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Application of innovative technologies in fashion design education

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Abstract. The application of the innovative educational and design technologies offers quality improvement of higher education in fashion design by interactivity, flexibility and dynamics. The paper presents the application of the innovative technologies in education in fashion design subjects, included in the Bachelor and Master programs of Design, Technology and Management in Fashion Industry at Faculty of Technics and Technologies, Trakia University, Bulgaria. According to the examinations results and studying student opinion it can be concluded that application of presented innovative technologies in fashion design education provide easier and more accessible learning of the study material, acquiring more knowledge in a short time, developing the students' creativity, creative and visual thinking and design skills, and generally their application can lead to an increase in the quality of education.

1. Introduction

The fashion design education requires high level of visualization of the study process [1, 2]. The application of the innovative educational and design technologies offers quality improvement of higher education in fashion design by interactivity, flexibility and dynamics.

The use of interactive white board (IWB) in higher education in the fields of engineering (fashion design and engineering, machine engineering, electronics, automatics, computer technology, etc.) is studied in details in previous publications of authors [1, 3]. Every interactive presentation system makes the students' classes closer to digital generation daily life, to their requirements for interactivity, high level of visualization, dynamics and attractiveness in educational process. The managing of objects through stylus or finger similarly to their mobile devices, adding of annotations and notes to slides, run of IWB as traditional white board, saving of the images of IWB in different types of file formats (.pdf, video formats, etc.), real-time sharing of content with remote users are opportunities that are very suitable for effective education at universities today. The interactive projectors are one of optimal decision among various models of interactive presentation systems and it is combine an interactive board and an ultra-short throw projector in one device and it can transform every traditional white board in IWB.

Add-ons such as CPS, tablets, document cameras can be added to the IWB. The document cameras [1] can to be used as separated devices without integration with IWB, connected to a projector or to a projector and computer, according to the capabilities of the particular model. All objects and actions under the camera's objective are visualized on an IWB or a screen, and by this way the visualization become available to the entire audience. The images can be rotated, captured and added with notes and lines. The ability to record video is also extremely useful. All explanations and actions of the lecturer,



drawing and writing can be recorded.

The augmented reality (AR) and virtual reality (VR) are also widely used in the education. Examples of application of AR in different educational fields of natural science, medicine, automation, vocational education and more are presented in [4, 5, 6, 7, 8, 9]. The high level of visualization with the ability to monitor animated 3D objects on all sides and virtual experiments without endangering the students' health, incl. saving of expensive equipment and consumables are just some of the benefits of AR in the learning process. AR is also a means of implementing the so-called blended learning which combines the advantages of traditional (using paper textbooks and manuals) and e-learning, using modern ICT based innovative technologies [1]. It certainly provokes the interest of today's learners and satisfies their needs for a virtual world and modern learning rooms and can therefore motivate them to participate more actively in the learning process. All described abilities of the AR in its application in the learning process can contribute to the better education of the students.

The paper presents the application of the innovative educational and creative technologies in education in Fashion Design subjects, which are included in the Bachelor and Master programs of Design, Technology and Management in Fashion Industry at Faculty of Technics and Technologies of Yambol, Trakia University, Bulgaria.

2. Application of innovative educational technologies in fashion design education

Document cameras, sometimes in combinations with interactive white boards [2], are used in education in subjects in the fields of traditional fashion design and pattern making, especially for visualization of different hand techniques for fashion and textile illustrations, and traditional hand pattern making. Interactive white boards are used in education of work with specialized software as 3D design, CAD systems, and raster and vector graphics apps, especially the suitable and optimal use of drawing and modified tools for specific design and pattern making forms.

The application of IWB and document cameras leads not only to additional visualization. With the help of these educational technologies full or parts of lectures are recorded in videos, which are available for students at the e-learning system, through added links in e-books and e-manuals, or QR codes in traditional paper textbooks, which students can use at any time and from any internet connected device and many times, according to their needs.

Figures 1 and 2 present application of document camera and IWB in fashion design education.

