Development of Creative Thinking through Lighting System Design Education

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Development of Creative Thinking through Lighting System Design Education: *The paper discusses the following issues: Lighting system design and the development of creative thinking; General solution of the indoor and outdoor lighting design; Target setting; Methodological approach to the organization, systematic structure, stimulation and management of creativity; Development of an individual profile of the created designs in the context of creativity; Creative thinking in the quality system of higher education.*

Key words: *Creativity; Lighting System Design; Methodological Approach; Creative Thinking; Quality of the higher education.*

INTRODUCTION

Creativity is generally considered as a process of development of new ideas which are useful [1].

Andy Green [2] defines creativity in a very detailed and convincing way. According to him creativity is:

- the skill to manage the contradictory variety in the world around you;
- the right to choose how to guide your "thinking box";
- the instrument which helps you to manage the world according to your own standards and views;
- the barrier which limits your notion about the world.

Creativity is a topic of interest of a large number of research studies. It is used in a variety of contexts and has been applied as managerial, creative and educational approach [1,3,4].

MAIN BODY

1. Lighting system design as a means for the development of creative thinking

The training of the students from the Undergraduate Programme in Industrial Design in the field of lighting technology and illumination design is done in the "Lighting Technology" course. As part of the learning process students are expected to develop a scholarly paper. The scholarly paper aims at reinforcing students' knowledge and skills to apply the basic methods and approaches in lighting design, and offer solutions and fixtures in order to develop the lighting design of products, indoor and outdoor spaces, and landscape. The course familiarizes students with the basic terminology used in the field of lighting and lighting system design. It focuses also on the modelling of the indoor and outdoor illumination through the use of light both as a visualizing factor and as a means of art. The course provides an insight into the aesthetic aspects of light and its role in the visual communication process.

The United Nations (UN) General Assembly 68th Session (20 December 2013) proclaimed 2015 as the International Year of Light and Light-based Technologies (IYL 2015) [7,8]. This is considered to be an additional factor for motivation.

Fig. 1. The logo of the 2015 International Year of Light and Light-based Technologies under the auspice of UNESCO

2. The place of lighting design in the general context of space lighting

The application of the methodology of lighting system design aims to develop students' creative thinking. This leads to the positioning of lighting design in the general context of lighting system design through the application of a set of approaches: aesthetic, ergonomic; sanitary and hygienic; ecological; economic; power supply; social [5,6].

This methodology develops students' awareness and beliefs in the design of technologically enhanced solutions of lighting systems, while the implementation of the created indoor or outdoor designs is to be considered a multidimensional creative process that fills-up a specific niche in the application of system light design based on the above mentioned principles.

3. Target setting

The development of creative thinking can be the end result of the achievement of the following main aims:

- Activating and using the individual designer potential.
- Identification of problems and offering of solutions to these problems.
- Implementation of the offered solutions.
- Moral values education (in accordance with the values and the importance that lighting design products have in society).
- Development of competences and skills for systematic organization of the acquired knowledge.
- Applying the steps of creative thinking in the development of innovations.

4. Methodological approach – organization, systematic structure, stimulation and management of creativity

The methodological approach is at the heart of the philosophy underlying the implementation of the created design and serves as a trigger to the development of creative thinking. The implementation of the methodological approach is illustrated in Table 1.

5. Development of an individual profile of the created designs in the context of creativity

The function of the course tutor

Each student is allowed to choose the object of his/her design. The course tutor who supervises the development of the design has a leading role in this process. He organizes a consultation session with the student on the basis of a preliminary discussion. The aim of this consultation session is to motivate the student and encourage him/her to approach the lighting system design task set in a creative way. Thus, after the analysis of a number of detailed solutions, the student is asked to create his/her own design and outline its key characteristics by proving its advantages both as a lighting design product and as an aesthetic product, as well as a product that is based on its own philosophy of development and evaluation system.

In order to develop an individual profile of the created designs students are expected to choose the lighting design objects they would like to work with. It is advisable that they choose among objects that are up to date and that are widely applied in contemporary lighting design and LED technology. Students have to present their lighting design ideas and solutions in the scholarly papers. An exemplary list of such objects, which is by no means exhaustive, includes: architectural and aesthetic lighting; advertising lighting; car interior lighting (functional and artistic); theatre stage and performance lighting; effective lighting of fashion shows; interior design lighting; "Sound and Light" spectacle lighting; lighting of historical artefacts; holiday outdoor lighting; other lighting designs.

