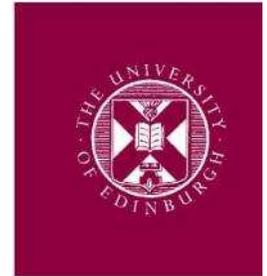




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Edinburgh College of Art

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STUDIES



Where Art Meets Science : 3D Printing in Veterinary Medical Education



Tobias Schwarz, Catriona Bell, Andrew Gardiner, Joan Smith, Andrea Roe, Richard Collins, Jason Felver–Gant, Eoghan Clarkson, Jessie Paterson and Susan Rhind

Overview



- Original idea
- What happened next..... 
- Evaluation
- Next steps

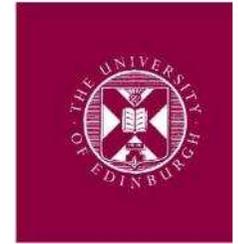


Background/ rationale

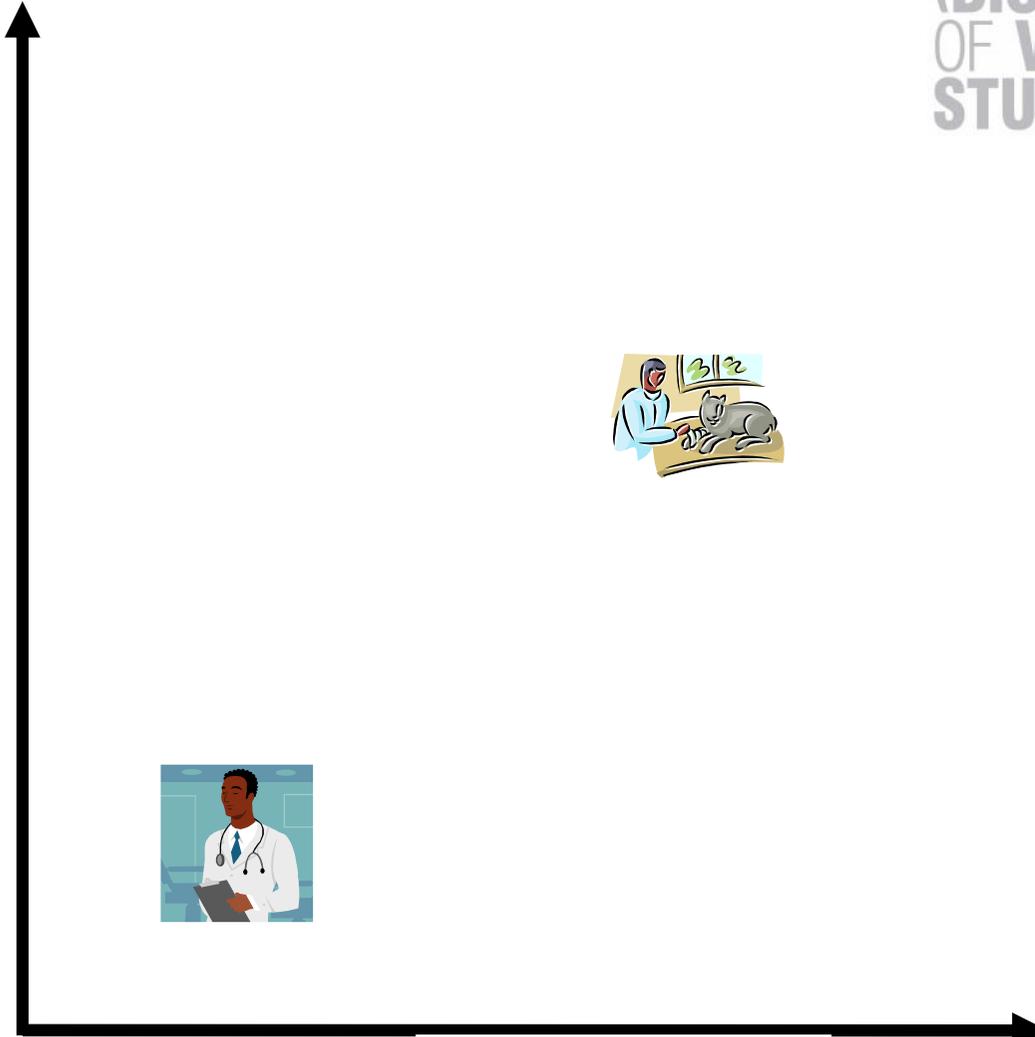
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- Essential to develop veterinary students' spatial understanding of key anatomical structures.
 - Structure and function of normal body systems
 - Understanding of the 3D development of pathology and disease.
- Veterinary students on day 1 after graduation are expected to be able to carry out basic surgical procedures → essential to develop a sound understanding of 3D surgical anatomy.



