Augmented Reality: A Pleasure or a Pain?

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Abstract
The following is a post-research discussion that reviews the findings of an action research project into Augmented Reality (AR) in the classroom.

1. Introduction

1.1 Augmented Reality in the Classroom

Our group decided to try using Augmented Reality (AR) as part of our teaching methodology. It seemed as though it was a good fit as a technology. For example, there are apps such as *Blippar* that allowed free educational use. After a discussion with colleagues, we thought we would see if we could up-skill the students with the technology and evaluate it for use as a teaching tool using an action research approach. We struggle with technology in the classrooms which mostly have just whiteboards and projectors. We thought it might be an interesting approach to utilise the phone in students' pockets as a learning tool. The aim was to see if AR increased student engagement in a range of sessions. We adopted three different approaches with different types of student to see the impact.

1. Lecturer Led, Lecturer Content: Sean Starkie is our work-based learning lecturer who created interactive lessons using AR as a stimulus for in-class activities. He created the content, delivered it, and led the discussions around the topic. The students were from a retail degree.

2. Lecturer Led, Student Content: I (WS) worked with Level 6 Business students to design a revision app based on their own created materials. The idea was that they would have their own bespoke learning environment, one they had created, although I led the project and ultimately created the app for them.

3. Student Led, Student Content – Lee Fishwick took a slightly different approach allowing students to choose their technology option rather than using AR and *Blippar*. The students ended up creating an online glossary and learning space for other students using a platform called *Padlet*. They rejected the complexity of AR and looked for a tool that focused on functionality and ease of use. The students were from a coaching and mentoring degree.

1.2 Results

Students enjoyed the project but did not feel it had a long-term impact. They were concerned that it felt like a lot of hurdles to learning such as downloading the app and so on. The students initially enjoyed creating the material and the app. Interestingly, one of them went home and downloaded each of the AR images and printed them out, creating a traditional handbook which they shared with others. This was a real reversal from the concept of using digital technology! The feedback also showed that most students did not have enough space on their phones for non-essential apps so were deleting it soon after downloading it.

LF encouraged full interactivity on the glossary, and it included the ability to vote/thumbs up the good pieces of work others had done. The feedback highlighted that students felt that they had learnt a lot and intend to use the platform moving forward.

Overall, we thought we were looking at AR in the classroom, but the underpinning feedback was around how students want to learn, coupled with a battle for space on their phone. There was also an ‘a-ha’ moment when we realised that we were using a new technology, but a more traditional delivery method. Rather than building the learning around

the technological abilities, we were using it to deliver a traditional approach, thus not changing the learning paradigm.

Rather than write up the results in a more traditional form, we thought that we could use the form of a podcast to have a discussion around the idea, again trying to leverage different technologies. We included a colleague who came from a media background in the discussion as he works in the education team and so had some interesting insights.

While AR has a place in learning, currently there are too many hurdles for it to be an easy solution within our lecture spaces. The investment and time required to create an immersive experience is beyond our current capabilities, so we were creating a single journey of learning based on our view of the world rather than the students.

1.3 Researcher Profiles

Lee Fishwick (LF): I am a lecturer here in coaching and mentoring. And my work with this project was introducing a piece of technology called Padlet.

Sean Starkie (SS): I am the industry links lecturer on work-based learning modules across the Business School and my approach here was to introduce some kind of augmented reality within the work-based learning module.

David Crighton (DC): I am a lecturer on the Education Studies course here at Blackburn. In a previous life, I taught but my background is in media, with a degree in film and media from Bradford College.

William Shepherd (WS): I am a business lecturer who worked on the Augmented Reality project, taking a student-led approach but doing it without technology.

2. Discussion

What was the Augmented Reality (AR) project?

We attempted to use augmented reality in three different ways, undertaking some action research to see how it would work across a range of subjects in a higher education (HE) and further education (FE) environment. WS took a student-led content approach with lecture-led development of app, Sean's approach was a lecture-led content and lecture-led app, and

then Lee took a student-centric approach. This gave us a range of viewpoints with different students and subjects to test the AR implementation. The software tool we had decided to use was *Blippar*, a free tool for educational use.

