Usage guidelines

Using Augmented Reality (AR) to transcend international education systems in order to provide differentiated learning for all.

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Introduction and Background

The work presented here looks at the commonalities in applying a globally available commercial Augmented Reality (AR) software package in the pursuit of truly differentiated learning. Working within the UK educational system context work has been undertaken in both the primary and secondary phases of education. Within the USA educational system context; work has been undertaken within the K12 phase of education.

Discussion and presentation of work and findings considers how different identified groups of learners can benefit from such technologies. Vignettes from expert classroom practitioners will highlight some of the issues and limitations which an end user needs to consider in seeking to apply the same approach in their own context. As this applies to the process, skills and methodology of technological application it is clear that the age phases to which this work is applicable are limitless.

Within the scope of this emerging study, the next steps are to further investigate the use of the same device (hardware) in order to provide differentiated content to multiple users rather than having specific tools for specific purposes. It is possible, that working with another software provider could provide the solution and this is currently being explored.

Context

For many years there have been different types of AR packages available for general use, Rinesco (2013) provides a useful summary of these changes over the past decade or so. In seeking to understand the differences between the packages, he presents a taxonomy for determining AR interactivity through the complexity of media and functionality of the end product which the use of AR process leads to.

One of the latest iterations of this type of 'off the shelf' work can be seen in the work undertaken by Disney Research. They have now developed a package that allows a user to render an image in real time and see it Augment in a virtual environment alongside this.
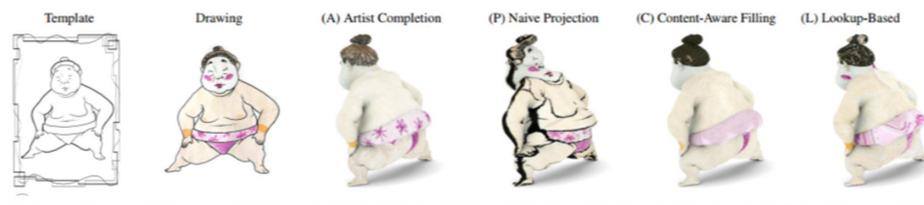
Above Image taken from Disney Research Studio showing the computer rendering process of a hand rendered drawing – but does an end user need to know the programing complexities of how it works?

In Practice

Many education settings have been using off the shelf AR Packages to supplement already established pedagogical approaches to their content delivery sessions for some time. Frequently these packages have little or no scope for end user customisation, however one of the advantages aligned to this is that it affords the end user some assurance around reliability as there is less to go wrong.

However, the challenge faced in using such techniques in the delivery of content is to ensure that all learners are able to access the desired content in a way they can understand. In doing so, it is anticipated that they will be able to gain knowledge, or assimilate it, in a way that enables them to all make individual progress. If AR is the learning medium being considered, then this leads to the necessity of requiring customisation of the software by those who have little, or no, knowledge of the technical aspects of computing.

Left: Primary phase students in The San Jose School in Valladolid, Spain using AR as part of everyday learning. Above: Interactive AR Science worksheets for use in the USA K12 School System.

Platform Decisions

Having looked at some of the viable options (including Layar, Blippar and Mybrana), it was decided that Aurasma™ would be the platform of choice for this comparative piece of work. There were a number of principal reasons for this; familiarity for both end users, ease of use and flexibility of the application itself. Unlike some of the applications mentioned earlier, Aurasma™ also offers the end user a significant degree of flexibility in its customisation and this is one of its great appeals in an educational context. Finally, it uses the concept of Aura's attached to a user account which can be set so it has restricted access; providing a degree of data security which is needed in the context in which has been used.
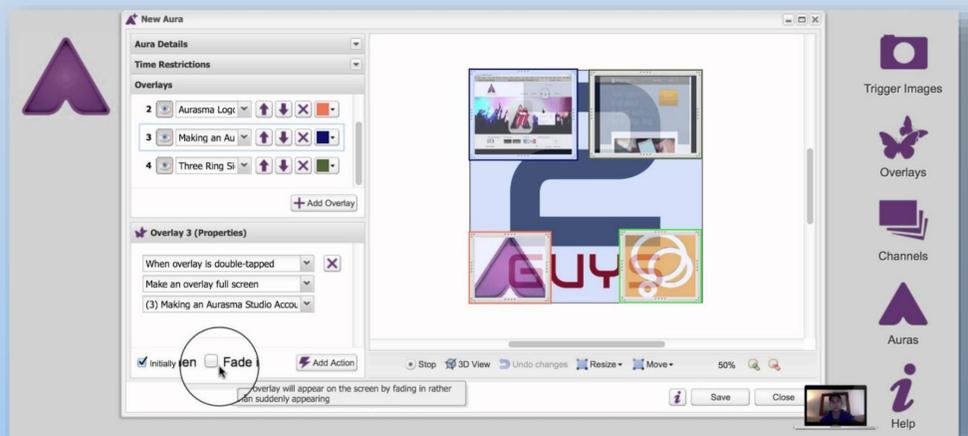
The above Image shows the working interface of the Aurasma Studio application, illustrating some of the degrees of customisation that can be achieved.

Application in Practice

Using a trigger image it was possible to use the Aurasma application to commence playing a video overlay. In the first context this was undertaken with Kindergarten Children. (The QR code left directs you to youtube). The steps in the creation of the AR interactive learning experience were very simple and in essence follow the sequence shown below.

How to Effectively Differentiate

Following a number of trials with multiple overlays trying to apply bilingual content through captions and videos an effective and reliable way to differentiate AR tailored content was found. This involved using the same trigger image across a range of devices, each running Aurasma and each logged into one of three different Aurasma accounts. This meant that each device would provide different content (from a predetermined range of three options) when the trigger image was scanned. It relies on a lot of preparation work upfront, and the ability of the class teacher to allocate specific items of hardware (in this case iPads) to specific pupils dependant upon their learning need(s).

As this approach is solely based on the premise of ability, it is possible to use the same images and AR content in a setting that uses a different structure of education system. As such, the content is universal even if the context of the system in which it operates differs. This approach has been very successfully trialled in a mixed ability classroom in a secondary educational phase context. Feedback from those engaged in this work reflects the positive nature of the strategy carried out.

AURASMA

"Once everything had been set up, it was a breeze to work with in the classroom. I did have some concerns that the technology would fail, maybe the wifi would drop out, or I would give out the wrong device to the wrong pupil. Neither of these things happened though, so it all worked well. I suppose the biggest problem I had was pupils crowding around the trigger images. They were on a wall and with hindsight, I should have put multiple pictures up, or even sheets on tables. Overall though, I like it and want to try it on other things".

Secondary Classroom Teacher

"The staff in the department which have used it have been enthused and buzzing about it, and the engagement of their pupils when they were using it. We will certainly expand its use in different areas of our curriculum, thanks for getting us involved".

Secondary Head of Department