SPECIES



PROCEDURES



Some other things to consider....

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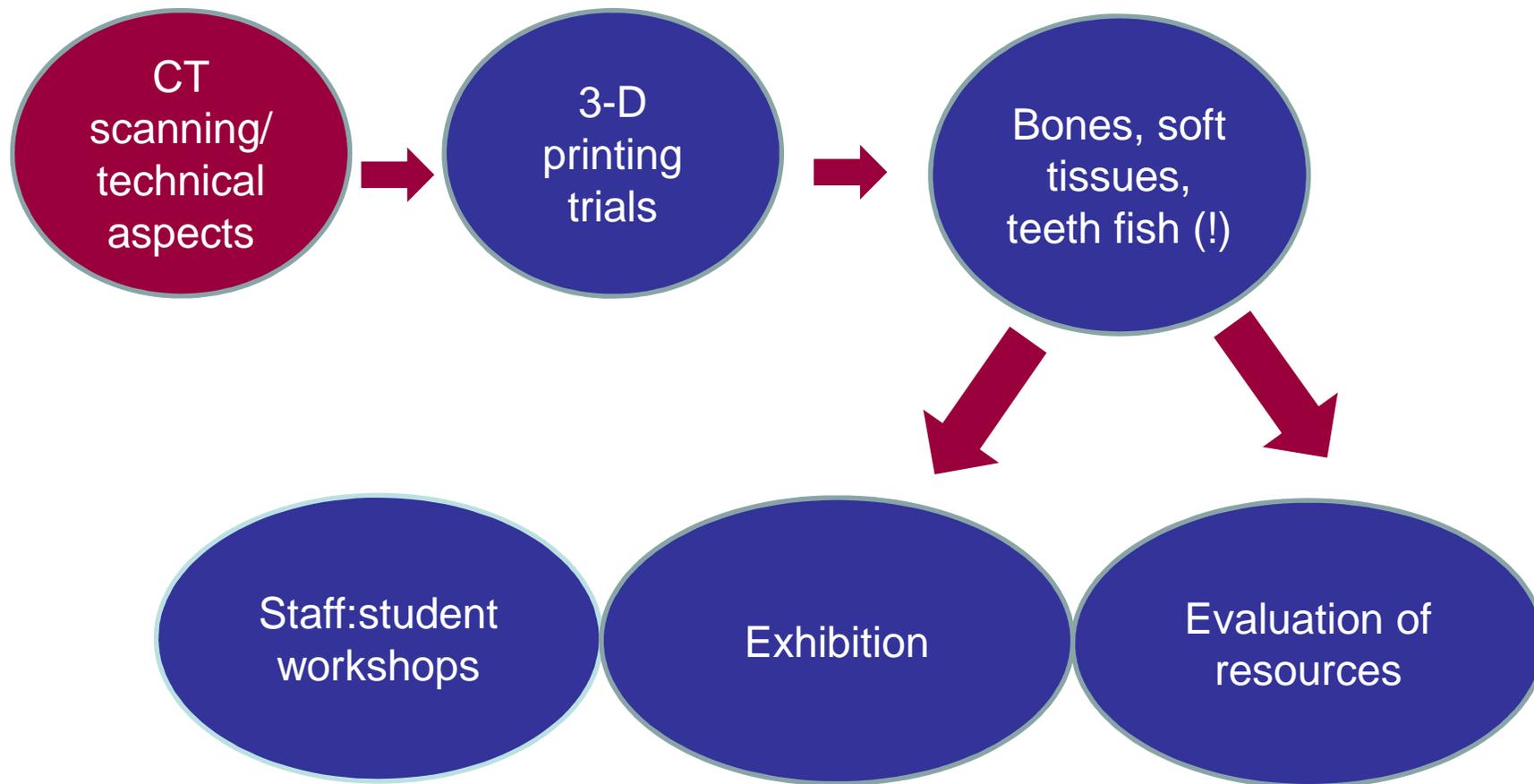


- Some studies have shown that women find it harder to comprehend 3D anatomy from 2D displays than men.
- Ethical issues - wish to explore alternatives to the use of animal tissues in teaching whenever possible.