LF: When we first started the project, I was on board with augmented reality (AR) and because of my background in exploring technology, I think I brought a different challenge. Even at the outset, I didn't feel that augmented reality matched what I needed my students to learn. So, with the permission of the group I took a different direction.

And that's why I did Padlet, because I chose technology that I thought better fit the learning experiences I wanted to generate in the classroom for my learners. There will be more of that but for me. When I am exposed to new technology, it always starts me thinking about appropriateness because one other thing that we discovered was that there is so much change, so much development in technology, that it's hard to keep pace.

Often what catches our eyes, and we laugh about it, is the shiniest thing. When we first started talking about AR, we saw it and it was awesome and it was interesting and exciting, and I think all of us share a desire to engage our students' curiosity and get them interested. So, actually, I think our initial enthusiasm around this could really be great. It could really engage our students in a new way.

I was really excited about it, but when I looked at what I wanted to generate in the classroom it didn't work for me. I looked around and decided to use Padlet as a different way forward.

SS: I would consider myself a bit of a tech geek, so when I saw the prototypes on YouTube and around the internet showing what could be done with AR I was massively on board and excited about what I might be able to do. But the reality is that we have a cost restraint, in that we had very little money to start the project. We also had time constraints and my technical expertise was also lacking.

What we actually produced was a much more watered-down version than what I actually envisioned at the outset. However, with that said, what we did produce and what the students used in terms of AR got some really positive feedback. The students enjoyed it and

it worked from my teaching point of view, albeit with restraints from a lack of further tools to be able to use it from a technical standpoint.

WS: And I guess the key question is have you used it this year, have you used it since you tried it as a part of the project?

SS: I have not used it again this year, but I intend to use it further down the line next semester. I used it for a part of the second assignment in Work-based Learning which we haven't started yet, so I haven't been able to reproduce anything.

WS: So, are you planning to use it again?

SS: I plan to use it again definitely.

WS: For myself I used the Augmented Reality app as a revision tool for my students. They created the content in class, and I turned that into an app.

The outcome of this was incredibly surprising for me – the following week one of the students came in with printed versions of the app. They had been on the app, downloaded all the material and printed it out as a handout for the rest of the students, removing the need for them to use the app!

This was an interesting experiment in how things work, and that showed for me that AR wasn't something that would work in its current form.

Post-research follow-up showed that that student feedback focused on a few key areas. One was that our students tend to have very full phones, so there is a battleground for tech space. These phones are used for everything, from you know a sort of music player, internet browser and photo albums. Asking them to put another app on their phones required taking something away which was always the challenge. They might need to delete photos of their kids or a revision app.

This is increasingly important as we work in an area that is relatively deprived, and people tend not to have the latest smartphones which in turn means they have less storage space on their devices.

Another hurdle was the technology because they weren't used to it. They weren't used to AR, they found that it became a barrier to learning, resorting to printing it off because there

is no barrier between them and a piece of paper - even though technically it is their own content.

What do you think are the challenges of technology in the classroom?

DC: Well coming from my last job I had to think in a differently from the way you three have approached your research. I had to try to put the brakes on my film students from using technology. They would come to me excited about the latest camera technology which would detract from the craft they were supposed to be learning. They got really pulled into the aesthetics of filmmaking and media making at the expense of the process.

I have tried a tech project in the first term here at Blackburn, where I've got the students to think about creating a podcast as a form of assessment. It was a totally different experience to teaching media students- from session one I have encouraged the use of technology and the initial enthusiasm from the students was there.

However, as time got closer to the assessment point the students engaged less with the technology aspect and the podcast became a straightforward audio presentation. In the beginning their ideas included interviewing people in the community and editing that in. So, I think it's important when you are thinking about the subject area in which tech's been used, does it have an impact upon and enhance the learning.

SS: I think going back to what you said about living in the area that we live in; it is a relatively deprived area and it may come down to experiences students have had previously with other technologies. I think if they haven't had exposure to some of this technology, they will be reluctant to use it.