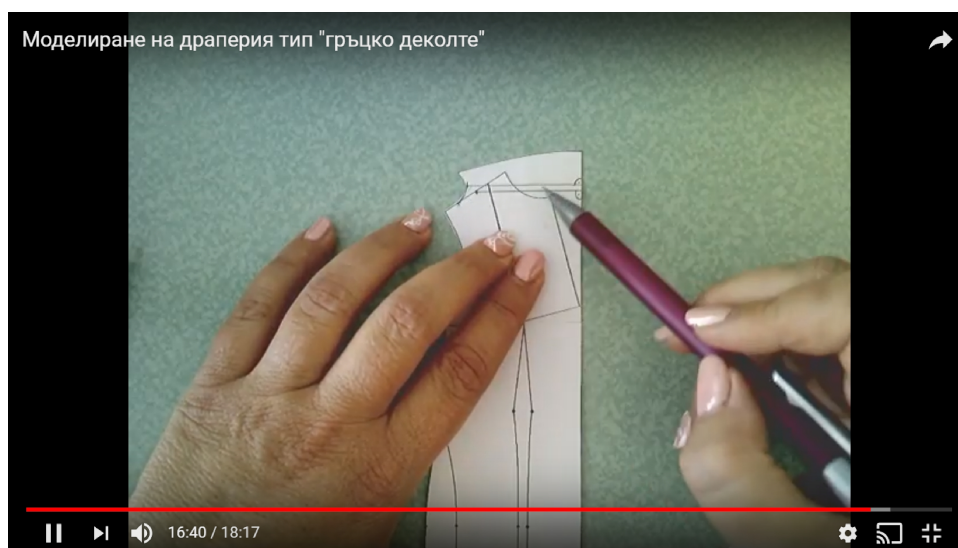


Figure 1. A screen shot of a video lecture about pattern making of ladies' clothing with draperies around front neck opening, made with the help of document camera.

Figure 1 presents a screen shot of a video lecture about a geometric way of pattern making of ladies' clothing with draperies around front neck opening. The presentation of the traditional hand process of pattern making is made with the help of document camera. The video is available online at: https://youtu.be/L39f7N_4x_c (84 views, 2 months ago).

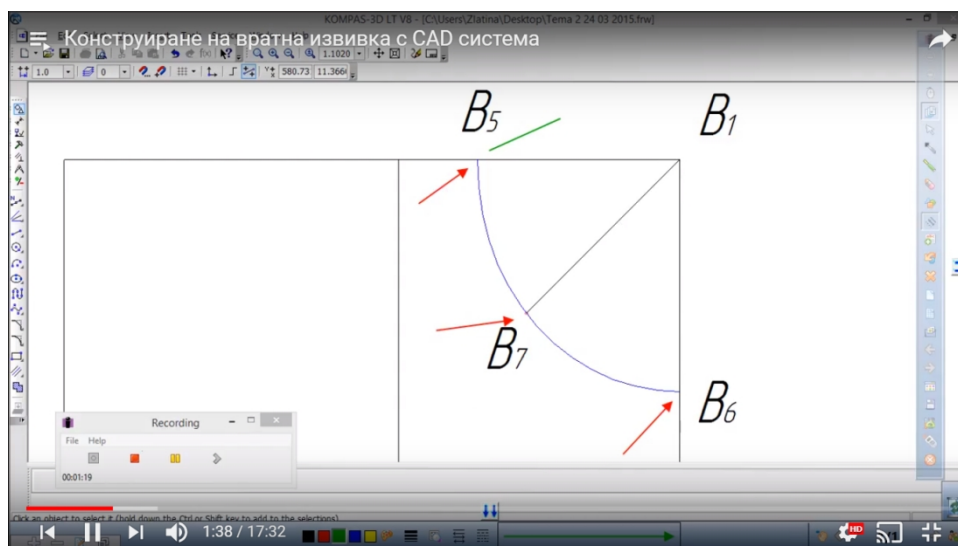


Figure 2. A screen shot of a video about drawing of neckline with a CAD system, which is made using interactive white board.