What we Did

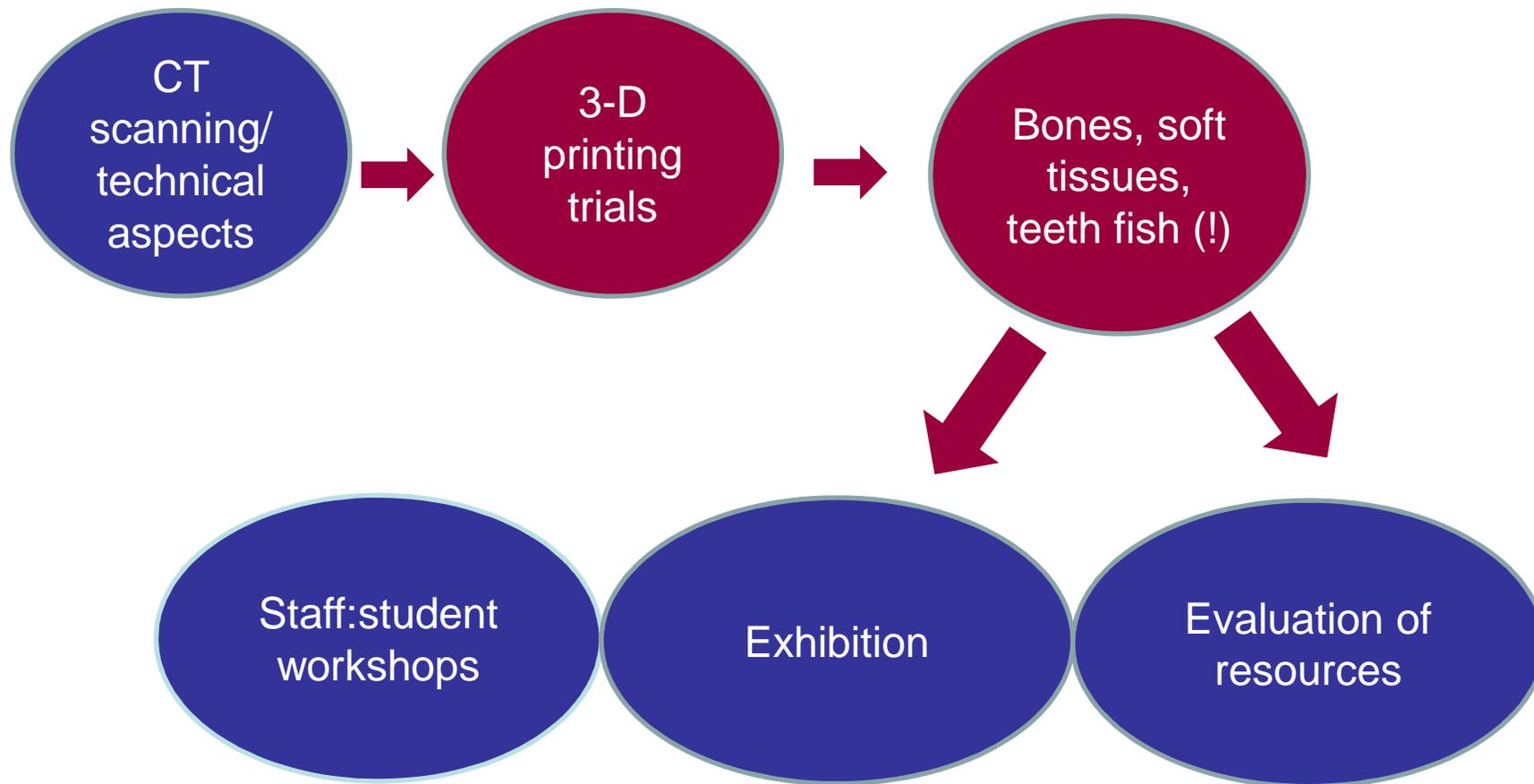