LF: For me listening to Dave talk there, that really struck me. What you describe here was that there was a main fact there a parallel process of what happened with those, where it's shiny and it's exciting and it's new. And they love the sound of it and actually I think there is something very interesting for us there. You engage them and they were curious, and for me these are two major ingredients in learning.

But time constraints seem to suggest that there is a journey that they need to go on to become comfortable with technology and adapt to it to some extent to make it a tool that's

useful for them that they are comfortable with. But we don't have the time for that. What you described is, as they get closer to the deadline, they abandon ship and they jump off.

Because as much as they would love to do it and there is an excitement about, like "I would love to try that," the pressure of assessment means that the stress sometimes is just that "I can't be dealing with that. I am going to revert back to what I know". This is what the human does when they are under stress. They don't take risks and they don't want to be creative; they want to play it safe. That's what I see in that situation.

DC: I had a student say to me that they were so excited at first because it was totally different, but as we got closer it terrified them and I couldn't understand why. Coming from teaching a creative subject into teaching education, which I am totally passionate about, I think for technology to work for education students in a creative way I need to restructure my teaching of it to groups unfamiliar with the tech.

LF: The reason that Padlet works for me was that straight away, it's easy to learn, and once I try to engage with it, easy to use.

This was highlighted by our BA Honours Groups in coaching and counselling. Some of the modules are debating modules where we debate key issues. And for me those debates often give the students a chance to rehearse, being critical and evaluative about the topics that they study. Now inevitably they all go in different directions and their collections send them into different places.

Now what often happens is all of that great range of resourcing gets kept within the confines of just that student, or a little group they might have worked in. What Padlet offers is a place where all of these resources can be landed. Now that's normal and we have seen it before, but what Padlet offers that was different it mimics a lot of the buttons and the features that the students know from social media.

So far example, if somebody puts a really interesting resource on and a number of other people look at it, they can grade it with stars and thumbs up and those sorts of things. And I found one it was engaging them to read it because they wanted to be the judge of somebody else's resources - but actually it was fairly meaningful because if it was crap, people would actually say it was crap and it wouldn't get the votes.

And then there is a natural selection process around them being thoughtful about quality of resource. So, it was just so you could see the settings so for me it was practically useful for the students, and actually they enjoyed it and it was fun. But what I am going to come back to is I allow them to play. So, the first two times we used it, they played, and there were all sorts of inappropriate resourcing came up when we were developing it.

But they knew this was play time - and I have to be honest that it's something that I brought from primary school. Age 8 -10 they learn by playing, which makes them feel comfortable with the tech and content.

SS: You mentioned good points, and I just want to pick up on one of them and it was the ease-of-use that you mention. Quite often when you see a shift in the use of technology, and I am thinking specifically about the shift from text messaging to the messenger app. The messenger apps work the exact same way as the messaging app. There was no learning curve as it just works the same way as a messenger.

But it added an extra element so you can upgrade some things like that. With the technology that we used, there was a learning curve not only for the staff to pick up and learn how to use AR. But then the students would come into a new user interface which they weren't familiar with and I think that was really difficult for students to grasp because it didn't work like Moodle that they had already used. Or it didn't work like the messenger app they had already used. It was something new to learn again and that was a barrier for some of the learners.

LF: Which again comes back to if we are going to offer a resource that we may think might be interesting and useful, we can't neglect the time that's needed for them to become comfortable. That's what you are saying isn’t it? When apps are familiar, and mechanisms are familiar, the learning time becomes shorter.

SS: And we were restricted to using the free app. If we had time money and resources to develop an app, maybe we could make something that works in a way that they are familiar with and use it that way. But obviously in this case we did not.

WS: I disagree with that - I think actually the AR Technology, where it is at the moment is a huge barrier because it's delivered by us and not chosen by them. And I think what David

was saying earlier, was that students come in to him on a media project saying, “How do I get it to do this, or I have seen this or I have seen that” and actually holding them back from that element.

