@ltu.bg

ABSTRACT

The paper is an attempt to summarize 25 years of experience of Furniture Design Education at the University of Forestry. The author attempts to look at the whole complex circle of problems facing the management and teaching staff at the university, such as compiling of curriculum and syllabi, creating study content and textbooks, securing study space and all organizational issues. On the non–material side key issues were: awareness of the creative nature of the designer's profession; establishing of artistic ethos and new relationship between staff and students; innovative teaching methods encouraging self-confidence and presentational skills of young people. These issues include not only staff and facilities, but also active involvement of students. Here we mean active student participation in: mobility programs abroad, national and international workshops, annual exhibitions, introducing opportunities for professional career at the university. In this line we can add the educational module "Project Week" and links with business. Meanwhile, positive program accreditation of the Engineering Design Program by the National Accreditation Agency; as well as the image of our alumni and their overall professional career gave the first rewarding signs. Last but not least, the report compares the program with analogical programs elsewhere in Europe with consequent conclusions for success and failures.

Key words: design, creativity, engineering design, education.

"…this elusive creature called design".

INTRODUCTION

A quarter of a century has passed from the beginning of the program that presently bears the name "Engineering Design (Interior and Furniture Design)". This took place in the academic year 1995/1996, when the first cohort of students was admitted at the University to follow the original five–year Master program. In this keynote paper, the author is not making a chronologic expose of the turbulent changes and organizational challenges; but just marks some of the issues that appeared and the experience of the past years of creating this one-time new, and today 25–year-old designer program.

SOME THEORY FOR A START: ABOUT DESIGN AND CREATIVITY

Before we begin our overview, let us give two definitions on the notion of design:

According ICSID [1] (the International Council of Societies of Industrial Design), "Design is the professional practice of designing products, devices, objects, and services used by millions of people around the world every day. Industrial designers typically focus on the physical appearance, functionality and manufacturability of a product, though they are often involved in far more during a development cycle. All of this ultimately extends to the overall lasting value and experience a product or service provides for the end–users. Therefore, design is a major factor for innovative humanization of

technology and a key factor for cultural and economic exchange". The Industrial Design Society of America (ISDA) gave the following definition [2]: "Industrial design (ID) is the professional service of creating and developing concepts and specifications that optimize the function, value and appearance of products and systems for the mutual benefit of both user and manufacturer."

Of these two definitions we can conclude, that design is "more than just giving an object a pleasing form" [3].

They widen the range of design activity by including processes, services and systems in their whole life cycle. The aim of designer activity is to direct technology so that it responds human needs, to be humanized and be a bridge to the human being and his needs. The strategic task of design is to be the key factor for development of market relations, of culture and quality of life [3].

The designer, therefore, is a creative person, who is expected to think innovatively. The educational system is confronted with the question: "How can we teach students to be creative?" When in 1999 I asked this question to a colleague in Glasgow School of Art, he said "We cannot teach them. We can only create conditions for them to reveal their innate creativity". How can this be done? Can we, from one traditional educational model, that relies on passive information and data, move to another, creatively oriented model, that relies on active intuition and imagination? "Creativity is the act of turning new and imaginative ideas into reality." [4] "Creativity is a combinatorial force: it's our ability to tap into our 'inner' pool of resources – knowledge, insight, information, inspiration and all the fragments populating our minds – that we've accumulated over the years just by being present and alive and awake to the world and to combine them in extraordinary new ways." [4]. Can creativity be learned? The short answer is yes. A study by George Land reveals that we are naturally creative and as we grow up, we learn to be uncreative. Creativity is a skill that can be developed and a process that can be managed" [4].