Table 1
Systematic organization of the operations leading to the development of creative thinking in the area of lighting system design

Operation	Content
1	***2***
Development of basic level knowledge in the field of illumination techniques.	*Acquisition of the sequence of systems: light (light sources); illuminators; illumination systems; lighting space.*
Raising students' interest	*The beauty of light and colour. Light is life. The 2015 year is the International year of light and light-based technologies (IYL 2015).*
Choosing an object	*Each student chooses the object of his/her design after a preliminary discussion with the course tutor who supervises the development of the scholarly paper. The place of lighting design in the general interior / exterior design is identified.*
Being proactive	*The purpose of this operation is not to create the easiest design or the design that is easy to produce. The number of generated ideas and their implementation is not limited. Originality of the created design (it has to differ from the general design solutions applied without any limits on the ideas and their implementation). The originality is sought in the combination of the aesthetic approach and the opportunities that present day illumination technologies have in the implementation of different designs.*
Guiding students to use innovative approaches in lighting design	*Moving from individual and specific lighting solutions to the application of a systematic approach in indoor or outdoor lighting design.*
Guiding students to use innovative technologically enhanced illumination products and solutions	*Being familiar with the technologically enhanced illumination products and components is a prerequisite for the development of creative thinking. The application of Light Emitting Diodes (LED) – a large-scale revolution in lighting technology (the transfer from conventional to semi-conductor light technology).*
Using specific terminology	*Scientific and professional terminology in standard technical Bulgarian language (and the relevant standard terminology in English)*
Presentation and discussion of the papers	*Raising the individual awareness of learners to the results of their own creative achievements and the development of a positive self-image and conviction in one's own potential for creative work.*
Helping students make professional connections and develop pro-active teams	*Helping students make professional connections which they can use as additional training development opportunities (additional work with students who demonstrate interest and willingness to work in the field of lighting design).* *Helping students make professional connections (e.g. with potential employers, leading illumination designers, professionals involved in the field of illumination design, researchers, etc.) which they can use as future career opportunities.*

The specific forms of implementation of the processes leading towards the guiding and development of creative thinking involve the application of:

- SWOT analysis of modern light-based technology in illumination design. For example: light-emitting diodes which led to revolution in lighting.
- Bringing out light as a functional element and as a means for aesthetic and emotional influence. Development of balance between the functional and aesthetic aspects.
- Systematic and semantic approach of illumination design.
- Creation of systematic tables which evaluate a rich spectrum of aspects of the designed lighting solutions on the basis of relevant criteria and indicators.
- Development of disposition to innovation – in terms of the acquisition of the essential elements and in terms of the aesthetic format of modern illumination design.
- Other forms.

6. Creative thinking in the quality system of education.

The provision of quality education involves the development of a solid system of basic knowledge and skills in accordance with state educational requirements. The specifics of university education demand the implementation of competitiveness. The latter can be achieved through the successful development and modelling of creative thinking which is a complementary phenomenon upgrading students' basic knowledge and skills. This guarantees the scientific validity of thinking and the application of adequate approaches in the offering of logical and adequate creative solutions.

As a result of this students develop:

- their professionalism (successful professional realization; development and application of innovative solutions as well construction of innovative products);
- their professional competences as researchers;
- a system for evaluation (criteria and indicators);
- professional ethics and morale.

CONCLUSION

1. Lighting system design is a solid ground for the development of creating thinking and has its own place in the overall indoor or outdoor lighting design.
2. The main aims of the lighting system design are defined in the context of creative thinking development.
3. A methodological approach which combines the aspects of organization, systematic structure, stimulation and management of creativity has been developed. This approach stimulates the development of an individual profile of the created designs in the context of creativity.
4. Creative thinking is a complementary phenomenon in the quality system of higher education as it upgrades students' basic knowledge and skills and at the same time it is an essential element of the measures taken for increasing the competitiveness of higher education.

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[7] http://www.light2015.org/

[8] http://en.unesco.org/

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