We almost said, “This is what you need to do, these are the hurdles that you need to climb over.” And so, the self-motivation was low and they wouldn't go away and that becomes a real issue. And interestingly I think one of the things that you pointed out was this concept of making things just work. FaceTime and Google have trained the world now to push a button to do this.

You know how to download an app and then put in a code and things like that. But I think even if we spend a hundred grand developing an AR app, I think we would probably end up in the same place. And for me one of the real learning is we are taking this new technology but using it in an old way. So, we are using old methodologies, so effectively we’re using it. Personally, we are using it as a digital textbook versus something else.

Part of the shift to technology that we need to be aware of is that we create things in different ways. Whether that be Instagram stories whether that be how Snapchat works, whatever it might be. And I think interestingly the US have adopted this with the 21st century learning skills, where they said there is four elements – collaboration, creativity, communication and critical thinking.

DC: But the collaborative process to that and in that environment involves the aspect of competition between students, in terms of what technology is available.

What are the benefits of Augmented Reality in education?

SS: One of the benefits I saw was that because it was new it tended to increase engagement more than maybe some of the other technologies that we were using. With Moodle information goes on there and it doesn't get looked at again in as it requires logging on to the site with a password. With the app we are picking up the phone to use it, and they potentially have access to that knowledge quicker and view the information again.

LF: On the same question about analysing and looking at benefits, for me, when I looked at how Padlet played out in the classroom I think it actually enhanced the learning experience. So, it took the debating resources to a new level, because they were doing an activity that I didn't prompt them to do. I would love them to evaluate the resources and make a judgement.

As those buttons were built-in, they started to do it automatically, so I thought that it took the learning to a new level. The other thing I think it does is it reflects the world and the world of work.

Padlet may not be the future as it has already moved on to another stage, but becoming familiar with new ways of filming and storing transferring and sharing, that seems to be a benefit if we can build it in. And I think in our case AR was trying to be ahead of the curve I suppose.

WS: And it's interesting I think Sean mentioned earlier something about the cost of things. Padlet has gone to a paid for version now, so a part of the reason why we used it is it was the cost, which in turn has stopped me using it.

LF: What happened with my students was that they started to use Padlet independently, because they knew it was a tool that they could use which I was really pleased about. And actually, they didn't need to tell me about that, but they did they said I am using it for such and such. But actually, they realised that they get to a point then get charged. So now a number of them has dropped it.

DC: I think the idea of using technology is a group experience, rather than using technology as a means to an end.

The year one project that I worked on which used Padlet, for instance. I just set the structure, asked them to use Padlet, include some video content, and create a presentation. Normally this would have been on PowerPoint, but with Padlet the idea was about creating that shared resource and something about that Lee has mentioned, that there was a real sense of community for the students.

Curating various contents, having fun with it, and then feeling proud to share it back are some of the key drivers for tech usage. One of the videos was a review of the key educational

acts. The students decided to make it interesting by getting their kids to read out the acts. Another student dressed up just like the Prime Minister, Arthur Balfour. She put on a fake moustache and read through the passing of the act in present tense.

It made the project fun and engaging and created a real sense of community with a high level of interest generated around those two Padlets.

LF: That really pleases me that actually they took it and they owned it and they were creative. And I think that's where learning becomes fun, because when creativity is flowing in a human being their enjoyment around learning. I wanted to add something about the collaborative aspect - because often technology can be seen to isolate people, you know, and people just be shut into their own world technologically.

But I think something that's coming out for us is that learning involves both things, so many depend on learning where you go away, and you get your head down. And what's great is there are so many different media. We can do YouTube and podcast and that's great for different learning styles. But all human beings most 99% love to collaborate they love to be with other people.

It's a bit rough and tough and we have our issues about being in groups together, but ultimately, we find it a rich experience to share our ideas and learn ideas from other people. So, if technology can - if we can remember that technology can be evaluated, it does empower and enables us to be more collaborative and creative. I think that's something I always try and look for when I am evaluating a tool.

WS: And it's interesting because I asked most of my students what they would like to get rid of, the single answer is group work because they hate it. They absolutely hate it.

DC: But do they hate group work for the experiences that they have had, rather than what we're proposing?

