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Exploring new educational technologies within the design and technology curricular.

STRAND 2:
Exploring and advancing teaching and learning for design and technology education (curriculum, pedagogy and assessment)

Abstract

To what extent does design and technology (D&T) equip children and young people with the technological skills they need for the future? This reflection discusses and critiques observations on international D&T curricula in the United Arab Emirates and the United Kingdom, exploring innovative practices such as virtual reality (VR) and other new educational technologies to support assessment and add depth to the curriculum. In this poster, I discuss educational perspectives from an autoethnographic standpoint and explore contributing factors, such as how culture, and how they have impacted me as a D&T practitioner. My observations come from teaching and leading within a an oversubscribed and high-performing co-education international through-school in Dubai; from five years situated within this environment I participated in the teaching and learning of the subject across the primary and secondary phases, in an expatriate community with over two thousand students from over eighty different nationalities. In comparison to the second educational environment, being an oversubscribed state co-educational secondary school in the Greater Merseyside area in England. These two educational establishments have distinctly different demographics and methods of delivery in their approach in D&T. My reflections on some of the challenges and 'quick wins' are shared with the aim to offer insights and observations that any D&T practitioner potentially can interject into their own practice.

Key Words: best practice, design and technology (D&T), curriculum, International, National, Virtual Reality, Augmented Reality.

1. Introduction

Design and technology (D&T) has been a part of the secondary school provision in England, since 1988, and has witnessed various reforms in past decades to align with current trends and evolutionary changes. McLain (2022) states, **"Design and technology (D&T) emerged as a subject in the National Curriculum for England from the largely gendered craft disciplines, with the intention of embracing a more design-oriented curriculum, reflecting changes in both society and industry. As D&T is not primarily about teaching a timeless body of knowledge but about using knowledge, then we ought to question what the subject is for and how it is taught in a technologically advanced and evolving world."** '*evolving*' and '*technological*' being the operative word; a surround sound if you will for the design and technology practitioner, needing, wanting and having to keep up to date with new and emerging technologies to inform our students of a new and emerging world. To name but a few new and emerging technologies being, augmented reality (AR) and virtual reality (VR) both of which have come to forefront in the twenty-first century. This poster shall provide an overview of how I have delved and delivered a curricular within my own practice utilising new educational technologies unpicking best practices within the setting of teaching Design and Technology as a practitioner.

2. Methodology

This poster demonstrates a qualitative research approach in the form of an analytical autoethnographic standpoint, which is rooted in my own,**' personal, self-narrative research and writing'** based upon my own '**heightened self-reflexivity**' experiences as a D&T practitioner in the both the UK and Dubai. I have analysed my own curricular delivered within a twelve-week cycle and critiqued the two methods of new technologies delivered within a national/international educational context with an, '**increased focus on emotion**' and how well I believe the methods have been implemented. *(Anderson:2006)* I have focused particularly upon:

1. Looking for ways to implement new educational technologies nationally and internationally within the D&T classroom.
2. What challenges and quick wins can be identified in using augmented/virtual reality in the D&T curricular.
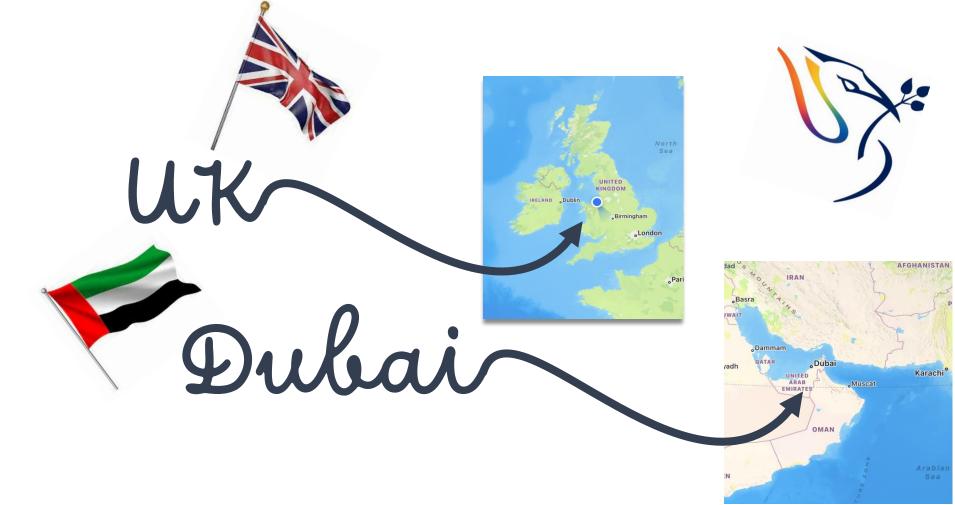
2.1. New technologies