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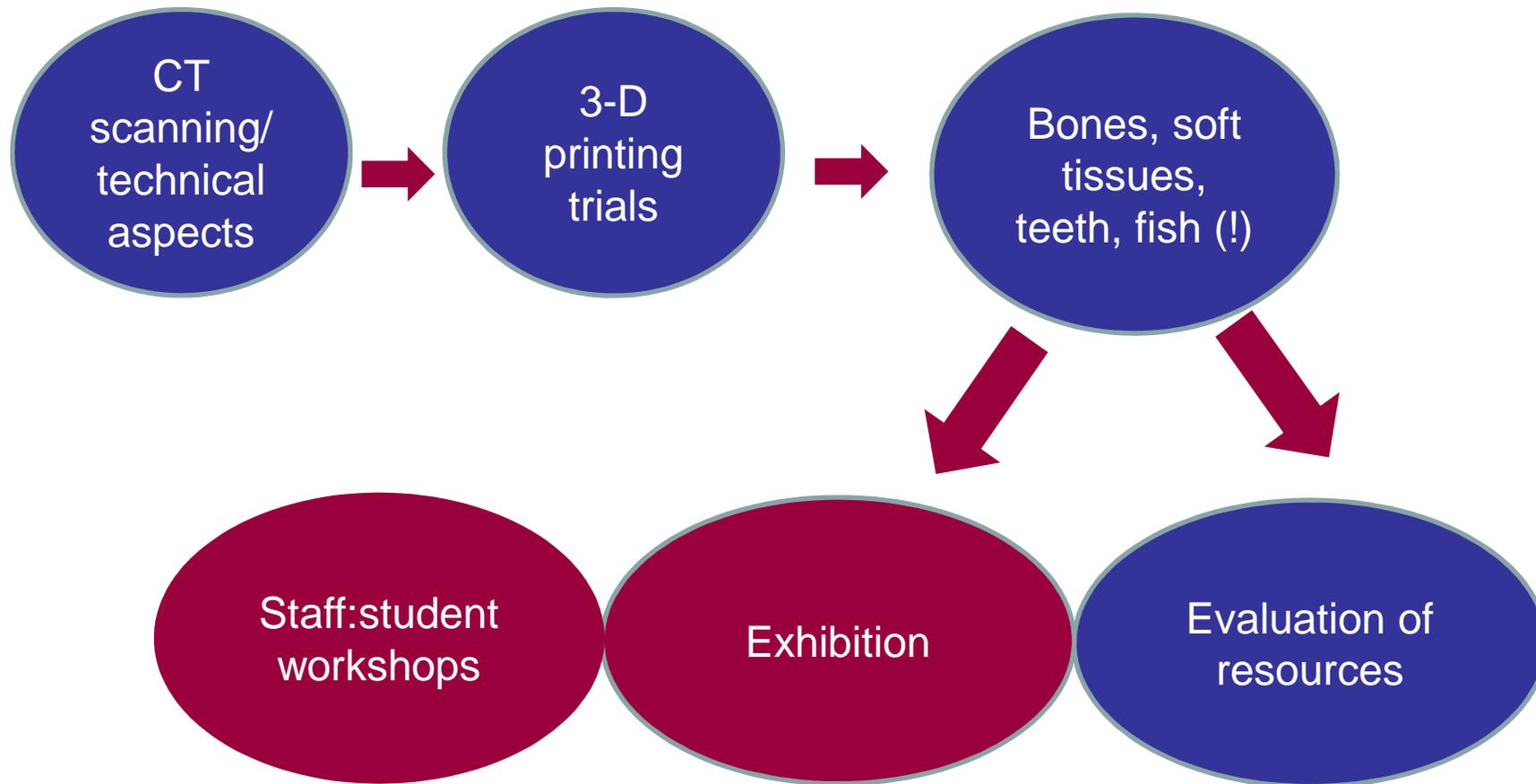


