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Taylor, Andrew

Investigating the Application of 3D CG Technologies in Fashion Education

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An Investigation into 3D Software Tools for Apparel Design and Construction in a Virtual Environment

Andrew Taylor
HEFCE funded Research Student: 1998-2000
Department of Clothing Design & Technology & Department of Textiles/Fashion
Faculty of Art & Design
Manchester Metropolitan University
Overview

- Starting at the Beginning and Learning new things:
  - body, measurement, clothing, fashion, illustration, pattern design and construction and presentation/merchandising
- Exploring the software available and how it is used in Fashion/Clothing Education and Industry
- Introducing 3D software to learning and teaching
- 3D now
MMU:
3D Software
Design Research
1998-2000

RESEARCH OF
3D BODY &
MEASUREMENT
Body Measurement
Made-to-Measure Clothing
## Standard Body Measurements

<table>
<thead>
<tr>
<th>SIZE SYMBOL</th>
<th>SML</th>
<th>MED</th>
<th>LGE</th>
<th>XLGE</th>
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<tr>
<td>BUST</td>
<td>82</td>
<td>88</td>
<td>94</td>
<td>100</td>
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<tr>
<td>WAIST</td>
<td>62</td>
<td>68</td>
<td>74</td>
<td>80</td>
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<tr>
<td>HIP</td>
<td>87</td>
<td>93</td>
<td>99</td>
<td>105</td>
</tr>
<tr>
<td>BACK WIDTH</td>
<td>32.8</td>
<td>34.4</td>
<td>36</td>
<td>37.6</td>
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<tr>
<td>CHEST</td>
<td>30.6</td>
<td>32.4</td>
<td>34.2</td>
<td>36</td>
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<tr>
<td>SHOULDER</td>
<td>11.9</td>
<td>12.3</td>
<td>12.6</td>
<td>13</td>
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<tr>
<td>NECK SIZE</td>
<td>35.5</td>
<td>37</td>
<td>38.5</td>
<td>40</td>
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<tr>
<td>DART</td>
<td>6.1</td>
<td>7</td>
<td>7.9</td>
<td>8.8</td>
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<tr>
<td>TOP ARM</td>
<td>26.4</td>
<td>28.4</td>
<td>30.4</td>
<td>32.4</td>
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<tr>
<td>WRIST</td>
<td>15.3</td>
<td>16</td>
<td>16.7</td>
<td>17.4</td>
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<tr>
<td>ANKLE</td>
<td>23.1</td>
<td>24</td>
<td>24.9</td>
<td>25.8</td>
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<tr>
<td>HIGHT ANKLE</td>
<td>20.1</td>
<td>21</td>
<td>21.9</td>
<td>22.8</td>
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<tr>
<td>NAPE TO WAIST</td>
<td>39.2</td>
<td>40</td>
<td>40.8</td>
<td>41.6</td>
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<tr>
<td>FRONT SHOULDER TO WAIST</td>
<td>39.2</td>
<td>40</td>
<td>41</td>
<td>42</td>
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<tr>
<td>ARMHOLE DEPTH</td>
<td>20.2</td>
<td>21</td>
<td>21.8</td>
<td>22.6</td>
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<tr>
<td>WAIST TO KNEE</td>
<td>57.7</td>
<td>58.5</td>
<td>59.3</td>
<td>60.1</td>
</tr>
<tr>
<td>WAIST TO HIP</td>
<td>20.2</td>
<td>20.6</td>
<td>21</td>
<td>21.4</td>
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<tr>
<td>WAIST TO FLOOR</td>
<td>102.5</td>
<td>104</td>
<td>105.5</td>
<td>107</td>
</tr>
<tr>
<td>BODY RISE</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
</tr>
<tr>
<td>SLEEVE LENGTH</td>
<td>57.4</td>
<td>58.4</td>
<td>59.4</td>
<td>60.4</td>
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<tr>
<td>SLEEVE LENGTH (JERSEY)</td>
<td>54.4</td>
<td>52.4</td>
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<td>Extra measurements (garments)</td>
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<td>CUFF SIZE SHIRTS</td>
<td>21</td>
<td>21.5</td>
<td>22</td>
<td>22.5</td>
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<tr>
<td>CUFF SIZE, TWO-PIECE SLEEVE</td>
<td>13.5</td>
<td>13.75</td>
<td>14</td>
<td>14.25</td>
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<tr>
<td>TROUSER BOTTOM WIDTH</td>
<td>21.5</td>
<td>22</td>
<td>22.5</td>
<td>23</td>
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<tr>
<td>JEANS BOTTOM WIDTH</td>
<td>18.5</td>
<td>19</td>
<td>19.5</td>
<td>20</td>
</tr>
</tbody>
</table>
3D Scanning and construction software developed by government military research
Scanned body data
Dummy Toile, workroom stand....
block is a foundation pattern constructed to fit an average figure
Identifying the 3D Design development gap in process in fashion / apparel design and manufacture (Fozzard, G & Hardaker, C. 1994)
Sourced from CDI. 1998.
Department of clothing design & Technology, MMU
Taylor, A. 1998. sourced Screen grab in CAD suite. Department of clothing design & Technology, MMU
Corel 6 Dream 3D
Three-Dimensional Illustration Software

