# Applications of the Combined Printed Textiles in Innovating Contemporary Designs for Interior Design Components Dr. Nehal Nabil Zahra

Lecturer at Interior Design and Furniture Department- Faculty of applied arts-Damietta University- Egypt.

nehalnabil@du.edu.eg

#### Dr. Basant Awad Mostafa Mandour

Lecturer at Textile Printing, Dyeing and Finishing Department - Faculty of Applied Arts- Damietta University - Egypt.

basantmandor@du.edu.eg

## Dr. Rania Rashad Tawakol Gaafer

Lecturer at Spinning , Weaving and Knitting Department - Faculty of Applied Arts -Damietta University- Egypt.

raniarashad@du.edu.eg

## Abstract:

Multidisciplinary design is one of the most important modern concepts that aims at deepening knowledge of multiple design areas and achieving integration among designers from different disciplines to extract the design process from the traditionally to creativity that combine aesthetic and functional value. Instead of considering the advanced technology and modern materials are the best ways to formulate the Designer's ideas to create contemporary products, he/she can exchange his/her experiences with designers from different fields and work on adapting and processing different traditional materials such as wood, metal, fabrics and others to create unique designs that have a distinct style. Therefore, the research is concerned with integrating the design inputs of the various disciplines in formulating innovative visions for the components of interior design by relying on textiles as an intermediary material, supporting it with different materials and printing it to form a contemporary product. The research aims to make use of the experiences of designers in the field of interior design, textile and printing to exploit traditional materials and enhance its value by integrating them together to reach materials. This mix between materials gives it new features and enhances the design and implementation characteristics. The research problem lies in ignoring the integration of the designer's experiences from different disciplines, benefiting from traditional materials, converting it to Combined materials, and creating combined printed textiles and apply them in multi-functional products to formulate renewed visions for the components of interior design that achieve multiples, uniqueness and contemporary.

# **Keywords:**

Multidisciplinary Design- Origami Multifunction Furniture- Interior Design- Denim (Jeans) Fabrics – Printing Multifunctional Textiles.

# The research problem:

The multidisciplinary design opens new horizons for providing innovative designs that surpass the work of a single designer with his/her own experiences from the perspective of his/her specialization only. The designer can exchange his/her experiences with designers from different fields and work on adapting and processing different materials to create designs that meet the needs of individuals in contemporary life. Therefore, the research problem is represented in the following question:

How to apply the concept of multidisciplinary design in adapting different materials and merging them together to raise their functional efficiency to provide innovative multifunctional designs that suit the contemporary needs of individuals?

#### The following questions arise from the main question:

1. To what extent is it possible to combine different types of contemporary furniture design trends to use their advantages and compose them into an innovative multifunctional origami piece of furniture by adapting the materials and taking advantage of their properties?

2. What are jeans fabrics and their characteristics as a material that can be employed in the design of an innovative multifunctional origami furniture for linking the design parts?

3. How can printed textiles be designed with renewed visions to create contemporary designs for multifunctional interior design components?

## The research aims:

 Integrating the experiences of designers in the fields of interior design, textiles weaving and textiles printing to exploit materials and enhance their value by merging them together to reach innovative designs with functional capabilities that suit the contemporary needs of individuals.
Studying and analyzing the characteristics of origami furniture and multifunctional furniture, as well as applicable furniture, packing able furniture, and modular furniture in order to combine

them and benefit from the advantages of each.

3. Determining the properties of denim fabrics to be used as a main material that enters into the design of an innovative multi-functional origami piece of furniture by combining the parts of the furniture piece.

4. Reviewing and analyzing the main determinants of multifunctional printed textiles design and apply them to create contemporary designs for multi-use interior design components.

## The research importance:

1. Emphasizing the importance of overlapping between the different design disciplines to obtain a design product that meets the elements of modernity and contemporary.

2. Creating new visions for integrating materials together in a distinctive design style to make use of their properties, raise their functional value, and flexibility in applications and use.

3. Concentrating on design more efficient innovative furniture designs to that meet the changing needs of individuals in contemporary life.

4. spot the light on the distinctive properties of denim fabrics (jeans) and the possibility of using it for non-traditional purposes.

5. Presenting renewed visions in the field of textile printing design in general and the field of designing printed interior textile in particular.

#### The research hypothesis:

The application of the multidisciplinary design concept between the fields of interior design, textile weaving and printing opens new horizons for the use of materials and raising their efficiency through the applications of printed textiles with renewed visions in the design of multifunctional origami furniture that meets the needs of individuals in contemporary life.