What we Did





What we Did



The Workshops

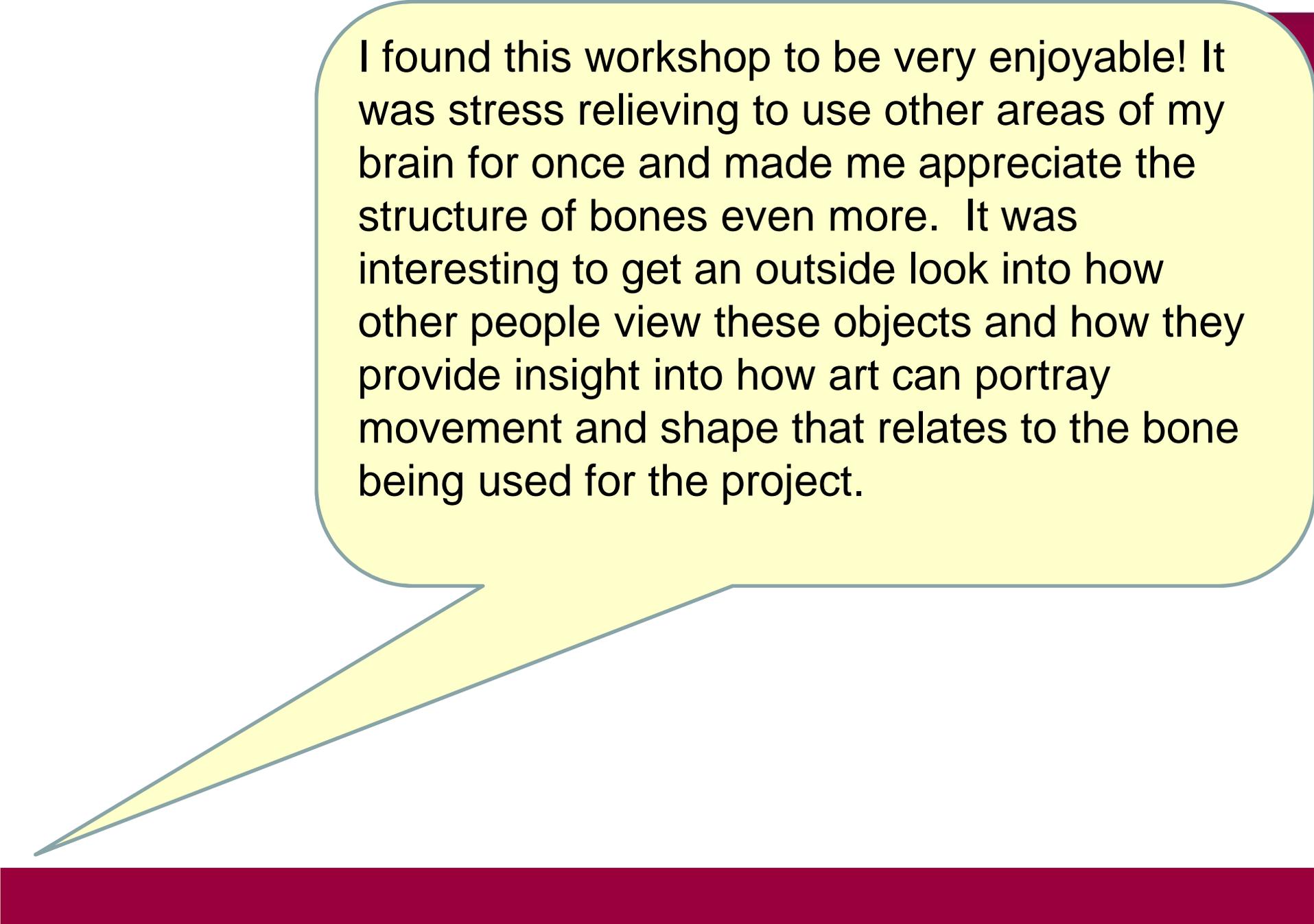
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I found this workshop to be very enjoyable! It was stress relieving to use other areas of my brain for once and made me appreciate the structure of bones even more. It was interesting to get an outside look into how other people view these objects and how they provide insight into how art can portray movement and shape that relates to the bone being used for the project.