EXPOSE

SOME HISTORY

The thought of telling everything about those 25 years is threatening. What we can do is to only pinpoint certain moments. The beginning was very enthusiastic. The model we followed for the new program was the one of existing engineering and architectural education: lectures, seminars, studio classes and designs, as a content model. An existing post–graduate two–year course in furniture design at the University of Forestry served as a basis for the curriculum. As soon as 1998, however, it had to be changed [9]: intensive work had to be done to bring the new curriculum in compliance with the three–stage education and the European Credit Transfer and Accumulation System, according to the new Law of Higher Education. The result of this time–consuming and laborious activity was the creating of the program's documentation. Faculty and department leaders did (and still do) the organizational work to gather the teaching staff. The first two successful accreditations in 2002 (starting) and 2010 (further accreditation) followed [12]: with a very high result. In this first 5-year period, the original establishing of teaching content began, and the first books were published, financed by European SJEP Tempus Phare project. The years to follow were filled with activities: our first cohorts became highly respected professionals and lecturers; the teaching staff continued to change, and important European projects were joined in order to increase the level of education. New

facilities (study halls) were added; important courses were developed or included. The big question of practical education came up to be solved with the 2010 accreditation procedure [13]; and after the third accreditation in 2016 [12], we are beginning to consistently build close connections with the business and have our pre–diploma traineeships started [14].

CURRICULUM AND CONTENT

The original curriculum of the Engineering Design program was compiled by a work group of three teachers (among them, the author of this report), led by the Dean of the Faculty. The model that was followed was the existing Engineering program called "Mechanical Technology of Wood" for engineers in furniture and woodworking. The initial program consists of two years fundamental basis which was followed initially by three years of theoretical design courses in "Form building" Theory of Composition", practical design courses in Residential and Contract Furnishing, etc. The structure of basis plus upgrading with specializing courses marked the beginning of the program with some controversy. In spite of this, the curriculum was created as a unified effort of teachers of the whole faculty. Lecture burden was too big, and less attention was paid to creative and artistic elements of the program. We are not, though, the only university that faced such issues. Here we quote an American paper, where it is proved that: "… the subject [of design] seems to occupy the top drawer of a Pandora's box of controversial curriculum matters, a box often opened only as accreditation time approaches. Even 'design' faculty – those often segregated from 'analysis' faculty by the courses they teach – have trouble articulating this elusive creature called design". Design faculty across the country and across a range of educational institutions still feel that the leaders of engineering departments are unable or unwilling to recognize the intellectual complexities and resources demanded to support good design education [5]". In agreeing with the above we shall add that the official Dean's yearly reports [9], [10], [14], as well as the Self–evaluation reports for the Accreditation Procedures for the "Engineering Design" Program, the last one being in 2017 [12], mark the important and necessary procedural steps to organize teaching and study plans. The initial aim was to comply to the new Law of Higher Education, the three–stage educational structure and launching the credit system. The need of further development of Bachelor and Master curricula by reducing the lecture load and also the improving of practical education led to more actualizations and the pre–diploma traineeship. Teaching load was assigned to the "Interior and Furniture Design" Department whose members were the ones to develop content and syllabi for those courses that did not exist before at the University. This made their work exhausting in the first 10 years of the Design Program. The last Dean's report in 2020 [14] of the present Dean in a statistically clear manner gives the idea of the present state of the Design Program with figures and data; this also shows a great shift towards criteria established by the National Accreditation Agency. The task to compile the basic study content and to outline the borders of the new Design Program in Bachelor and Master Level was fulfilled.

TEACHING STAFF

The basis was and still is taught by lecturing staff from the Faculty of Wood Industry; the specializing block was assigned to the newly created Interior and Furniture Design Department and the Furniture Manufacturing Department. Teaching staff included a number of specialists with different background,

full-time and part-time staff from other universities. It should be noted that at the beginning, teachers with designer background were few. The tendency was to complete the teacher team with full-time staff for most of the courses. In time, in concordance to this policy, the staff grew and became younger. The first cohort of the program became assistants and doctoral students at the Interior department, and formed a coherent core. The Project weeks have invited more staff from abroad, from the business, due to the participation of the University in the European educational programs.

