This is a graded discussion: 10 points possible due Oct 29, 2017

W10-1 Activity: Augmented Reality Cases

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Augmented Reality Cases

In this individual activity you will first read a book chapter entitled " Augmented Reality Teaching and Learning (by Matt Dunleavy and Chris Dede)", and then find & analyze two cases of AR enhanced lessons.

Step 1 : Book chapter reading

First, read the book chapter provided under Content and make a note as you read.

Step 2: Discuss the following two questions and post your responses.

(1) According to reading, what are two theoretical foundations for AR in education?

Are there any other learning theories you think could apply to the use of AR in education? Explain them and provide your rationales.

(2) What would be the benefits and the drawbacks of using AR technology in education?

Step 3: Find and analyze two cases of AR in education/training.

Go to Google, and Web search for two cases of AR design/use in education, and then analyze each of them using the following guiding questions. You may use "Augmented reality + Education" or "Augmented reality + Learning" as a searching keyword.

General overview

- Target audience
- Subject area
- Supporting theories
- Objectives of AR experience

Design

- What are the types of intended AR experience?
- What are the expected learning/training outcomes?

Development

- What was the tool (or tools) used to develop the AR experience?

AR experience

- How students/trainees are involved in the AR experience? (Use the 7th grade life science scenario in the book chapter as an example)

Comments

- What would like to add to the AR learning experience or What would like to modify in the current AR learning experience?

Your posting will include your **discussions for the two questions** & **two case AR case analyses.**

Search entries or author | Unread | Subscribed

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Oct 22, 2017

1. Two theoretical foundations of AR are situated learning theory and constructivist learning theory. The first assumes that the quality of learning is a result of interaction relative to a given context. Constructivist learning theory posits that meaning is imposed by the individual and that people construct knowledge based on their past experiences, social standing, economic status, and developmental level. AR lends itself to these theories because the activities require learners to be highly engaged and involved in knowledge construction.

2. Are there any other learning theories you think could apply to the use of AR in education? Explain them and provide your rationales. Augmented reality activities are new and innovative and carry with them a high level of motivation. This is why gaming is such a powerful and highly addictive learning tool. Modern learning theories take into account new technology and the neural pathways it creates. Connectivisim means that you are connected to a community – visual, sound, sight, reading, and connects all the learning pathways. The following

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Oct 29, 2017

According to the reading, what are two theoretical foundations for AR in education?

AR *assumes* two theories when applied to learning: Situated Learning, which is largely contextual and Constructivism, which considers meaning or knowledge as a procedurally created attribute between the learner and the world(s).

Are there any other learning theories you think could apply to the use of AR in education?

Informal Learning applies in that a device user might, of their own volition, use AR to learn. An example of this is the rapid increase in non-traditional “boot camps” for various skill sets. With enough market saturation with quality platforms for AR, it’s likely we’ll see a concomitant increase in informal learning experiences. In fact, informal learning contexts like lunches, symposia, conferences, and webinars may well be enhanced by AR.

What’s interesting is that some of the largest companies including Google and Amazon are represented in the informal communities. For instance, YouTube communities have among them a plethora of videos about proprietary technologies like SAP, PeopleSoft, and other enterprise information systems. By their very definition, these are organizational skills that are remarkably specific. So much so that I’m willing to claim AR, if implemented to facilitate this brand of learning, amounts to Organization Learning in some respect.

What would be the benefits and the drawbacks of using AR technology in education?

Some of the various affordances construe benefits, such as incomplete, but complimentary perspectives and student motivation. Cognitive Overload and the significant effort an instructor must invest comprise two limits on these affordances. In a practical sense, two design-dependent constraints, place-dependent and independent spaces, may impose some obstacles to successful implementation. One such instance is when the AR device/software requires certain physical objects, like trees, to overlay the content. If students aren’t in the proper setting, the AR might be rendered useless.

First AR Analysis: Augmented Reality Development Lab: http://augmentedrealitydevelopmentlab.com/ (http://augmentedrealitydevelopmentlab.com/)

Brief and Target audience

The Augmented Learning Development Lab (ARDL) is a line of tools and products offered by Digital Tech Frontier, LLC. The company is associated with major tech companies like Google and Logitech. Based on the copywriting, website images, and the backgrounds of the company’s founders, there’s a clear emphasis on K -12 classroom learners.

Subject area

The ARDL is a set of tools and content modules. As of right now, science and math modules are available. These include solar system exploration and geometry. The planetary sciences cover things like lunar phases or characteristics of planets. More material is being produced to expand the array of subjects. One such upcoming module use AR to teach students about the Maori society, their way of life, and common cultural objects. Teachers can craft their own modules or objects using Google Sketchup. Apparently, an AR development plug-in is available for the program. It’s worth noting that modules are categorized as “concepts” and not discreet subjects or disciplines.

Supporting theories

The ARDL promotional video begins with their guiding statement: “we believe playing and learning are the same thing.” This phrase embodies a certain conception of play; a way for students to remain engaged. This means that it’s unlikely that ARDL modules will contain drills or memorization games. Through figures like Piaget, AR (hopefully) stimulates play which is closely associated with cognitive development. That said, motivation is likely to be intrinsic and stimulated by “knowledge gaps” or anticipated success.

Objectives of AR experience

Again, the objective of the experience is to induce “flow” or a state of engagement. It’s posited that users, when adequately engaged, will explore of their own volition (intrinsic motivation) a microworld or simulation to *produce* the learning experience (a constructivist objective).

What are the types of intended AR experience?

One of the demonstrations shows a computer monitor and web camera. Recognition software tracks a black and white printout card (called a “paddle”) onto which images or 3D models are superimposed.

What are the expected learning/training outcomes?