The Workshops

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The Exhibition

EDINBURGH INTERNATIONAL
science
festival

EDINBURGH INTERNATIONAL
SCIENCE FESTIVAL
SUMMERHALL PROGRAMME 5–20 APRIL 2014



GROUP SHOW THE BONE LIBRARY

The Bone Library Gallery

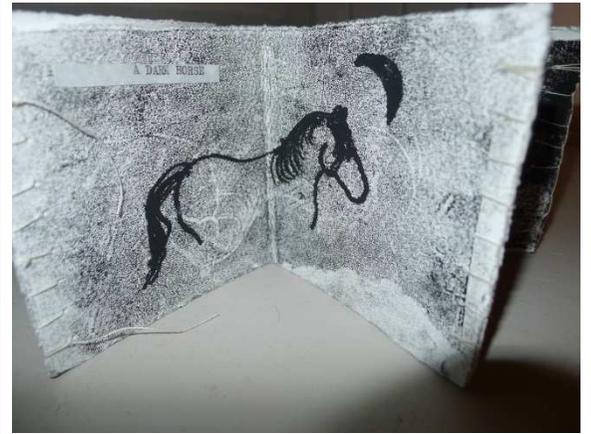
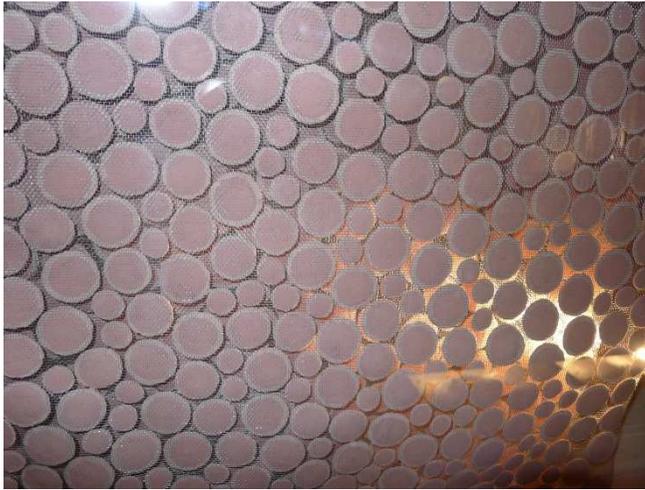
Students and staff from Edinburgh College of Art and the Royal (Dick) School of Veterinary Studies are exploring the use of 3d models in veterinary education. The result – *The Bone Library* – examines and interprets the creation of 3d models. It raises ideas

The Bone Library

Students and staff from Edinburgh College of Art and the Royal (Dick) School of Veterinary Studies are collaborating in a project which examines the development and evaluation of 3d models in veterinary education. 'The Bone Library' exhibition is a result of this collaboration.

3d printed models of animal bones have been made in the Edinburgh College of Art CAD/CAM suite using a CatalystEX printer. This process has allowed multiples to be made, raising ideas and questions about cloning and reproduction and the inherent flaws which can result, as well as about authenticity. The process of printing bones will facilitate development of novel resources to support student learning, as well as create materials which could directly assist in surgical planning.

'The Bone Library' both examines and interprets the creation of these 3d models and responds to broader themes in relation to art and veterinary medicine. The exhibition finds its home in the old Dick Vet Bone Library, bringing the animal home to their cultural home and finding in them new



The Winners

Wenna Potter, ECA

This piece has emerged as a result of studies done with the Veterinary staff and students into the development of 3D printing as part of education, as well as personal research into the properties of paint and the physical qualities it offers as a three-dimensional object.