FACILITIES

The state of material conditions was a striking difference with established high schools abroad, where the Product and Interior Design students work in studios with a constant working stations for each student. There, they can work on their models in well–equipped workshops with machines and materials. At the beginning, the Interior Department could use only 2 specialized study halls. The situation changed after the year 2000, with a number of other small rooms for seminars were given only for the new program. One of them was equipped under the Tempus Phare project. Today, the material conditions improved considerably after the finishing of construction of the 5th floor above the Building A of the University, where we have rooms, only intended for the new Design Program.

THE EDUCATIONAL PROGRAMS OF THE EUROPEAN UNION

In 1996, a team of teaching staff members of the Interior Design Department applied at the European Commission in Education in Brussels with a Joint Project under Tempus together with two more European universities; this application was successful, and a project under TEMPUS S_JEP–12479–97 was started in 1997. The aim of the Tempus project was basically to develop teaching materials and to buy equipment. Secondly, the aim was to make connections with other analogical universities in Europe. During the time of this Joint European Project (1997–2000), Bulgaria was a pre–accession country for EU; while due to the Tempus Program it became possible to get acquainted closely with educational programs and teaching methods abroad. Tempus Partners were The University of Applied Sciences in Stuttgart, Germany; The Glasgow School of Art and the Edinburgh College of Art in Scotland. In the year 2000, the first three-day workshop in rendering techniques was organized with the enthusiastic help of Prof. Eberhard Holder from Stuttgart. It was a proof to all of the 20 students, who attended the workshop, that drawing is possible for everyone under the leadership of an experienced teacher. In the academic year 2000–2001, the start was given to a new academic exchange program under the name Socrates (today Erasmus+) for students and teaching staff. For the first time, Design students were included in it for individual semestrial mobilities as well as IP–s (Intensive Programs, intensive modules developed as designer competitions with ‘live’ projects and business sponsors), in different partner universities.

At that time, the awareness of the difference in working conditions, organization and teaching methods of our partners brought about a significant outcome with steady long–term effect from European education programs. Some of the differences noted in the organization of study process were: student cohorts in every one partner university were smaller in numbers (18 to 30 people against 55 people in our country). Design courses were organized in shorter modules and not semestrial ones with 15 weeks dura-

tion. These modules consist of smaller designer assignments in the frames of 2–3 to 4 weeks' time; a semester typically includes several such modules. They represent the so–called 'live projects', and are a way of participation of manufacturing companies in the educational process by means of securing the theme and also the prize to create competitional atmosphere. Students form teams, each one of which develops their own variety of the assignment – one serious difference with the system of developing a single design project with one semester duration. What was observed with these modules with live sponsors was a totally different psychological competition atmosphere, intensive creative work, public presentation of the stages, developing a designer idea or product according to a definite story, and a much higher motivation of participators. This system had the same effect on Bulgarian students that studied a semester under Erasmus abroad. Team work is systematically implemented in most of the universities that teach product or interior design; it works even with diploma design projects. In the year 2005, on the occasion of the 10th anniversary of the Engineering Design Program, a team from the Department applied for financing of an Intensive Program to the European Commission Education and Training in Brussels. The project won the financing and was organized and successfully implemented as the first ever such module with 5 partner universities of different EU countries (Germany – Stuttgart and Rosenheim, Austria: Salzburg, Scotland: Edinburgh and Slovakia: Zvolen). The success of the design workshop "Open up, Sesame!" from 2005 brought about the outcome of proposing to the Faculty Dean and approval of a regular study module for 3rd and 4rth year students, called "Project Week" (today, "Design Project). With it, the introduction of team work was targeted by means of implementing a short intensive module (for 5 days) on an assignment offered by the industry, for development of a product concept. The accent falls on intensive creative work, on Interim and final Presentation, when all teams communicate the results of their work in front of their colleagues and the jury; on presentation materials; on creative discoveries of each team. As we can see in the specialized publications, the described method was more or less known in Western Europe and the USA under the name of "Project–based Learning – PBL" [6], [7]. and has similar to the above mentioned aims: better motivation of students, introduction of PBL both in the first years of education (as conceptual assignments), as well as in the graduating year; keeping high level of interest and a means against drop-outs in the first year of the program; motivating students to go on studying in the next years of the program or even follow higher education levels; helping student presentation in the graduating years [5].

