Engaging Our School Teachers: An Augmented Reality (AR) Approach to Continuous Professional Development

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Abstract. Currently, trainee teachers in the UK learn about behaviour management strategies from a theoretical perspective at university, through discussions with their school mentors, and by trial and error at their school placement. Existing literature mainly focuses on these issues from the 'adult' viewpoint, not the voice of the child. This paper reports on work-in-progress developing a range of Augmented Reality (AR) resources, drawing upon co-design research workshops with children from a Year 6 class (aged 10) in a UK Primary School. Our research informs approaches to classroom management by encouraging reflection and analysis of 'critical incidents' identified by the pupils, and explored by trainee teachers in workshops through the medium of AR, giving a reality previously uncaptured in more traditional approaches. Our final resources will be a set of Open Education Resources (OER), offered to the wider community for reuse/ repurposing for educational settings through a Creative Commons (cc) licence.

Keywords: Augmented reality · Classroom behaviour · Co-design · Participative research · OER

1 Introduction

Currently, trainee teachers in UK school placement/working settings learn about behaviour management strategies from a theoretical perspective at University and through discussions with their school mentors; however, they learn most by trial and error at their placement setting. Haydn [1] emphasises the importance of reading and talking about managing classrooms with a range of practitioners from other schools as it provides the opportunity to explore and discover new ideas which they had not come across before. Our project is seeking to bridge the gap between university and school settings through the use of 'critical incidents' identified by school pupils, by the medium of Augmented Reality (AR). Our AR materials capture a range 'voices' in the classroom to provide discussion points, such as the children themselves, who have written, designed and acted out scenarios to be filmed for this project, but also those supporting the classroom – the head teacher provides a rationale for the school behaviour policy; the classroom teacher offers his

perspective; a newly qualified teacher talks about her fears; an Ofsted inspector talks about the framework for national policy; school governors offer their views, as well as the university lecturers giving an overview of key behaviour theories. Thus a rich and critical learning experience is being developed that can be accessed through face-to-face workshops, but additionally in a fully online context.

Augmented reality is identified as a key emergent technology in the NMC Horizon Higher Education Preview [2], and the pedagogic context of its use as an education tool is the focus of research by assessment expert Bloxham [3]. The increased use of Smartphones, individual devices for accessing the internet is rapidly increasing – in 2012, over 40 million subscribers accessed the internet via their mobile phones, an increase of nearly 9 million since 2011 [4]. Just 39 % of high school students said that their school is currently meeting their technology needs according to the 21st Century Classroom Report [5]. It is evident that students at university are now expecting academic staff to lead in the use of educational technology for their learning [6]. Thus, the increasing coverage and use of Bring Your Own Device (BYOD) makes it feasible to implement AR in different learning contexts, and Fink [7] suggests sufficient students now have access to mobile devices with features that enable them to make the most of these materials. Although utilising sophisticated technology, the tools and development environment are now accessible to non-experts (e.g. Vuforia [8]; Aurasma [9]). So, as well as integrating AR resources into the curriculum it is possible for students and staff to create their own artefacts in a constructive learning context. Our materials are hosted through Aurasma, "the world's leading augmented reality platform. Available as a free app for iPhones, iPads and high-powered Android devices or as a kernel for developers, Aurasma uses advanced image and pattern recognition to blend the real-world with rich interactive content such as videos and animations called 'Auras'" [9].

2   Schools in the United Kingdom: Complex Policies and Options

Education in the United Kingdom is a complex affair as there are different approaches to the education systems and policies of England, Scotland, Wales and Northern Island. Though there are similar issues relating to behaviour management facing all schools and teachers, our case study is in England, and so for the purposes of this study, our aims are addressing the requirements of the education system in England.

The English education system is broadly divided into the Primary sector, catering for children aged 5–11, and the Secondary sector, aimed at 11–19. Recently, there has been a great deal of change within the English education system with a new national curriculum for all age groups, and changes to the types of schools leading to the development of academies and free schools in both the Primary and Secondary sectors. The government's defining aim through these changes was to increase the opportunities for school autonomy and thereby develop a culture of self-improvement [10]. As Hanushek, Link and Woessmann [11] suggest the thinking of this policy is that increasing school autonomy, when linked to with greater accountability, can result in raising standards. Such changes have also given schools the opportunity to work in collaboration to produce joint continuous professional development, though a consequence of this policy is that there is a loss of local authority support.