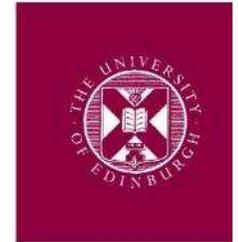


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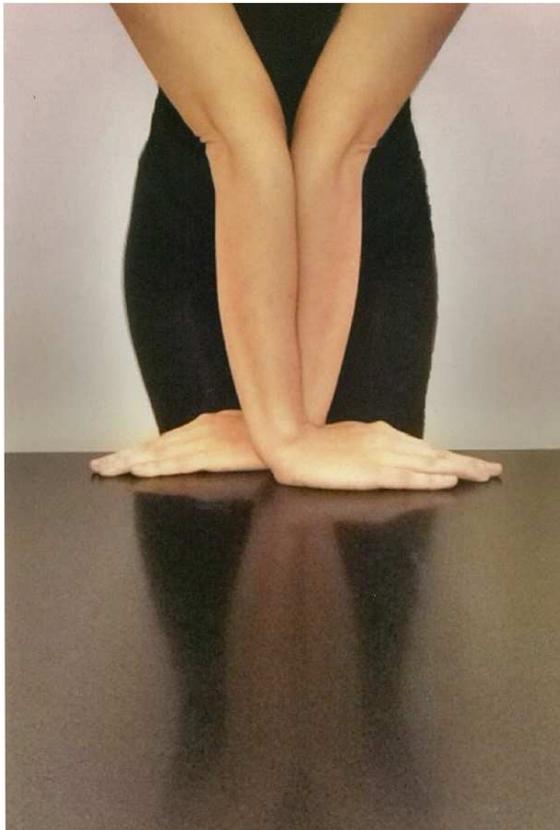
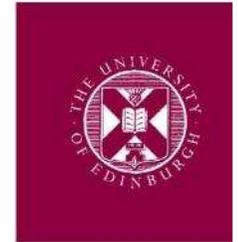
The work itself is made from 5 litres of household paint, poured onto 27 threads of elastic that have been stretched vertically to their maximum possible length; which in this case is 240cm. By releasing the tension, the strands slacken and curl. I then displayed them, hanging in stasis, within a shelf in the exhibition space. The title, “5:27, *rooted*”, denotes the quantity of paint in litres, followed by the number of strands created.

The Winners

Colette Angel, R(D)SVS



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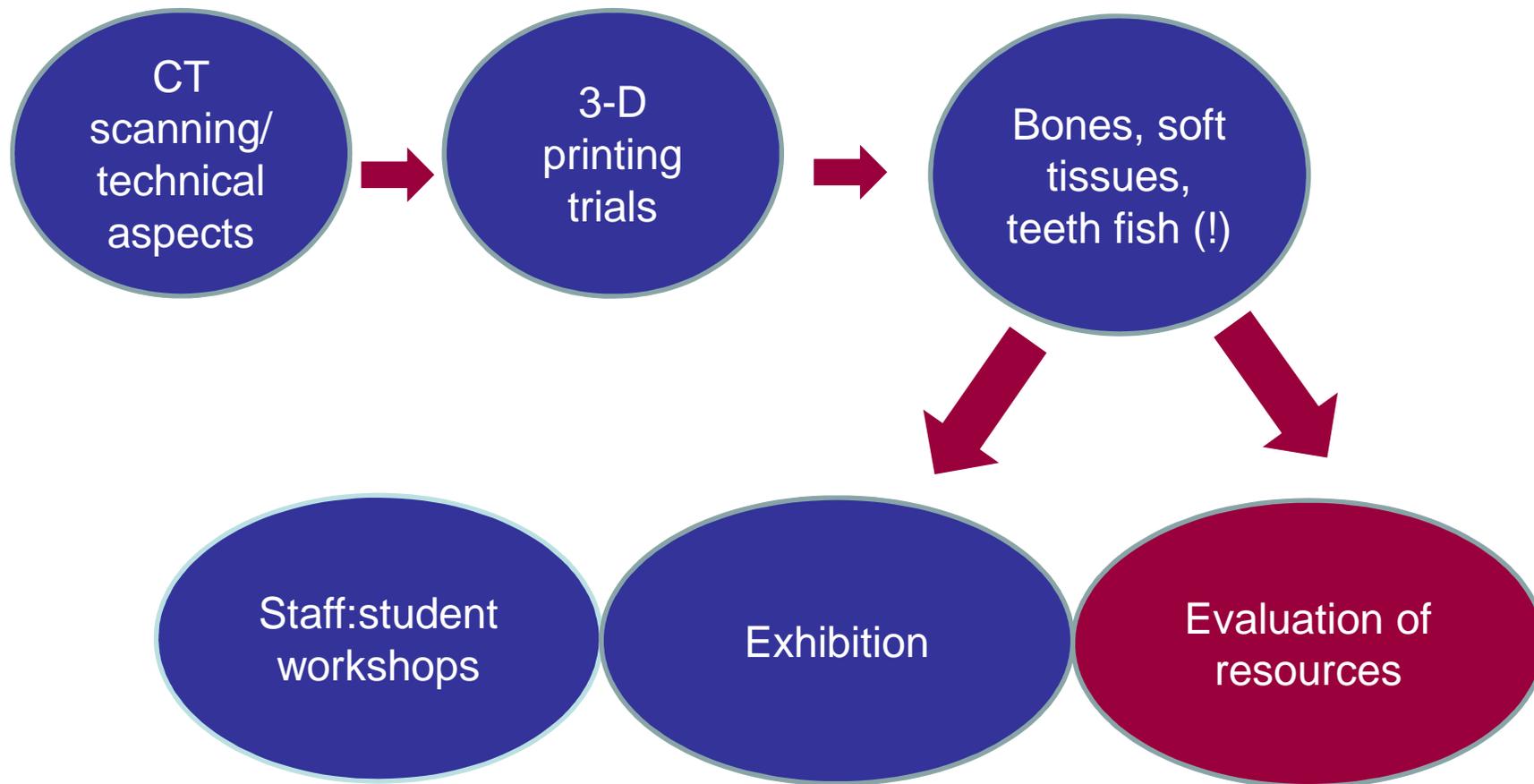