THE OPINION OF STUDENTS AND ALUMNI

In the past years, student opinion was researched mostly by means of questionnaires on the occasion of different events. In June 2007, an opinion poll was made with the aim to establish the expectations and opinions of alumni of the university and other universities considering their education, the opportunities for professional career, their employers, etc. The Poll was implemented on the platform www.dibla.bg [3] and was published; the largest section of respondents turned out to be alumni of the University of Forestry of the Engineering Design Program and Technology of Wood program; next in line were architecture students (UACG), Engineering design from Russe Technical Uni-

versity, Varna Technical University, National Academy of Art, New Bulgarian University and Technical University in Sofia. The respondents were all of more than 5 years professional experience, were employed by different companies – furniture manufacturers, their own startups, etc. The large percentage (71%) of respondents gave as a positive side the fact, that they have the opportunity to work in an interesting and creative position; major negative side was the fact that they could not choose their clients. Concerning their professional work, the respondents underlined that they expect to be assigned total interior solutions (64%), while a smaller number respondents (21%) stated that their work is to manufacture and launch their own prototypes for serial manufacturing, and a still smaller percentage (14%) said they would work on laying out ready–made furniture for contract and residential buildings and only design a small part of them. 57% of the respondent students then pointed out that they use in their work the following graphic software: 3D Studio Max, and 25% stated they use AutoCAD. 73% stated they are fluent in English language. Considering satisfaction with their work, 52% stated that they learn a lot of new things and work with interesting people; the rest stated they have opportunities for growth at their work place (21%) or better payment (13%). 4% stated directly that their work is badly paid and that they are not treated well. This questionnaire demonstrated that the average expectations of employers might be: good technical literacy, knowledge of graphic software; capacity to solve problems, communication skills and good relations with the team of co–workers [3]. Of all real requirements before the university alumni, those for computer graphic software knowledge and technical literacy are well covered with courses. A more difficult issue is team work; the ability to present in front of a large public, the skill to organize work in short time by generating enough numbers of ideas, the use of design methods at the beginning of the process, as well as the skill to constantly switch between divergent and convergent thinking. These are also the basic "zones requiring more work" that we have established after implementing our regular Project weeks with Years 3 and 4. These established shortcomings were an additional argument for the introducing of the new study module "Project week".

THE GREAT BREAKTHROUGH

To teach students team work, public presentation, organized work, idea generating, in the 2012/2013 academic year, for the first time the "Project week" module was implemented as part of the regular curriculum for year 3 and 4 of Engineering Design Bachelor Program. The aim of this intensive module is to place student teams in real conditions, in competition, to develop a common assignment to create a product or a product concept. The Project week is also the time and place for personal contact between designers, entrepreneurs, investors, teaching staff and students. This is also one of the most cited advantages of this event that participants in the module shared in their questionnaires, which are mandatory to fill in at the end of the period. In spite of difficulties in initial team work to harmonize the different personalities of the teams, every time we find that precious and original ideas emerge, and the desire for such project weeks to be organized more often during the education period is categorically expressed by students, participating in these modules.

A similar type of intensive programs, but with international participants, were carried out in a number of European countries. Bulgaria also took part in them by sending students and teachers, all this was possible

due to the Erasmus+ program. In this way, for five consecutive years from 2010 till 2014, in countries such as Austria, Czeck Republic, Finland and Spain, intensive programs were carried out, or the so-called design workshops, under the title "Building with sustainable resources". Initially the list of students wishing to participate was not impressive, but with the passing of years and with acquiring more experience and self–confidence, and also due to the traditional presentations of participants, we came to the situation, where for each place 4 to 5 or more students were applicants. Now we can proudly state that each time, the winning team had a Bulgarian participant, sometimes as a key figure. During these international events it became clear that our students had the widest ranging background, both theoretically and practically are equipped with multiple skills and knowledge, concerning not only furniture structure and interior design, technical and technological issues. What sometimes hindered them to reveal in full these advantages was low self–confidence and sometimes low motivation.