Taking the “Human Heart Builder” module as an example, users/learners are expected to come to an understanding about the hearts function, circulatory systems, and its relation to the rest of the body.

Development

The specifics of the programming that went into its development aren't discussed, but teachers and other users can use Sketchup, mentioned earlier, to create content. A basic version of Google's program is available to download for free.

AR experience

Students wield "paddles" or simply printed cards that contain the projected images (as shown on their screens or devices). Some of the objects, such as the math module's array of blocks, are open-ended. Students play with these objects in real time.

Comments

In the case of ARDL the amount of content needs to be substantially increased. Improvements to fidelity might increase student engagement, but I realize that this is nascent technology and/or applications.

Second AR Analysis: Augmented Reality Development Lab:
http://portal.uc3m.es/portal/page/portal/actualidad_cientifica/noticias/professors_glasses (http://portal.uc3m.es/portal/page/portal/actualidad_cientifica/noticias/professors_glasses)

And

http://onlinelibrary.wiley.com/doi/10.1111/bjet.12047/full (http://onlinelibrary.wiley.com/doi/10.1111/bjet.12047/full)

Brief and Target audience

Although not exactly the much touted "Google Glass," much of the same technology is used to make what's called Augmented Lecture Feedback Systems or ALFs a reality. Rather than give students an AR-capable device and program, the technology is worn by the teacher or professor. This is a remarkably different audience than most other projects as it doesn't aim to disrupt the traditional teacher/classroom/student context.

Subject area

Subject areas don't really apply in this case. It's far more of a socially mediated system. In this sense, the subject area is more generally communications.

Supporting theories

This AR implementation can be partially related to the ARCS model, namely the facets of attention and confidence. However, the authors of a paper that promote this application of AR cite a "feedback loop" of communication that could be improved. Some students are too timid to speak up in class or the professor is unaware of misunderstandings. Since the technology is proposed to help combat this gap in communication, it aligns well with Keller's model since two facets -- confidence and attention -- are at stake. The degree to which these facets are mediated by the technology is not yet known.

Objectives of AR experience

The objective is to enable teacher responsiveness to student needs. A "bidirectional" communication between students and teachers is greatly affected by the emotional and thus, behavioral implications of the necessarily "social" nature of a classroom. If a student feels compelled to remain silent amid concerns, the objective of the AR is to mediate the relationship between the student and teacher without "hailing" the student publicly.

What are the types of intended AR experience?

What's fascinating about this form of AR is that it doesn't appear to "take the stage." It aims to remain minimally invasive and merely assist the teacher. The experience itself could be quite overwhelming if, virtually, it appears that every student in class has their hand raised! That's a poor vision of this technology though and it's reasonable to guess that the user/teacher has some control over how much feedback is provided by the AR HMD.

What are the expected learning/training outcomes?

One of the least mentioned results of this form of AR is an increase in meaningful interaction between teachers and students. In fact, it may not involve a learning outcome at all or at least, not in the traditional sense. Perhaps a student is depressed or anxious; the AR HMD could provide a notification to the teacher those barriers to learning could be removed.

Development

Again, the specifics of the programming that went into its development aren't discussed. It's nice to think that teachers could customize their experience and tailor it to specific subjects. Maybe a coach would prefer to see their student athlete's hydration levels. The possibilities are staggering.

AR experience

Ultimately, students still need to participate. Their reactions that signal the teacher are enabled by their device. A negative consequence could be students withholding “affect” which, in theory, could impact the results of the ALF. This would be an unfortunate consequence.

Comments

This is probably the most compelling use of AR, in my opinion, since it’s minimally invasive and not radically disruptive. I’m concerned that a teacher might be overwhelmed by the classroom’s demands if every nervous tick or inappropriate thought is symbolized onscreen for them.

References

Dunleavy, Matt & Dede, Chris. (2014). Augmented Reality Teaching and Learning. Handbook of Research on Educational Communications and Technology. 735-745. 10.1007/978-1-4614-3185-5_59.

Edited by John Allan (https://usflearn.instructure.com/courses/1284510/users/3960758) on Oct 29, 2017 at 7:46pm

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Oct 29, 2017

Hi John,

I love your choice of bringing the "One Flew Over the Cuckoos Nest" into the discussion. It's a very creative idea. I agree with you that this could be the most compelling use of AR and is as disruptive as it can get. That is funny that you mentioned that the educator could come somewhat undone or uncomfortable by some of the "adult content in the book....the movie, contains even more, graphic scenes -- there is some inappropriate content in writing but--great idea!

Thanks for sharing,

Best,

Jenn

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Oct 29, 2017

According to reading, what are two theoretical foundations for AR in education? Are there any other learning theories you think could apply to the use of AR in education? Explain them and provide your rationales.

The reading discusses the situated learning theory and constructivist/interpretivist theories. However, I think that AR could be used support learning through cognitive apprenticeship and problem-based learning. This would involve instructors/designers developing specific guided learning experiences through AR to support a specific project/task. The task would feature learning in a real-world situation, and the instructor could embed modeling and coaching through the experience through AR.

What would be the benefits and the drawbacks of using AR technology in education?

As discussed in the reading, there is a risk of student cognitive overload. This could be decreased by scaffolding and limiting characters and items. Another mentioned caveat would be the level of technological skill of the instructor. AR is a tremendous opportunity to support blended learning. It could support availability of learning materials at home and give students more opportunities to take charge of their learning. However, it is possible that it could contribute to increased frustration if the app does not function appropriately on different devices or platforms.

Case 1

http://www.cphmusic.net/2013/10/aurasma-in-the-music-classroom.html (http://www.cphmusic.net/2013/10/aurasma-in-the-music-classroom.html)