When we were told of the "bones" theme and to think of a "cabinet of curiosities", I knew I had to do something with my arms!





What we Did





Evaluation

- Student summer project – comparing 3-D controllable ‘spins’ against static and videos.
- Workshop with 3rd and 4th year students: qualitative



‘Cool’ Things!



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- “you don’t usually get to see pathology like that...so it’s quite cool to actually see the inner workings.”
- “It’s really cool, ‘cos I’ve never actually seen this... to see how far it extends and its shape. ... being able to see inside with a 3-D structure... the only things you usually get to see inside is with radiographs which are totally 2-D”
- “Like vet student toys!”
- “I would buy a miniature horse skull hands down!”



Less 'Cool' things.....

- “Path wise you want to feel it”
- “Teeth, bones, ear canal come out really well; the soft tissues less so”
- “This liver is too... which doesn't feel like... look like... seem like... in any shape or form”
- “Perhaps for some tissues it works better for than others. I wasn't sure if this was lung or liver..... I was trying to figure that out.”



“Wish List”

- “ I think anything where it helps you practice things that doing on clinics. 'cos I find when I am under pressure, I am not good at aiming”
- “If you could simulate a joint where you do a CSF tap; it’s the kind of thing you are never going to get to do in practice.”
- “Large things: especially horse skulls and specimens are hard to come by and so precious so it would be great to have as many as you wanted”
- “If you actually give students their own model they can make it personal and use it and draw on it”

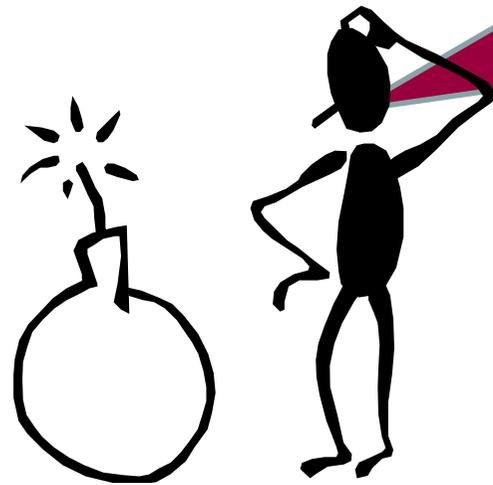


Themes

- Things they had never actually seen before
- Bones and spatial awareness
- Knowledge transfer: Clinical perspective to show a client
- Health and safety
- Making small things big and big things small
- Basic normal anatomy/ comparative
- Core clinical skills/ welfare implications

Quotes of the day.....





It would be nice to blow up rats and comparative to similar sized dog... For someone interested in exotics, it would be nice to blow up gerbils and hamsters and birds.....



- the pathology will come alive if you get to play with it more....



The Future

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- Successful proposal for Principals career development Studentship: 'Imaging and 3-D printing in Anatomical Sciences Education'; Julie Dickson (Starts September 2014)
- Purchasing own 3D printer so we can 'play' some more....



‘How will the project inform teaching and learning practices in your School and beyond?’



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The value of breaking down discipline boundaries and exploring other ‘worlds’

Links to student well being/ mental health

Exploring the technical aspects of developing the ‘best’ 3-D prints for the most appropriate purposes

Investigating and supporting the development of spatial awareness





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Andrea Roe
Joan Smith
Richard Collins

Principal's Teaching Award Scheme