After the introduction of the Project week (which today is called "Design Project") we can say that results did not take long to show. The contact with established and successful Bulgarian designers and manufacturers was effective. The investors' point of view is that the key to development of our economics and community is this designer "added value", authorship and innovation, and luckily they achieve it; the proof are prizes from international intensive programs, the prizes achieved by our students in direct competition with professional designers and students from all over the world, the international acknowledgement of their talents. This gives us the ground to believe we follow the right way and to overcome issues that may appear.

TEACHING METHODS

After laborious work of Department staff of the "Interior and Furniture Design", considerable progress in introducing new methods was implemented. This progress was due to constant exchange between them and their colleagues from leading design programs in European universities. The aim of these new methods was to stimulate thinking, remove psychological barriers; encourage students to transfer from "reproducing" to "creative" thinking model; to help idea generating by means of organizing, restructuring and using present knowledge and experience in group or individually. Some of the most important changes follow [11]:

- Design teachers introduced shorter modules in the framework of their course; this allowed for rigourous time management during the semester. For this change in the regular work in design courses, the intensive module "Project week" had a great role to play.
- Interim and final presentations were introduced, where not only the teaching staff, but also all students take part and give their opinion. Such exchange of opinions allows the problem to be considered from different point of views, to see better all mistakes and to also find interesting solutions.
- Some of the courses practice mutual evaluation of designs as an indicator for critical thinking. Students get the opportunity to compare their own design projects with the rest and see their own level.
- Designs are developed in teams of several students. In this manner of work, the individual participants add to the productivity of the group by unifying the efforts. In order to ensure

equity, work is divided equally between all participants of a team. In this way, solutions could be developed in more detail without putting great load of work on a single student project.

SIX SKILLS DESIGNERS NEED TODAY

To compare with international design community requirements, here are the six skills [8] that are said to be necessary today for designers, according to the website digitalartsonline.co.uk: 1. Communication skills (in short: work with clients, securing a flow of contracts; clear articulating of one's own capacities). 2. Problem solving (not only creative design, but also functionality, budget issues, etc.). 3. Technical savviness (work with up–to–date graphic software). 4. Time management ("Regardless of how innovative the design may be, if it's not within the required deadline it won't be a success [8]). 5. Resilience (the capacity to take in critical feedback [8]). 6. Team work and collaboration (also defined as "soft" skills and work with professionals from other fields, such as marketing, manufacturing etc.) [8]. The above outlined six skills are to a great extent the result of acquired experience in contacts with contractors and team work with other professionals. These situations emerge in professional career. Their trial in advance even from the student bench make the young graduate more competitive. Communicativeness, problem–solving, time management, collaboration and perceiving of critic feedback are all elements of "real life situation" in practice. Apart from project weeks, another conclusion emerges, namely, to use the technique also during semestrial work by developing "live" assignments of actual investors. Then we could have student team work as the answer to a more professional or deep development for the requirements of life.

WHAT WE DID NOT DO

To our regret, we still have not reached the moment where each student can have his personal work place, in order to make his models at the university for his semestrial designs or diploma projects.

We did not implement a Joint Master Program with other European universities. With this scheme, in the framework of an international Master Degree, students are taught each semester at a different partner university, receiving at the end of the study period a Joint Degree Diploma.

We did not introduce diploma presentations in the format of an exhibition – where diploma projects are presented and questions are answered more easily and in comfort, omitting the usual stress.

