Factsheet for Product Design / 3D Form Design sector



SHIFTVET

Digital Transformation for Wood and Furniture VET

SHIFTVET
Digital Transformation for Wood and Furniture VET

Content

1. Description of the VET Programme 4
2. Potential Subjects for Transfer 5
3. Transferable ShiftVET Exercises 5
4. Example of application in the New Sector 7
5. Required Adjustments 8
6. Conclusions 9
Summary 9

Industry / VET Sector Analysed: Product Design / 3D Form Design

VET programme(s) analysed: Product Design (3D Forms), Riga Art and Media School (RMMT), Latvia

1. Description of the VET Programme

What should be included?

The Product Design (3D Forms) programme at Riga Art and Media School is a four-year vocational secondary education programme after Grade 9, leading to Latvian Qualifications Framework Level 4. The programme develops creative, technical and digital competences for designing functional three-dimensional products. Relevant professional modules include Design Processes, Technical Drawing, Materials and Technologies in Design Product Development, Form Development, 2D and 3D Digital Modelling, Design Product Development, Digital Design, New Materials and Technologies, and Product Design Project Implementation. Practical learning combines traditional form-making and material work with contemporary digital technologies. Students learn 3D computer modelling, 3D scanning and file preparation for 3D printers, CNC milling and laser cutting, making the programme highly relevant for testing the transfer of ShiftVET digital fabrication exercises beyond the wood and furniture sector.

2. Potential Subjects for Transfer

Subject / Module	Applicable Technology	Relevant ShiftVET Exercise	Transfer potential
3D Digital Modelling	3D Printing	Exercise 1 – Structural connector for wood joints	High
Form Development	3D Scanning	Exercise 2 – Reverse engineering for a seat surface	High
Design Product Development	3D Printing / 3D Scanning	Exercises 1 and 2	High
Materials and Technologies in Design Product Development	3D Printing / CNC	Exercises 1 and 3	High
Digital Design	3D Printing / 3D Scanning / CNC	Exercises 1, 2 and 3	High
Product Design Project Implementation	Combination of technologies	Exercises 1, 2 and 3	High
New Materials and Technologies in Design Product Development	3D Printing / CNC	Exercises 1 and 3	High

3. Transferable ShiftVET Exercises

All three ShiftVET A2.1 exercises have transfer potential to Product Design (3D Forms). Exercise 1, 'Structural connector for wood joints', has the strongest

immediate transfer potential because its core learning process - parametric CAD modelling, tolerance management, slicing, FDM printing, testing and improvement - is directly relevant to product prototyping. The original exercise also identifies product and industrial design training as a possible transfer context. At RMMT, 3D printing is already actively used in teaching and in qualification projects, including product-design objects that combine 3D-printed components with wood. Exercise 2, 'Reverse engineering for a seat surface', is also transferable by replacing the furniture component with a product, prototype, sculpted form or model; however, RMMT is currently awaiting a new 3D scanner because the previous scanner is no longer operational. Exercise 3, 'CNC programming for machining a drawer front', can be adapted to a product-design component or mould. Overall, 3D printing requires the least contextual adaptation and offers the strongest immediate transfer potential.

ShiftVET Exercise	**Technology**	**Transferability (High / Medium / Low)**
Exercise 1 – Structural connector for wood joints	3D Printing	High
Exercise 2 – Reverse engineering for a seat surface	3D Scanning	High
Exercise 3 – CNC programming for machining a drawer front	CNC Machining	Medium

4. Example of application in the New Sector

A practical transfer example can be based on product-design work already carried out at RMMT. Students use 3D printing to create functional components that are integrated with traditional materials such as wood, for example in a napkin holder and a stationery organiser. The workflow can be directly linked to ShiftVET Exercise 1: students design or adapt a functional component in 3D CAD, define dimensions and tolerances, prepare the file for FDM printing, manufacture the part, test its fit and function, and improve the design if necessary. Similar use of 3D printing is also visible in interdisciplinary learning at RMMT, including printed bag handles developed with Textile Product Design students, chess pieces as learning tasks, and model components or miniature furniture used by Interior Design students. This demonstrates that the ShiftVET workflow can be transferred from furniture production to product design and related creative VET programmes.

5. Required Adjustments

The main adaptation required is contextual rather than methodological. The ShiftVET exercises were developed for wood and furniture VET, while Product Design (3D Forms) works with a broader range of objects, forms and materials. Exercise 1 can therefore be reframed from a structural wood-joint connector to a functional product component, connector, handle, fitting or prototype element. RMMT has several 3D printers of different sizes, including Original Prusa XL and Olivetti 3D-S2 machines, so the 3D-printing workflow can be implemented with existing equipment. Materials and print settings should be selected according to the design task. Learning objectives should retain the ShiftVET digital competences - accurate 3D modelling, tolerance management, file preparation, machine setup, testing and evaluation - while adding product-design considerations such as function, ergonomics, form, user needs and iterative prototyping. For 3D scanning, the methodology remains relevant, but implementation depends on the availability of the new scanner that RMMT is currently awaiting. CNC exercises can also be adapted where suitable equipment and materials are available. Assessment should consider both technical accuracy and design quality.

6. Conclusions

Transfer of ShiftVET results to Product Design (3D Forms) is highly feasible. The programme already includes 3D digital modelling, 3D scanning and preparation of files for 3D printers and CNC milling, while 3D printing is actively used in RMMT teaching and qualification projects. The strongest immediate transfer potential is 3D printing because the necessary equipment is available and students already apply the technology in real product-design work, including objects that combine 3D-printed parts with wood. Exercise 1, 'Structural connector for wood joints', is therefore the easiest ShiftVET exercise to transfer: the original furniture-sector context can be replaced by a functional product component while retaining the CAD, tolerance, FDM printing, testing and improvement workflow. 3D scanning also has high pedagogical transfer potential, although practical implementation currently depends on the arrival of a new scanner. CNC transfer is feasible but may require more adjustment to equipment, materials and the specific design task. Overall, ShiftVET can be integrated into existing product-design learning and can also support interdisciplinary work across creative VET programmes.

Summary

Overall Transferability Assessment

x High

☐ Medium

☐ Low

Main technology with transfer potential

x 3D Printing

☐ 3D Scanning

☐ CNC Machining

x Combination of technologies

Main transferable exercise

Exercise 1 – Structural connector for wood joints (adapted to a functional product component, connector or prototype element)

Secondary option: Exercise 2 – Reverse engineering for a seat surface (adapted to a product / prototype / sculpted form when 3D scanning equipment is available)



SHIFTVET

Co-funded by
the European Union

Co-funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the Spanish Service for the Internationalisation of Education (SEPIE). Neither the European Union nor the granting authority can be held responsible for them.