## The research Results:

1. Rooting and applying the concept of the multidisciplinary design opens new horizons to provide innovative designs that suit the contemporary needs of individuals.

2. Achieving the integration among weaving and textile, textile printing and interior design to merge between different materials, can enhance its functional value.

3. The merge between the advantages of the different contemporary furniture design trends and the non-traditional use for materials, lead to more efficient innovative designs that meet the individuals needs in contemporary life.

4. Insert rules and determents for multifunction printed textiles and applying it on multifunction origami furniture (table – stool – hanged textile).

## The research Recommendations:

1. Generalization the concept of the multidisciplinary design for fresh graduated designers to enhance designer Capabilities from deferent specializations in all fields of the applied arts.

2. The necessary of merging among the advantages and the properties of the contemporary furniture design trends and adapting various materials to design more innovative furniture designs, that suits the indoors contemporary needs of the individuals.

3. Establishing rules for the design of the multifunction printed textiles as an essential part in multifunction product researches by relying on textiles as an intermediary material.

4. Expansion the utilization of denim fabrics in non-traditional purposes that serve other various specialties.

# **References:**

1. Maíra Prestes Joly ,Jorge Grenha Teixeira , Lia Patrício and Daniela Sangiorgi : " Leveraging service design as a multidisciplinary approach to service innovation", Journal of Service Management Emerald Publishing Limited, 2019 , 30 (6), p681–715. DOI 10.1108/JOSM-07-2017-017

2. Zheng Xie, Miao Li, Jianping Li, Xiaojun Duan and Zhenzheng Ouyang: "Feature analysis of multidisciplinary scientific collaboration patterns based on PNAS", *EPJ Data Science journal*, 7(1), 2018, p2. doi:10.1140/epjds/s13688-018-0134-z.

3. Binbin Pan and Weicheng Cui:" Multidisciplinary Design Optimization and Its Application in Deep Manned Submersible Design", Zhejiang Science and Technology Publishing House Co., Ltd. and Springer Nature Singapore Pte Ltd, China, 2020, p6:8. (1-292).

4. Guang Liu, Yi Xiong and David W. Rosen: "Multidisciplinary design optimization in design for additive manufacturing", Journal of Computational Design and Engineering, volume (8), issue (6), 2021, P1–16

5. Florence Sakade , " Origami Japanese paper folding" , Tuttle publishing , second edition . Tokyo .2002  $.p\,4\,(1\mathchar`ef{1.96})$ 

6. Robert J. Lang . "Mathematical Methods in Origami Design". Bridges 2009: Mathematics, Music, Art, Architecture, Culture. Banff, Canada, Banff International Research Station.26-29 July 2009, p 11-12. (11-20)

7. Marco Meloni, Jianguo Cai, Qian Zhang, Daniel Sang-Hoon Lee, Meng Li, Ruijun Ma, Teo Emilov Parashkevov, and Jian Feng ." Engineering Origami: A Comprehensive Review of Recent Applications, Design Methods, and Tools". Advanced Science .8. 2000636 . 2021 . p 1:3 .(1-31)

8. Alex Avila, Spencer P. Magleby, Robert J. Lang, and Larry L. Howell. "Origami fold states: concept and design tool". Mechanical Science journal. 10. 2019. p9 (91–105).

9. Deniz Demir , Buket Metin: "Foldable Structures in Architecture : A Temporary Exhibition Unit Design", XIIth International Sinan Symposium, Trakya University, Edirne, April 8 – 9th 2021,p348.(347-357)

10. Samar Hossam ElDin, Ahmed Abd ElWadoud, Ahmed Samir Kamel Ali, and Wael Raafat Mahmoud Helal: "Methodology for Using Origami in Designing Deployable Shelters", journal of Design Science Volume 1, Issue 2, june 2020, p50:51. (38–54).

11. Gomes, R., Pedro, J. B, & Almendra, R., "Furniture design for flexible use of dwellings", the 5th annual European postgraduate symposium of the Faculty of Architecture - University of Lisbon, Lisbon, Portugal, 2015, p110-114.

12. Husein Ali Husein: "Multifunctional Furniture as a Smart Solution for SmalSpaces for the Case of Zaniary Towers Apartments in Erbil City, Iraq", International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies, ISSN 2228-9860 eISSN 1906-9642 CODEN: ITJEA8 ,2021,p2: 7.