During the last years, although students demonstrated great interest, not one could find an employer and go on a Designer Traineeship to an EU country under Erasmus+ program. This opportunity was used by other students of the university (veterinary medicine). This is a very probable pre–diploma traineeship scheme that could be implemented, with some help from the industry furniture branch.

CONCLUSION

In order to make a positive finale, we will make a comparison between the initial "Interior and Furniture Design" Master Program, the one we started with in 1995, and the "Engineering Design (Interior and Furniture Design)" Bachelor Program of today. The following can be summarized:

- The program was re-named, reworked from Master into Bachelor-cum-Master level; the curriculum was edited and actualized, in order to be concised into 7 semesters plus one diploma project semester

for the Bachelor, and 2 semesters plus one diploma semester for the Master level.

- The number of part-time staff was gradually decreased, and teaching was taken by the Interior and Furniture Design Department. The habilitated staff ranks include more and more younger colleagues; still at the moment the program hungers more young staff, which is also the policy of the department.

- Material conditions are better now with the construction of a fifth floor over the old building "A" of the university, where the program boasts study halls only used by design students.

- Graphic software courses were introduced in education specially for the technical documentation and visualizations of furniture and interiors; a course specialized in generating presentations was introduced in the Master level.

- Initially, the study module "Project week" did not exist; students did not have this emotion. In spite of this, international experience demonstrates the need to include such study module as early as Year One of the Design Program, and not only in Year 3 and 4.

- The Erasmus exchange program did not exist initially, it was created in the year 2000, and gave the opportunity for students to go and study one semester abroad, or have a traineeship for 2 or more months.

- In 1995, we did not have specialized design press. Today, periodicals such as the magazines DMT (Design, Materials and Technology) and MD (Furniture Design) have a great role to play to popularize the success of the new program.

- Design competitions did not exist. For instance, the competitions of dibla.com constitute an important forum for designer achievement, such as "Designer of the Year" etc. We can add here cultural events, such as the "BG Furniture Piece of the Year", an initiative of "The World of Furniture" and "Technomebel" exposition. Other events include Sofia Design Week, other competitions such as "The Ideal Bathroom" of "Ideal Standard" company, the Roca Company events for students, etc.; all of these constitute part of the whole picture of design.

- In the past, we had no professional designers, just nameless employees to develop furniture models. Today after 25 years, the contingent of graduates of Engineering Design Program grows in numbers, as the most popular of them achieved international success at great expos in Cologne, Udine, Milan, Dubai etc. The Success of each young designer is by all means his own, but the background serves him as a spring board. I will venture to cite some names. Ilian Milinov, who by the way is a graduate of the Wood Technology Program in 1997, when Engineering Design was still in its infancy, is the undisputed leader of product design with numerous prizes (Chair of the Year 2002 in Udine, Italy; multiple Red Dot awards at the Cologne Furniture Fair; other awards of international online competitions). He was not only the border line between two epochs: the one before and after the year 2000, a predecessor for a long cohort of young creators after him, but also an enthusiast for the Project Weeks, as a teacher and a jury member ever since the first Workshop in 2005. A long list of other Engineering Design students follow (some of them are ex– Erasmus students or have a workshop under Erasmus abroad). Opportunities for different design events were the expo "The World of Furniture", Sofia Design Week, etc. Here are more names: Irina Konstantinova, yacht designer, the whole Fimera company – Ivan Grozdev, Maya Kostova; Megi Ilieva, Iliana Stoilova, Yordanka Jilova, Paula Saratlieva (now teacher in Finland), Mariel Ganeva (Riva 20

award winner), Maya Ivanova, Engineering Design graduate and Politechnico Di Milano Master graduate, Georgi Novoselets, Tsvetan Stoykov, Simona Groshevska, (award from an event in Dubai), Boryana Petrova – the list can be completed with more names. Our graduates win awards, prizes, acknowledgement at home and abroad and demonstrate the best of the young designer generation. They are the living proof of the work of the previous generations of teachers.