Figure 2 shows a screen shot of a video about drawing of neckline in constructional base of lady's jacket with a CAD system, which is made using interactive white board. The IWB tools help students in their first meeting with the application of the more interesting drawing tool NURBS in pattern making. The video is available online at: <https://youtu.be/qtLGsYeXN5M> (634 views, 3 years ago).

The last innovation, which we use in fashion design education, is augmented reality (AR) [4]. Certain themes in textbooks and manuals of fashion illustration, design theory, fashion design and pattern making have been completed with augmented reality markers and the study material is additionally visualized with 3D models which the students can see on the displays of their mobile devices.

Figure 3 presents an example of application of augmented reality in fashion design theory education. The adding 3D dynamic model is a lady's figure with a dress in Y turned silhouette. With the application of AR the basic 12 silhouettes [10, 11] in ladies' clothing have been visualized in every direction and it is easy and successful way for costume forms recognition and differentiation. The augmented reality helps not only with visualization of the type of the silhouette form, AR is very suitable for presentation the different ways of forming of every silhouette. In the case, which is shown in Figure 3, with the help of AR one of the ways for design of Y turned silhouette is presented. That mode is use of one-sided gathers for forming of the volume down Y turned part of the silhouette.

Figure 4 shows a case of use of augmented reality in pattern making education. The adding 3D animated model is a lady's figure with an eight pieces skirt with ruffles. With the use of the AR marker, which is included in the theme for pattern making of ladies' skirts and the other themes in the paper textbook, the students can see the result of pattern making process.

As both photos (Figures 3 and 4) show AR is very suitable for visualization of 3D elements in clothing like gathers in the adding model, presented in Figure 3, and ruffles in the dynamic 3D model shown in Figure 4.

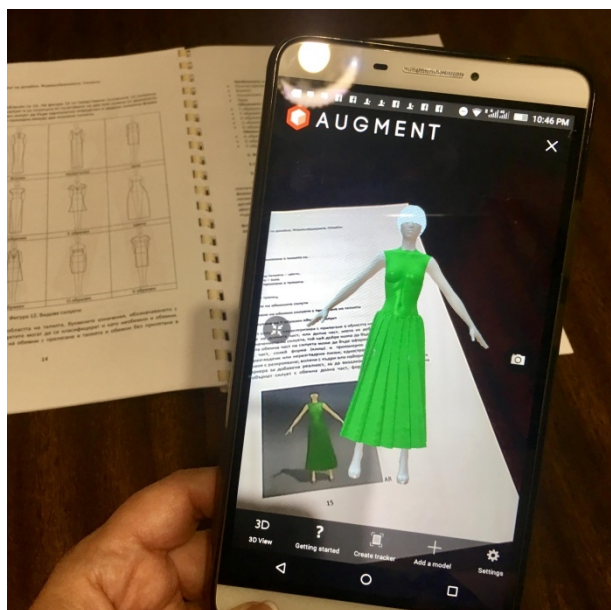


Figure 3. Application of AR in design theory education.

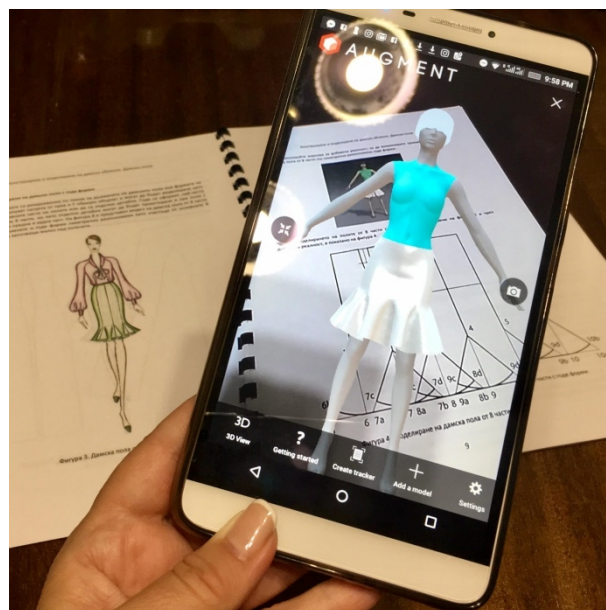


Figure 4. Application of AR in pattern making education.