Taylor, A. 1999. 3D Texture mapped on 3D Text
Department of Clothing Design & Technology. MMU
Poser 2+3+4

The Remarkable Figure
Design and Animation Tool

Taylor, A. 1999. 3D body animation experiments using Poser. Department of Clothing Design & Technology. MMU
Taylor, A. 1999. 2D - 3D. 3d Print experiments using PAD system Department of Clothing Design & Technology. MMU
Fit for Profit Conference

June 1999

Department of Clothing Design & Technology
Hollings Faculty
Manchester Metropolitan University
AIMS

- To demonstrate the interface between 2D and 3D software applications
- To simulate 2D style developments in a 3D CAD environment

2D-3D PATTERN DESIGN & CONSTRUCTION OF APPAREL IN A VIRTUAL ENVIRONMENT

by Andrew Taylor Terry Bond
## SIZES

<table>
<thead>
<tr>
<th>To Fit Chest</th>
<th>90 cm</th>
<th>95 cm</th>
<th>100 cm</th>
<th>105 cm</th>
<th>110 cm</th>
<th>5 cm</th>
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<tbody>
<tr>
<td>/ 36&quot;</td>
<td>/ 38&quot;</td>
<td>/ 40&quot;</td>
<td>/ 42&quot;</td>
<td>/ 44&quot;</td>
<td>/ 2&quot;</td>
<td></td>
</tr>
<tr>
<td>To Fit Neck</td>
<td>14.5&quot;</td>
<td>15&quot;</td>
<td>15.5&quot;</td>
<td>16&quot;</td>
<td>16.5&quot;</td>
<td>0.5&quot;</td>
</tr>
</tbody>
</table>

| A  Full Chest & Hips | 106   | 111   | 116   | 121   | 126   | 5cm  |
| B  Half front chest/Hip | 26    | 27.5  | 29    | 30.5  | 32    | 1.5  |
| C  Half back chest/Hip  | 27    | 28    | 29    | 30    | 31    | 1.0  |
| D  neck buttoned       | 40    | 41.5  | 43    | 44.5  | 46    | 1.5  |
| E  Neck Line           | 41    | 42.5  | 44    | 45.5  | 47    | 1.5  |
| F  Half front neckline | 13.6  | 14.0  | 14.5  | 15    | 15.4  | 0.45 |
| G  Half back neckline  | 6.9   | 7.2   | 7.5   | 7.8   | 8.1   | 0.3  |
| H  Dropped Shoulder    | 19.4  | 19.7  | 20    | 20.3  | 20.6  | 0.3  |
| I  Half Cross Front    | 22.5  | 23.5  | 24.5  | 25    | 26.5  | 1.0  |
| J  Half Across Back    | 25    | 23.5  | 26    | 26.5  | 27    | 0.5  |
| K  Scye Depth          | 28.6  | 29.6  | 30.5  | 31.6  | 32.6  | 1.0  |
| L  Length              | 77    | 79    | 81    | 83    | 85    | 2.0  |
| M  Upper Arm           | 44    | 46    | 48    | 50    | 52    | 2.0  |
| N  Slv. head depth     | 8.5   | 9.5   | 10.5  | 11.5  | 12.5  | 1.0  |
| O  Slv. Length & cuff  | 56.5  | 58.5  | 62.5  | 62.5  | 64.5  | 2.0  |
| P  Cuff Buttoned       | 20    | 21    | 22    | 23    | 24    | 1.0  |
2D Pad Pattern Design Module