Within this poster two educational technologies have been explored nationally and internationally it may be worth noting educational technologies are not to be, "**confused between technology education... The two are very different, one being a subject or discipline, the other a cross-curricular suite of pedagogical approaches and products that include hardware, for example, interactive whiteboards, visualizers, and so on— and software, for example, virtual learning environments (VLE), quick response (QR) codes, augmented reality (AR), virtual reality (VR), and so on. Clearly, technology education uses technologies, such as machines and equipment (hardware) and CAD programs (software), but these are primary elements of the curriculum content, rather than vehicles to support learning, or technology-enhanced learning (TEL)".** (McLain, M. & Finnigan-Moran, S. (2023).

4. Preliminary Findings

Implementing/finding ways to deliver two new educational technologies being:

Virtual reality – this is a platform whereby a designer (student) can visualise a product or object via a computer-based (virtual) environment giving the user a 3D form/ illusion. Quick response time for 3D designing and prototyping, realisation of design concepts, aids developmental stages in design process pre- manufacturing. This platform was accessed through a VR headset, using ***Tilt Brush*** by Google.

Quick wins:

- Suited more so for the higher key stages such as key stage 4 or 5 (GCSE groups) albeit they can still be accessed by other key stages.
- Assists with prototyping and the iterative design process.

Challenges:

- Initial set up costs are high and challenged more within a national context.
- Can cause bottlenecks in a busy D&T environment.
- Headset can only be used by one student at a time.

Augmented reality – is a platform whereby a designer (student) can use technology to superimpose a product or idea in the 'real world', via the use of quick response (QR) codes. The AR app specifically used for this research was called *Zappar*. Zapper offers not only the facility of an AR platform but also the use of other educational tools such as, internal assessment marksheets, that can be linked/paired in the same platform with any QR code developed by the user. This offers the D&T practitioner more autonomy/assistance over management of assessments within a practical environment leading itself to a more innovative formative assessment approach within a busy D&T environment.

Quick wins:

- Versatile and can be positively used for all key stages
- Brings different dimensions to the D&T learning environment, inside and outside of the D&T curriculum. For example, this new technology can also be used in other subjects such as Physical Education.
- Lends itself to cross-curricular links in school contexts
- Can aid/assist wall-displays for the wider community- informing school communities in new innovative way.
- Adapted learning for all learners
- The internal assessment tool linked to this platform is also a worthy bolt on.

Challenges:

- Subscription fee required to use platform – yearly.
- Quick response (QR) code content is to be created by partitioner which takes time.
- Quality of the graphics/content created is dictated by the subscription package purchased.

Summary:

One may also want to consider the upskilling of the staff body on how to use the new educational technologies. The success rate and innovative practice within the D&T environment is worthy and should be considered- using these platforms allows the students more autonomy over their own learning and allows various cross curricular links within the wider dissemination of the school context (mainly international due to more staff participation and access to technology to deliver the new educational technologies).

4. Conclusion

The new educational technologies explored have enhanced the curriculum within the D&T environment based upon the quick wins identified both within National and International contexts, the main challenges identified are:

- Time
- Budgets (mainly nationally)

Therefore, my recommendations would be for *VR* to be intertwined within the KS4 curricular, and *AR* which has more accessible/versatile to be delivered throughout all key stages within a D&T departments and whole school. Internationally this platform was very viable mainly due to resources available for example iPads or electronic devices to access the new technologies, in comparison to national contexts where electronic resources are limited.

5. Future implications

1. Can new educational technologies such as AR impact positively upon pupil attainment?
2. How can new educational technologies be more readily available in national contexts?

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