3. Application of innovative creative technologies in fashion design education

3D printers [12] and 3D markers are used in education of fashion design subjects. With their help the students realized projects of design of decorative elements and small accessories, or parts of bigger accessories, as real models or prototypes. 3D printing and modelling with 3D markers help with 3D forms and models the education in some themes of design theory and fashion design subjects. The priorities of the use of 3D marker compared to 3D printer are not only the lower cost but the easy change of the colors and possibility for realization of more free and artistic design ideas.

Figure 5 presents a decoration for a blouse which is made with 3D marker. This model and other similar creations with 3D marker can be used as real decorative pieces of the garment or as real jewels. Another type of application is as prototypes of a clothing decoration or a bijoux, which can realized with embroidery, beads, etc.



Figure 5. Decoration for clothing made with 3D marker.

Our partners from the business help us with digital textile printing for clothing and our students have possibility to realize parts of their project, which they at first have realized with CAD systems, software for raster and vector graphics, or traditional hand way. The students choose the project for printing with software for 3D visualization of clothing. We stimulate our students to use free software and internet applications for design (CAD, raster and vector graphics) and visualization, which give them possibility to create their designs not only in the university classes.

Figure 6 presents a pattern of a lady's dress with textile patterns, which are designed for digital textile printing.

With the help of cooperation with our colleagues from other universities and business we have possibility to present in the process of students' education adaptation of our projects in the software for embroidery, woven and knitted fabrics and decorative bands, and realized designs. For example, the geometrical and floral ornament of the Flower of Life, which is applied in the project for digital printing show in Figure 6, is used in embroidery and woven fabrics digital designs, which are presented in [13] and [14]. Other examples for realization of digital designs of decorative bands, which are presented in [15], are available online at: <https://sites.google.com/a/trakia-uni.bg/textile-design/realizirani-proekti>.

We use our experience and encourage our students to present their design projects in internet sites and shops about digital printing.

Figure 7 shows a model of lady's garment with deigned textile pattern from an internet shop for digital prints. The model is available online at: <https://shopvida.com/products/flowers-933>.

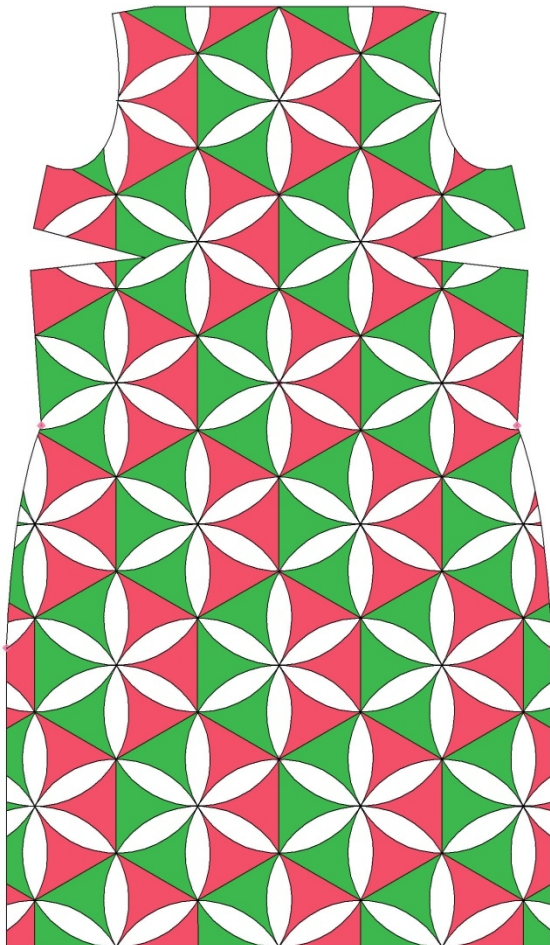


Figure 6. A project of a digital print.



