ART

Putting the 'A' in STEAM

Tim Thatcher is a Digital Trainer with Using Technology Better

When Winston Churchill was asked to cut arts funding in favour of the war effort, he simply replied, "then what are we fighting for?"

As the educational landscape becomes increasingly technology focused what place does the Arts now have? and how can STEAM not STEM ensure learners are critical and conscious users and consumers of technology? We owe it to our learners to support them to holdfast to all that the arts offer in terms of asking big questions, nourishing culture and ultimately leading fulfilling lives. So how do we put the 'A' in STEAM and what does this look like in the classroom?

I am a head teacher and leader of e-Learning at Napier Girls' High School, New Zealand. For the past 10 years I have taught both Visual Art's and Technology, two separate subjects with a lot in common. In 2018 I created a new subject for Year 9 students called Design and Innovation. With two other teachers we developed a STEAM course which synthesised the best bits of the Art and Technology curriculum. We had several main goals for this integration:

- Encourage girls to be involved in STEAM careers
- Develop a valuing of process not product
- Balance out the bias towards disciplinary thinking within a traditional school
- Develop innovative thinking capabilities.

While we have learned a lot along the way, one standout is how the inclusion of the Arts can support a much richer learning experience.

What is Art?

It was essential for us to ensure that in this new course the key Learning Objectives of both curriculum's were met, as the token art teacher I actively sought ways to integrate the arts within the technology focused projects. This inquiry led me to form a strong idea of what the 'A' is in STEAM:

- A questioning of the greater context and impact of the project
- A creative process of synthesising ideas from other sources
- A focus on not just function but also aesthetics
- A sense of meaningful community contribution or emotive value
- A discussion of ethics and morals
- A level of making and craft.

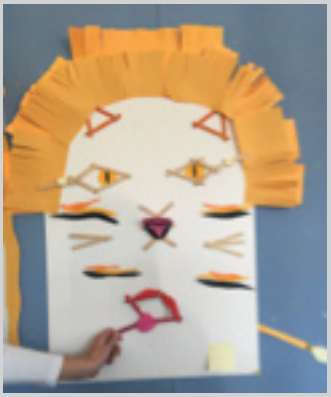
While the 'E' in STEAM encompasses a plethora of engineering disciplines the 'A' can encompass the Visual Arts, Performing Arts and the Humanities.

How is the 'A' included?

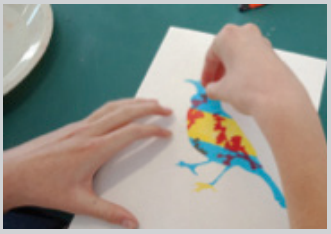
Asking hard questions

The 'A' can be addressed either superficially or extremely in-depth. As our new Design and Innovation course was 18 weeks long we chose to go in-depth. For one project the students explored mechanisms by creating a large mechanical face. In the initial stage students researched robots that could mimic human facial expressions. We then facilitated a ethical debate over what it means when a robot can mimic human emotions. The humanities critically analyse society and ideas so by incorporating this approach students were encouraged to question the nature of their project and ask hard questions.

The learners then looked at famous art works such as Edvard Munch's 'The Scream' (1893) and Picasso's 'The Weeping Woman' (1937). Students pondered how artists evoke emotions through



An example of a mechanical face project by Year 9 students



A Year 9 student wiring up her bird monoprint

exaggerated expressions. The facilitation of this big picture thinking supports students to be conscious creators of technological outcomes. This stage is tricky for the facilitator as the learning design must include lateral research stages.

Making Meaning

NZ is a nation of birds and invasive species are steadily dwindling bird populations. The Design and Innovation students identified this as one of their concerns and we developed a project which promoted awareness of native birds. Students created beautiful monoprints of birds to celebrate the many species. They then researched conductive elements and made their own conductive paint which was applied on top of their prints.

The back of the prints were wired up and connected via a copper tape circuit to an Arduino board. When the works were exhibited their peers could touch the images and hear the bird sounds. The combination of visuals, sound and electronics created an immersive experience. When some birds were pressed no sound was emitted as those birds were extinct and their sound has never been recorded. This had a profound effect on the viewer and the students not only learnt about coding and circuitry but also made meaning and affected the emotions of the viewer. STEAM projects make meaning and have not just practical outcomes but also emotive and aesthetic ones.

The active integration of the arts in our new course has allowed the students to go much more in-depth with their learning. I feel we have not only equipped them with an understanding of technology tools such as block coding but also the confidence to question the role of technology in society. Students responded that they now understood technologies potential as a cultural outcome not just a product.

Tim Thatcher is now a Digital Trainer with Using Technology Better, a Digital consulting company. UTB support schools to integrate meaningful STEAM and digital technologies into their school.