REFERENCES

https://wdo.org/glossary/industrial–design/

http://en.wikipedia.org/wiki/Industrial_design

Д. Иванова, Р. Райчева, П. Панайотов, Н. Григоров, Г. Христова, М. Младенова, С. Ковачева, И. Иванов, В. Брезин, Г. Тасев, Ж. Гочев, В. Пиралков. 2008. Наръчник на предприемача в дървообработващата и мебелна промишленост", глава 2 – „Проектиране и дизайн", ЛТУ, Център за насърчаване на предприемачеството, 2008 г., ISBN 978–954–323–461–5, стр. 9–17.

https://www.creativityatwork.com/2014/02/17/what–is–creativity/#:~:text=Creativity%20is%20the%20act%20of,phenomena%2C%20and%20to%20generate%20solutions.

Dym, C., Agogino, A., Eris, O., Frey, D., Leifer, L. 2005. Engineering Design Thinking, Teaching and Learning, Journal of Engineering Education, January 2005, Available on the Internet: http://www.inovacaoedesign.com.br/artigos_cientificos/engineering_design_thinking_teachingandlearning.pdf.

Raycheva, R., D. Angelova, P. Vodenova. 2015. Project–Based Learning in Engineering Design in Bulgaria: Expectations, Experiments and Results (now in production). European Journal of Engineering Education, ISSN: 1469–5898 (online).

Raycheva, R., Jivkov, V., Angelova, D., Vodenova, P. 2016. Study Module "Project Week": through the Eyes of Students. Innovation in Woodworking Industry and Engineering Design, 1/2016, ISSN 1314–6149, e–ISSN 2367–6663, pp. 46–53.

https://www.digitalartsonline.co.uk/features/graphic–design/6–skills–every–designer–needs–get–new–job/.

Русанов, Х. 2005. Доклад на международна научна конференция „10 години специалнсот „Инженерен дизайн (Интериор и дизайн за мебели)", окт. 2005 г., стр. 7.

Тричков, Н. 2010. 15 години специалност „Инженерен дизайн (Интериор и дизайн за мебели)" във факултет „Горска промишленост" при ЛТУ, Сборник научни доклади от Трета научно-техническа конференция Иновации в горската промишленост и инженерния дизайн, София, 5–7 ноември, 2010 г. стр. 23–26.

Райчева, Р., Д. Ангелова, 2010. Дизайн методи и обучение по дизайн, Сборник доклади, Трета научно–техническа конференция „Иновации в горската промишленост и инженерния дизайн", София, стр. 261–265.

ДОКЛАД от И. Илиев, И. Амуджев, П. Щърбанов, за извършената проверка по процедура за програмна акредитация на професионално направление 5.13 Общо инженерство, област на висше образование 5. Технически науки, в Лесотехнически Университет – София. Докладът е публикуван на страницата на НАОА https://www.neaa.government.bg/129–profesionalni–napravlenija/429–akreditirani–profesionalni–napravlenija–v–ltu–sofija.

Доклад-самооценка от 2016 г. ЛТУ – София за програмна акредитация на специалността "Инженерен дизайн (Интериор и дизайн за мебели)", професионално направление 5.13. "Общо инженерство".

Гочев, Ж. ОТЧЕТ за учебно-преподавателската работа, научно-творческата дейност и за състоянието на ФГП за учебната 2018–2019 г. и периода февруари 2019 год. – февруари 2020 год., и научно–изследователската работа за календарната 2019 г. Докладът е изнесен на 20 февруари 2020 г., пред факултетния съвет на ФГП.

INNOVATION IN WOODWORKING INDUSTRY AND ENGINEERING DESIGN, 2/2020 (18): 5–6

UNIVERSITY OF FORESTRY

FACULTY OF FOREST INDUSTRY

INNOVATION IN WOODWORKING INDUSTRY AND ENGINEERING DESIGN

2/2020

INNO vol. IX Sofia

ISSN 1314-6149
e-ISSN 2367-6663

Indexed with and included in CABI

CONTENTS