Article

Not peer-reviewed version

Digital Transformation to Support Sustainable Literacy Development: UAE Storytime

Sameera Alhosani , Lewis Hall * , Hayley Holuj

Posted Date: 31 October 2023

doi: 10.20944/preprints202310.2058.v1

Keywords: augmented reality; literacy engagement; reading for pleasure; transformative education; emergent digital technologies; United Arab Emirates Ministry of Education; UAE; Storytime; interactive literacy experience; young learners; bilingual literacy; local and global contexts; 3D objects; interactive games; learner agency; family engagement; global community; curriculum integration; creativity; holistic learning experiences

Article

Digital Transformation to Support Sustainable Literacy Development: UAE Storytime

Sameera Alhosani, Lewis Hall * and Hayley Holuj

[1] Affiliation 1; e-mail@e-mail.com
[2] Affiliation 2; e-mail@e-mail.com
* Correspondence: e-mail@e-mail.com; Tel.: (optional; include country code; if there are multiple corresponding authors, add author initials) +xx-xxxx-xxx-xxxx (F.L.)

Abstract: This case study explores the transformative effects of emergent digital technologies, particularly augmented reality (AR), on literacy engagement and reading for pleasure. The United Arab Emirates Ministry of Education implemented the UAE Storytime programme, utilising AR to create an interactive literacy experience for young learners. The programme incorporated bilingual episodes, featuring stories based on local and global contexts, with 3D objects and interactive games to enhance understanding. The results indicate a positive correlation between the use of AR and literacy engagement. A high proportion of learners scanned the QR codes to access the AR objects, which enhanced their engagement and understanding of the stories. The programme fostered a learner agency, engaged family members in the learning process, and established a sense of global community. The study recommends the integration of similar initiatives into the curriculum to promote collaboration, creativity, and holistic learning experiences.

Keywords: augmented reality; literacy engagement; reading for pleasure; transformative education; emergent digital technologies; United Arab Emirates Ministry of Education; UAE Storytime; interactive literacy experience; young learners; bilingual literacy; local and global contexts; 3D objects; interactive games; learner agency; family engagement; global community; curriculum integration; collaboration; creativity; holistic learning experiences

1. Introduction

Education systems around the world are working with emergent digital technologies at various levels. Learning has moved from traditional methods and devices such as mobile phones have become part of diverse educational settings. Future trends of education require quality digital tools for creation and communication (OECD, 2022) [1]. This paper will explore how this has been considered via the use of augmented reality (AR) and its potential to engage learners and communities through literacy.

The United Arab Emirates Ministry of Education has worked towards transforming literacy through the power of technology contributing to the UNESCO SDG Target 4.6 (SDG4 Target 4.6: By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy) along with increasing digital skills in line with UNESCO SDG Target 4.2.1 (SDG4 Target 4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill).

The accelerating transformation of our societies driven by digitalization and digital technologies is reshaping the ways we live and learn. Digital technologies have the capability to enrich certain educational processes and improve some learning outcomes (UNESCO, 2022). An example of this is augmented reality (AR) which integrates both real and virtual objects simultaneously for the same task (Zhang, Sung and Chang, 2014) [2]. This paper will further explore the effects of digital transformation through analysing the relationship of AR-enhanced content and its relationship with reading for pleasure engagement. Furthermore, it will identify if rapid digital transformation projects created during the pandemic are scalable for future curriculum.

2. Literature Review

Reading for pleasure contributes significantly to a learner's literacy development and has been described as a form of play that allows us to experience other worlds and roles in our imagination (Clark and Rumbold, 2006) [3]. Twist, Schagan and Hogson (2007) found that there is strong correlation between the amount a learner reads for pleasure and their academic achievement, including international assessment such as OECD PIRLS [4]. As well as academic gains, it is known that reading for pleasure has positive emotional and social consequences (Clark and Rumbold, 2006) [3]. However, reading for pleasure has been on significant decline over the past decade (Clark and Teravainen, 2017), which indicates low levels of literacy engagement [5]. Such statistics indicate that the uni-directional and traditional approaches to learning may allow for the reimagining of education to support a flourishing future for generations of learners.

Various strategies have been implemented by educators to encourage literacy engagement, with a focus on fun. It is widely known that technology can support new and innovative learning approaches to engage learners and improve the learning process. Although there are concerns with technology being detrimental to education such as lack of interpersonal interaction or monitoring learning (Klawitter, 2022) [6], the transformation to digital learning enables learners to achieve their academic goals. Ramesh (2018) states that "formats such as simulations, serious games, augmented reality (AR) can help learners practise and internalise high-level concepts" [7] (p31).