This has meant that often that training of a comparable standard is no longer always possible across schools, and that schools now have either to develop their own professional development or buy into schemes or courses. Conversations with our own trainee teachers in school indicate that some staff training days they have attended (where the school is closed to pupils and staff expected attend to develop their knowledge and skills) are didactic in approach, with little material available to them once the training day sessions are concluded. This project aims to produce an innovative approach to providing focussed high quality training for schools, produced in partnership with schools. The government are keen to encourage schools towards an evidence based practice agenda, and this project fits in well with this approach.

Behaviour management in English schools has always been a matter of some discussion, with many teachers claiming that behaviour is getting worse, though a recent report states that there is no conclusive evidence of this [12]. There is great number of books written to advise teachers on how to deal with behavioural issues in the classroom (see the works of Bill Rogers [13], Phil Beadle [14] and Sue Cowley [15]), and the UK Government also has provided further guidance [16]. However, all of these focus more on what the teacher should do, and do not look so much at the students perspectives. It is worth noting that in a recent survey of teachers in England, 60 % of those who participated stated that they had not received any professional development relating to managing pupil behaviour in the last 12 months, and of those who had 15 % received only informal support from their colleagues [17].

3   Project Methodology

Our case study school is a Primary School in a semi-rural setting in Essex, UK. It has approximately 270 children on the school roll, and has a history of taking Anglia Ruskin University trainee teachers on placement. The head teacher and the Board of Governors take seriously the Government aspirations of evidence based practice, and support staff who are keen to develop their research skills through a range of Continuous Professional Development (CPD) activities, including funding Masters and Doctoral studies, as well as having external links with universities. They have already collaborated with Anglia Ruskin University to capture 'best practice' writing throughout the school [18]; and with funding for staff development being transferred to school budgets, they have been keen to develop resources to assist both their own, but also other trainee teachers working in school classrooms across the East of England.

We worked with the school to agree the scope and parameters of our study, and went through both the school's and the university's risk and ethics approvals to ensure the safety and wellbeing of the children working on the project [19]. The school were happy with the focus on behaviour management, as they could see a real purpose for developing effective CPD in this area. They were particularly interested in the inclusion of AR within the design.

The end product will be a training course with AR triggers which will link to small video clips of 'critical incidents' in the classroom. These can then be discussed, and supported by further short videos of children and staff talking about the issues and possible ways of dealing with them.

The data collection schema comprised:

- A co-design workshop with 8 children age 10 and three members of staff (see below),
- Filming day 1: work with year 6 children (age 10), during which the 'critical incidents' are staged,
- Filming day 2: film staff, pupils from other classes and school Governors, to gain other insights, comments, reactions, etc. to the critical incidents and behaviour management in general,
- Questionnaire evaluation: we have added three questions to the annual school/parent survey relating to behaviour management in schools so as to elicit some views of the parents.

3.1 The Co-Design Workshop Approach

During the children's workshop we followed a co-design approach [20] which helps to identify work-oriented design of computer artefacts in order to understand the requirements and steps; this prompts narration and design steps that children would work through preparing for filming. The co-design workshop consisted of collecting the information generated and proposed by the participants, observing how they created their ideas about classroom behaviour, and is a feature of design based research (DBR). DBR is a genre of research in which the iterative development of solutions to practical and complex educational problems also provides the context for empirical investigation, which yields theoretical understanding that can inform the work of others [21]. It emerged around a decade ago as an alternative paradigm which situates meaning in interventions offered in real-life settings [22].