STYLE1: LONG SLEEVE SHIRT
2D Pad Pattern Design Module

STYLE2: SHORT SLEEVE SHIRT
ADDING COLOUR & TEXTURE TO SHIRT STYLE 1
ADDING COLOUR AND TEXTURE TO SHIRT STYLE 2
3D Virtual Sample Model

PAD System 3D Sample

Form1.sam

Simulation Scene Shading Dress form

Model shininess

Ambient light

Light 1

Light 2

Light 3

Renderer: WireFrame

Draw

Move cursor to change model shininess value
ADJUSTABLE DIALS FOR SIZING & CUSTOM SATIATION OF THE 3D MODEL

PAD System 3D Sample - [3D-2d.sam]

Simulation | Scene | Shading | Dress form
---|---|---|---
Type: Man
Height: 141.00
Underarm circum.: 105.00
Chest circumference: 102.30
Waist circumference: 83.20
Hip circumference: 99.20
Chest width: 0.00
Apex to apex: 0.00
Size variation (waist): 0.00
Auto apply: [ ]
Apply: [ ]
Shoulder pads: [ ]
Shoulder pad height: 0.00
Dress form lines: [ ]
Dress form color: [ ]
3D SHIRT SIMULATION
With PRINT DESIGN MAPPED
3D SIMULATION OF FIT & DRAPE
“..the most straightforward way of taking 2D data and presenting it as 3D data is to use a 3D model.”


3D EXPERIMENTS
2D working drawings

Corel Draw 9
graphics drawing, painting software

Department of clothing design & Technology
Fitted trousers with print/textile mapped to pattern in 2D & 3D in Pad Software

Taylor, A. 1999. 3D textile mapping experiments
Department of clothing design & Technology. MMU
ACROSS BACK CENTRE BACK DEPTH

Back Bodice Drafting Measurements

Taylor, A. 1999. 3D textile mapping experiments Department of clothing design & Technology. MMU

Development Animated 3D learning tools using PAD Software

Department of Clothing Design & Technology. MMU
POSER4 AS A LEARNING TOOL

Taylor, A. 1999. 3D Areas of suppression visualisation experiments
Department of clothing design & Technology. MMU

AREAS OF SUPPRESSION FOR BASIC BLOCK PATTERNS

A) Above and under the bust prominence
B) Above and under the shoulder the blade
C) Between underarm and side hip
D) At the elbow or between the elbow and wrist
Taylor, A. 1999. 3D modelling experiments using primitive shapes and Poser software. Department of clothing design & Technology. MMU
Taylor, A. 1999. 3D animation hoody visualisation. Department of Clothing Design & Technology. MMU
POSER 4 + 3D STUDIO MAX+
FINAL PHASE EVALUATION OF GERBER AP3DS 3D -2D DESIGN, FIT & KES_FABRIC MEASUREMENT
Taylor, A. 2000. 3D Gerber AP3D-S experiments with 3D-2D pattern
Department of Clothing Design & Technology. MMU
Department of Clothing Design & Technology. MMU
Taylor, A. 2000. Evaluation experiments with Gerber 3D ease and fit tools
Department of Clothing Design & Technology. MMU
Department of Clothing Design & Technology. MMU
MMU: 3D Software Design Research 2000-

FUTURE PHASE
3D Studio Max and ClothReyes collaboration
- Catwalk simulation by
  Thierry Mugler
Virtual Reality:
The ultimate future textile design experience?
“If the artist does not perfect a new vision in his process of doing, he acts mechanically and repeats some old model fixed like a blue print in his mind.”

John Dewey, (1935) Art as Experience, p. 50

in

Strauss, A Corbin, J
Basics of Qualitative Research-Grounded Theory Procedures and Techniques
“Minds are like parachutes: they only function when they are open.”

Sir James Dewar