WS: And that's interesting as well because is there a role for us to teach people how to be in groups? Because that comes back to Four Season collaboration and creativity and shared things.

LF: I have to come back at you because one of my modules is group work, lead groups and I look at how groups evolve and develop. I think probably all of you have touched on it.

And it's a definite yes, we can't just expect that people know how to operate effectively in a group. We have to teach it, we have to model it, and we have to be explicit in our discussions about the group and its function, as well as what the group is working on content lines.

SS: We do a lot of that in work-based learning, because obviously they are going out and getting some experience in the workplace. They need to know how to communicate with one another and how to identify the dominant person in a group, and how to deal with conflict in a group and all of these different issues that you get with group work.

How could we use AR in education?

SS: I carried out a bit of a research before starting the project. My wife is a social worker and they were looking at ways of getting adopters to understand the adoption process, what the benefits of adoption are and the drawbacks and any issues you might face with the adoption process. One organisation has developed an app which was an interactive app.

It was actually virtual reality rather than augmented reality. Through the use of a headset or some kind of visual device in front of your face you could experience different scenarios in the adoption process, through the eyes of different people in the room. So, it was through the eyes of the child, through the eyes of the adopters and through the eyes of the social worker. It created different perspectives from different situations that could occur through this virtual reality.

For our students, we can actually put them in the environment. So you could think about sports coaches being able to be out in the field while sat in the classroom just by putting a headset on, or construction students being able to be on the building site and experiencing what goes on, at the building site and be able to interact with these things. This is invaluable as you know the time, cost and effort in taking a whole group of 20 or 30 students out on a trip.

For a large Institution taking 100 students to a building site to experience these things, it's massively impractical. Suddenly they have got mobile devices in front of them or tablets in front of them, and they are all viewing the same vision but from different angles and manipulating that situation with their fingers. It could be quite exciting.

WS: It's interesting that you say that because that almost goes back to my point on this concept, that I think the reason why AR wasn't as successful as I thought it would be is because we were using a new technology in an old way. We picked up the new technology and we say how can we use that to do what we are doing now.

And almost what you've highlighted there is a different end goal, and the technology is the hurdle to get to that end goal. And this relates to what David was saying, rather than "How can I get them to read a book or can I get them to look at an app." But we are looking at the same process versus changing the process to be more beneficial to them.

LF: I want to watch something about AR because I wasn't a complete AR rejecter. And I want to tell you about a sequence of ideas that happened after we did an open evening downstairs here. One of the groups was using some AR, and they were using it as a headset to engage people to walk around the area where the open evening was taking place. So, the idea was to use the augmented reality system.

It was like a Dungeons and Dragons Den, where there were monsters and things you could find like treasures all around the room, but it was a way of getting them moving around the room to different places. It helps the flow actually.

But I think I got the thinking that we could use the same principles of AR, where we ask students to go away and look at information and to read it and collate it and try and understand it. We could, if we wanted to, move them around a little bit and have a little bit of fun and engagement. Place the information all around the building, and they would have to go and collect it, but they would have to read it to make sense of it to decide whether it was their information or somebody else's information. So, it's low-level but it's a way of getting them moving. I would argue that some of them have found it more engaging than being sat in a jigsaw group going through an information collecting session.

SS: And on a larger scale we talked about it in our initial research, the Pokémon Go phenomenon that took off where people were out in the streets and fighting and collecting Pikachu. Straight away that got me thinking about how you can use that again in the construction industry. So, you can don a headset and suddenly there are holes in the wall, and you can see the construction of the wall.

WS: Interestingly businesses are doing that – organizations in the real world. That's how they train people. What they are doing now is 3D mapping. I was talking to someone the other day and they are creating a new warehouse for something, and the warehouse has been created in AR. So, they can go to the building site and they can walk through the warehouse and see where everything needs to be laid out.

DC: I like what Sean is saying in terms of social work professionals using VR, you know something similar could be used in education to develop social skills like empathy. I think maybe a lot of students are under pressure in terms of grades, and to develop the understanding the theory of education and how do you construct a lesson plan.