Figure 7. Visualization of a digital printed garment.

4. Conclusion

According to the examinations results and studying student opinion it can be concluded that application of presented innovative educational and creative technologies in fashion design education provide easier and more accessible learning of the study material, acquiring more knowledge in a short time, developing the students' creativity, creative and visual thinking and design skills, and generally their application can lead to an increase in the quality of education.

References

- [1] Stoykova V, Georgieva K, Kazlacheva Z, Ivanova N, Ilieva J 2015 Good practices of students' education in the programme of design, technologies *Tekstil i Obleklo* (Sofia) vol **63** no 10 pp 252-258
- [2] Wiana W 2018 The Effectiveness of Using Interactive Multimedia in Improving the Concept of Fashion Design and Its Application in The Making of Digital Fashion Design *IOP Conf. Ser.: Mater. Sci. Eng.* 306 012131
- [3] Stoykova V, Smrikarov A, Kazlacheva Z, Georgieva K 2012 Some applications of interactive presentation systems in the learning process *Proc. Conf. on e-Learning in Higher Education* (Svishtov: National Centre for Distance Education and "Dimitar Tsenov" Academy of Economics) pp 351-358
- [4] Videnov K, Stoykova V, Kazlacheva Z 2018 Application of Augmented Reality in Higher Education *ARTTE Applied Researches in Technics, Technologies and Education* (Yambol: Faculty of Technics and Technologies) vol **6** no 1 pp 1-9
- [5] Ivanova G, Aliev Y, Ivanov A 2014 Augmented Reality Textbook for Future Blended Education *Proc. Int. Conf. on e-Learning'14* (Ruse: "Angel Kanchev" University), pp 130-136
- [6] Okimoto M L L R, Okimoto P C, Goldbach C E 2015 User Experience in Augmented Reality applied to the Welding Education *Procedia Manufacturing* **3** (2015) pp 6223-6227
- [7] Coimbra T, Cardoso T, Mateus A 2015 Augmented Reality: an Enhancer for Higher Education Students in Math's learning? *Procedia Computer Science* **67** (2015) pp 332-339
- [8] Calderón R R, Arbesú R S 2015 Augmented Reality in Automation *Procedia Computer Science* **75** (2015) pp 123-128
- [9] Hsieh M C, Lee J J 2018 Preliminary Study of VR and AR in Medical and Healthcare *Journal of Nursing and Health Studies* vol **3** no 1 pp 1-5
- [10] Kazlacheva Z 2007 Silhouettes in the ladies outer garments *Tekstil i Obleklo* (Sofia) vol **58** no 1 pp 12-15
- [11] Kazlacheva Z 2010 Silhouettes of lady's elastomeric clothing *Tekstil i Obleklo* (Sofia) vol **55** no 9 pp 8-11
- [12] Verlan V, Irovan M 2018 Applications of 3d printing technologies in the Garment industry *ARTTE Applied Researches in Technics, Technologies and Education* (Yambol: Faculty of Technics and Technologies) vol **6** no 2 pp 85-93
- [13] Indrie L, Kazlacheva Z, Ilieva J, Gherghel S 2017 Embroidery - from digital designing to fine art *Industria Textila* (Bucharest) vol 68 no **5** pp 366-369
- [14] Indrie L, Diaz-García P, Kazlacheva Z, Montana I, Ilieva J 2018 New technology in producing textile designs and fabrics *Industria Textila* (Bucharest) (in print)
- [15] Ilieva J 2015 Fashion design using decorative bands based on the golden and Fibonacci forms *ARTTE Applied Researches in Technics, Technologies and Education* (Yambol: Faculty of Technics and Technologies) vol **3** no 3 pp 265-274