3.2 The Co-Design Workshop with the Children

The children were selected for the workshop by their classroom teacher, and comprised four girls and four boys. We divided the children into two groups (each with two girls and two boys) and asked them to identify on cards the key aspects of classroom behaviour that they did not like. The children then ranked the replies in order, and each group selected the 'top' card to develop further ideas with. They were prompted to use storyboards to 'tell' their stories about poor behaviour, and to suggest ideas for dealing with this back in their own classroom context. It was noticeable that the staff working with the children were really surprised and bemused with the quality of thought and feedback. The children then developed a 'film script' storyboard to tell the story of the 'critical incident' they had identified, and worked together drawing narratives and rapidly decided, without adult intervention, that they would writing a script for the potential actors who would be filmed telling the story of the incident.

The themes the children developed are being taken back into the classroom, and will be developed through the English and Drama curricula, and they have invited us into their classroom to film the 'critical incidents'. This will take place before the end of the school year in July. Key themes will be analysed and summarised over the summer, and exemplars will be hosted through the project website, ready for dissemination and

Fig. 1. The co-design workshop in action

feedback at conferences, workshops and talks; after which the final materials will be produced and reviewed in the pilot for the CPD workshop with the teachers (Fig. 1).

4   Emerging Themes

A number of themes are emerging from this study, and they can be grouped into two: themes relating to behaviour management, and themes relating to the use of the technologies. With respect to behaviour management, our initial findings have identified a significant 'gap' in the literature on classroom behaviour in UK schools, in that much of what has been written focusses on the teacher's perspective and little is written about the children's perspective. Consequently, some of the children's responses to the co-design workshop were a surprise. Whereas we would have expected the children to have focussed on the major disruptions in a classroom, in line with the usual concerns of trainee and newly qualified teachers [23], the children expressed most frustration with low level misbehaviour. A further interesting point was that the children initially felt that the punishments should be much more severe than we would have expected. They then softened their responses on discussion with the teachers about why the teachers responded in the ways that they did. This would suggest that it is important that when approaching behaviour management they views of both the children and the adults are included.

A number of themes relating to the use of AR as a technology to support CPD also have begun to emerge. One aspect is the interest that AR can engender in both staff and pupils, and they both became very eager to explore the use of AR, not just for this project, but in other aspects of the learning and teaching in the school. The teachers, in particular, could see it as a way of embedding technology in the curriculum for the children, as well as using to help train teachers in the future (Table 1).

Table 1. The project timeline

Timeline (6 months)	Activities in school	Activities at University
Initial meeting with key staff	Governors, Head teacher, Classroom teacher	
School agree to collaborate	School get necessary consent forms from parents and children, agreement from staff to be filmed	Full ethical processes undertaken
Co-design Workshop	8 children, 4 boys and 4 girls plus two classroom teacher and the researchers	Preparation of materials for workshop Literature review
Filming of staff	Staff who have agreed are filmed answering these four questions: • What behaviour do you find most annoying? • How does disruption in the class make you feel? • What is the best way of tackling disruption in class? • Describe in your own words a good learning environment	Initial themes: • Low level disruption is the key issue • A degree of frustration with having to repeat the same instructions to certain children • Staff were able to articulate effective ways they were able to encourage good behaviour • Staff were very consistent in their views and these aligned to the school policy document
Filming day with full classroom of children	30 children take part in filming 'issues' they have prepared – the children have researcher, written scripts and briefing plans for their group 'film'	Ongoing analysis
Preparation of interactive website	School act as 'critical friends' and review materials	Feed into site development process

5   Conclusions

Our initial findings have identified a significant 'gap' in the literature on classroom behaviour in UK schools, and it implies that there is a greater need to incorporate both the adult and children's voices in any development of training in such issues. Messiou [24] has previously stated that children's voices should be taken into consideration so as to develop inclusive practices, and it is evident from our study that there is much to be gained in this. Clearly, there is also potentially a big interest in schools

for the use of interactive technologies, and both staff and pupils are excited by the pros-
pect. The school 'film day' materials are currently being analysed, together with the
staff and children's viewpoints. The initial film clips comprising children's stories and
our materials will be available to share later this year, and these will be developed into
workshop materials. These will then provide a more authentic learning experience
through the use of AR and the incorporation of 'real' user-generated content [25].

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