13. C. Vaida, B. Gherman, M. Dragomir, O. Iamandi and D. Banyai:" Smart Furniture – QUO Vadis ", International Conference on Production Research, Africa, Europe and Middle East ,3rd International Conference on Quality and Innovation in Engineering and Management ,2014 ,p2:7.

14. Honghua Li, Ruizhen Hu, Ibraheem Alhashim, Hao Zhang ." Foldabilizing Furniture" ACM Transactions on GraphicsVolume 34 Issue 4 . Article No.: 90 . 2015. pp 1–12.

15. Ayş e Eli f Coşku n Orlandi and Ayşe m G . Çakıroğl u Başar : " IKEA and The Flatpack Concept on Scandinavian Design Traces", ICOVACS International Conference on Value Chain Sustainability, izmir University o f Economics Publicatio n No: IEU 026, Izmir Turkey,2008,p 105. (99–108)

16. S.Banu GARIP, Nilüfer SAGLAR ONAY, Ervin GARIP, Orkan GÜZELCI: "Flexible and Modular Furniture Design for Changing Living Environments", Proceedings of the 29th International Conference Research for Furniture Industry ,September 2019, Ankara, Turkey, p 534. (p533-546).

17. Florian Perteneder and others : "Foxels: Build Your Own Smart Furniture", Proceedings of the Fourteenth International Conference on Tangible, Embedded, and Embodied Interaction ,February 2020 P 111–122.

maysat fikri, hudaa 'ahmada, riham eatif. "mafhwm taeadud alruwaa watasumuym tibaeat aqimishat almafrushati", majalat altasmim aldawliat aleadad althaalith (2015): min s 123 'iilaa s 131.

ashjan eabd alkrim. "altakamul alabdaeiu waltarabut bayn 'asalib tibaeat almansujat almukhtalifat waltasmim aldaakhili", majalat aleimarat walfunun aleadad aleashir (2018): min sa33 'iilaa sa53

maysat fikri, habat husayn, hind saeid. "alkulaj kataqniat raqmiat faa aistihdath tasmimat tibaeiat li'aqmishat altaathith dhat altaabieat alwahidati", majalat aleimarat walfunun aleadad althaani eashar aljuz' althaani (2018): min s 727 'iilaa s 757.

21. Sadia Farooq, Mohammad Arif Kamal: "Exploration of Fabric Typology for Interior Furnishings with Reference to Regional Textile Products of Pakistan", Civil Engineering and Architecture, Vol. 4, No.4, 2021: pp. 166-175.

22. Himadri Gupta, Labiba Noshin, Nazma Sultana: "Multipurpose Table Lamp: A Functional Improvement of a Table Lamp". International Journal of Mechanical Engineering and Automation, Vol. 4, No.1, 2017: pp. 138-148.

23. Olfat Shawki, Mohamed Mansour: "Using the Transformation Concept in Creating Safari Multifunctional Fashion Designs for Women", Journal of Arts Architecture, and Humanistic Science, Vol. 15, 2019: pp. 41-53.

24. Osmud Rahman, Minjie Gong: "Sustainable Practices and Transformable Fashion Design– Chinese Professional and Consumer Perspectives", International Journal of Fashion Design, Technology and Education, Vol. 9, No.3, 2016: pp. 233-247.

25. Elnaz Farjam: "The Role of Contemporary Innovations on Flexible Residential Furniture with Smart and Green Material", Master Thesis, Eastern Mediterranean University, Gazimağusa, North Cyprus, 2014: p 19.

fatimat husayn, nahaa sultan. "altasmim altibaeii lilmansujat kaqimat jamaliat mudafat fi tasmim 'athath mueasir dhu tabie 'iifriqiin", majalat aleimarat walfunun eadad khasun (2) almutamir alduwaliu alsaabie "alturath walsiyahat walfunun bayn alwaqie walmamul" (2021): min s 1291 'iilaa s 1306.

shima' alnajar, eafaaf eumran, riham alsabaei. "matbueat mubtakrat biqawalib khamat aljild lituliayim mukmilat altasmim aldaakhilii lilmanzil aleasrii", majalat buhuth altarbiat alnaweiat aleadad alsaadis wal'arbaeun (2017): min s 805 'iilaa s 828.

28. James Elkins, Abstraction's Sense of History: "Frank Stella's "Working Space" Revisited", American Art Journal, Vol. 7, No.1, 1993: pp. 29-35.