And then you are set free into education I think, the idea of working with AR or VR around developing skills and empathy and looking at different situations, and how you deal with different situations it would be quite interesting.

WS: Racing drivers race the tracks in advance. They spend hours on it, and it's almost like you run your degrees, where our business students can actually have business simulations like the SIMS.

LF: Which actually recognises one of our significant factors as human beings that we learn through reputation, and what Will is saying about racing drivers - they ride those tracks they drive those tracks without having to actually be at the track, for one reason only because they know that the more times they drive it the faster they get and the more they are efficient.

So I think there is probably some rooms sculpt for further discussions around how effectively can we bring the work experience in the workplace right here into this building, and allow them to repeat the process of learning to be in a cross classroom, or actually being able to be in a building that was being constructed - and actually maybe having.

Because one of the things that I often wonder is, what would we get if we invested more time in our relationships with our local employees. This might be one of the benefits that they will share some of their AR and VR Technologies and storage, which actually allows them to be seeing the very same level of details, or the same depth of experience as they are actually experiencing on the job, which would be a fantastic preparation for the world of work.

Would you use AR in the coming academic year for education?

LF: No, and the issue is time, because for me to be comfortable about choosing it as a resort I would have to be at a level of comfort with it. And I didn't find it easy or quick to learn with and to get, because I need to feel that sense of confidence about the resource and to be clear about what it can do and how I can build it into the learning. If I don't get to that place, I am also reluctant to engage with it. So realistically it is a no.

SS: Yes, I would. However, I would need some kind of finished article to be able to use it, and that requires the development time. So, going back to what we were saying about social work project, so if you could put students in a situation and get them to experience it - if that technology was readily available to buy off the shelf, yes *absolutely*, I would use it.

DC: Probably not. I would want to know that it was going to enhance the experience of what was going to take place in the classroom, rather than just being an alternative for the sake of being an alternative.

WS: And I think I agree with all of you that technology is not the answer. It's a method to get there. And based on the money that we have, and the time that we have, and even the objectives that we have, it doesn't really fit with what we are trying to do. But it does lead to the follow-up question

Are you likely to use Tech in your classroom in the next academic year?

LF: Yes, because the experience of being in the project actually encourage me to change some of my practices as a facilitator of the learning. I realised in a very visceral real way that the engagement level went up, the ease of working doing some of the mundane tasks it was easier for them. So, for me I probably would have started to look more widely at how I might use other approaches and apps to try and get the same effect.

In terms of engagement and collaboration, I love David's idea about creativity. He’s got me thinking that maybe we as a group could be more collaborative about our learning the technology as well. It makes me feel more comfortable if we were in a regular, actual learning

set, where we would sit, and we would create something together. We could go away and have a go at it but come back and I feel the benefit of collaboration and being supported in our learning. It can get me to the point where I can become a confident user of it. And then I am at the stage where I can be much more confident about implementing it in the right place in the learning.

SS: Well I think we all inadvertently use technology more than we ever have done. I have noticed students over the past two or three years, rather than going on to Moodle to download a PowerPoint, they are taking a picture of every slide as we go through them in the classroom. So, if we are going through a particular topic, they will take a picture of every slide rather than login to Moodle.

And it goes back to what we were saying before that what's easier for some students isn't necessarily for others. You have got some students who will just login to Moodle and download a whole PowerPoint and use it that way. And you have got some students that want to take a picture, we have now got the new boards where they can just scan a QR code and it gives them the notes. So, any notes that we have made on the board or any kind of collaborative work that we done on the board you scan it and you have got it and they got access to it that way.

DC: Absolutely, but any use of technology needs to consider the types of students and the types of technology avaliable. For instance, taking the practices, techniques and I used in my last job simply wouldn’t fit with the current students I teach. A framework needs to be developed around the use of technology that fits with the needs of your current students.

WS: And whilst I echo those thoughts, it's an interesting one. For me in some ways I have almost taken a retro step and gone back to much more paper base and things like that. And that's partly because the feedback from the project was that students like the handouts, it gives them a tangible feeling of safety.