29. Michael Schreyach: Barnett Newman 's: "Sense of Space": A Noncontextualist Account of Its Perception and Meaning", Common Knowledge, Vol. 719, No.2, 2013: pp. 351-379.

wisam qarni. "alfikr aliakhtizaliu liltasmim aldaakhilii wal'athath alhadithi", majalat aleimarat walfununa, aleadad alsaabie eashar(2019): min s 674 'iilaa s 688.

maysat fikri, nifin faruq, nanis jamal. "tasmim tibaeat 'aqmishat mukamilat almalabis bitatbiq alfani aliakhtizalii", majala alturath waltasmim almujalad al'awal aleadad alraabieu(2021) : min s 91 'iilaa s 109

32. Alicia Longwell: "John Graham: Maverick Modernist" Parrish Art Museum, New York, 2017, P.95.

33. Helen Gardner: "Gardner's art through the ages: the Western perspective", Thomson Wadsworth, Belmont, CA, United States, 2006, p. 290.

linah maseud, najwan shihaatuhu, nirmin saedu. "altawajuhat almueasirat w alaistikhdam altatawur altiknulujaa lilmansujat w damjiha mae alkhamat faa altasmim aldaakhlaa", majalat alfunun waleulum al'iinsaniati, almujalad althaalith aleadad alsaadis (2020) : min s 100 'iilaa s 110.

35. Muhammad-Fitri S, Suffian M, Wan-Mohd-Nazri WAR and Nor-Yuziah Y: "Mechanical PropertiesOf Plywood From Batai (Paraserianthes Falcataria), Eucalyptus (Eucalyptus Pellita) and Kelempayan (Neolamarckia Cadamba) With Different Layer and Species Arrangement", Journal of Tropical Forest Science vol 30, No (1), 2018, p: 58–66.

36. Hafsa Jamshaid , Abdul Waqar Rajput , Bilal Zahid , Norina Asfand , Sikander Abbas Basra , Amer Ali :" Comparison of functional properties of woven and knitted denim fabrics ", Indutria Textila Journal , Vol.71 , No.1 , 2020 , p.3

37. Heba assem el-dessouki : " Effect of different washing methods on mechanical properties of egyptian denim fabrics ", International Design Journal, Vol.5, No.3, 2015, p.1099

38. Mohammad Abdul Hasan Shibly, Mohammad Mohsinul Hoque, Solayman Miah:" Development of Eco-friendly Denim Fabric Washing by Natural Resources ", International Journal of Textile Science, Vol.10, No.1, 2021, P1.

39. Nasrin Akter, MD.Reazuddin Repon, Daiva MikuČioniené, Mohammad Abdul Jalil, Tarikul Islam, MD.Rezaul Karim:" Fabrication and characterization of stretchable denim fabric using core spun yarn ", Pre-Proof Journal, Dol: <u>https://doi.org/10.1016/j.heliyon.2021.e08532</u>, 2021, p.3.

40. Ramratan , Rohit Kumar , Sukhvir Singh :" Study of denim fabric on finishing process and characteristic performances " , Asian Textile Journal , 2020, p.26.

41. Elizabith King :" Denim fabric manufacturing ", Cotton Incorporated Publishing, America , 2004, P.1

42. O.Babaarslan , E.Sarioğu , H.K.Kaynak , M.Ertek Avic : " Air permeability analysis of denim fabrics from dual-core spun yarns "  $18^{th}AUTEX$  World Textil Conference , Istanbul , Turkey , 2018.

43. Heba Abdel Aziz Shalaby , Adel Abdel Moneim Abd Allah Abo Khozaim :" The effect of multiple layers of woven fabrics on tensile strength and elongation ", International Journal of Advance Research in Science and Engineering , Vol.6 , No.5 , 2017 , P.728.

44. Vildan Sülara, Eren Öner, Ayse Okur: "Roughness and frictional properties of cotton and polyester woven fabrics ", Indian Journal of Fiber & Textiles Research, Vol.38, 2013, P.349. 45. Eman Eltahan, "Structural parameters affecting tear strength of the fabrics tents ", Alexandria Engineering Journal, Vol.57, No.1, 2018, P.98.

46. Atasheh Soleimani-Gorgani, Najva Shakib: "The Effect of Reactive Dye Structure on the Ink-Jet Printing of Cotton", Prog. Color Colorants Coat. , Vol. 4, 2014: pp.19-26.