Park, S. Khoshnevison, B. (2019) aimed to present the necessity of AR-augmented reality in second language acquisition for improving the language proficiency of learners, through the various types for targeting literacy of a second language [8]. They refer to Klopfer & Squire (2008) to identify AR as a "situation in which a real-world context is dynamically overlaid with coherent location or context sensitive virtual information" [9]. According to Yeh, H. C., & Tseng, S. S. (2020), AR refers to the blending of the context of real-world with virtual approaches and items that technology provides [10]. Likewise, Yilmaz, R. M. (2018) posits AR as a new technology which bridges the real-world and the virtual environment by casting the interaction synchronously [11].

The combination of virtual and real objects resulting in real-time interaction distinguishes AR from other technologies (Yilmaz, R. M. 2018) [11]. Pan, Z., López, M., Li, C., & Liu, M. (2021) indicate that mobile technology such as AR are 'booming' the educational fields, in which it composes virtual graphs and images over the real physical environment, allowing for better interaction through physical manipulation [12].

Further research indicates that AR may account for better academic outcomes as it increases learner's motivation, supports memory retention and sensory engagement (Saltan, 2017) [13]. In addition to the positive academic outcomes, AR supports wellbeing as learners are encouraged to create their own learning experience by manipulating and interacting with their surroundings in an interactive manner, which enhances senses. In fact, Ramesh (2018) believes that AR and technology alike "can act as a bridge…leading to happiness, compassion and human flourishing", [7] (p31).

3. Context: UAE Storytime

UAE Storytime is an online programme that uses augmented reality to create an interactive literacy experience for young learners (aged 4–11) across the UAE and globally. Hosted on the Ministry of Education's YouTube channel, the Programme was introduced during June 2020 during the COVID-19 Pandemic with the aim to engage young learners in literacy and technology.

The COVID-19 Pandemic triggered the transformation in this particular area. However, the UAE Ministry of Education were equipped with tools and expertise to facilitate such a rapid transformation in response to the Pandemic. Students across the UAE were equipped with the required technology to participate in distance learning; however, both parents and students needed support with adopting to this new environment. UAE Storytime was introduced as an afterschool activity to both celebrate the Eid national holiday and was intended to be used as a 'fun and light' educational tool to support parents with engaging their children. As well as supporting families during the Pandemic, the Programme created further opportunities for learning and exploring with

 doi:10.20944/preprints202310.2058.v1

AR-enabled technology and its relationship with active learning to make sense of things we do and use in the real world.

Through cross-organizational coherence, a combination of skill sets was combined to develop the Programme—A group of local publishers, expert Cambridge authors, curriculum specialists and actors contributed their services without a budget to work on the innovative project to ensure a safe and enjoyable learning environment was provided to children during the uncertain times of the COVID-19 Pandemic. Curriculum specialists worked on creating and developing items on the project plan which included reviewing and approving content of the story titles, writing scripts, and creating the digital content whilst our partners sourced and briefed authors to deliver the stories.

A series of story time episodes were hosted bilingually in both Arabic and English to support parents with understanding, and guest authors read their own stories to an international online audience. Titles were based on both local and global contexts as the Ministry worked with local UAE publishing house Al Rawy, along with the internationally renowned Cambridge University Press. The stories celebrated Emirati culture and identity whilst encouraging global citizenship through the *Tales of Hamad* and *Cambridge Reading Adventure*s. There was also a special focus on early years through an animated yoga version of the *Bear Hunt.* The selected stories were then 'brought to life' through immersive AR technology as bespoke and personalized 3D objects were created to illustrate key concepts of each storyline, and further enhanced by interactive games to check understanding. Using an augmented reality camera, AR captures reality and looks for predetermined target points—and attaches virtual objects. The 3D objects were embedded into QR codes which were displayed on the screen during the story time. Authors and hosts would guide learners on how to access the QR codes via a mobile phone or tablet device at certain points throughout the story. A visual digital timer was also used to encourage students to complete the task and to ensure the story stayed on track.

The Programme incorporated a range of literacy strategies to support learners. The texts were presented visually as well as audibly, and the 3D objects were used as visual aids to support meaning and understanding. Literacy was used as a tool to exploit technology, whilst technology allowed for a range of scaffolding to make the texts accessible for a range of levels of learners. The different aspects of the project blended elements of the physical with the real world, which is becoming more of a reality for learners of the digital age.

4. Results and Discussion

The below tables present the UAE Storytime data including total number of episodes, views and survey responses.

Table 1. Storytime episodes.

Total Episodes (to Date)	
Emirati Episodes	8
Cambridge Episodes	7
The Bear Hunt	1
Total	**16**

Table 2. Storytime views.

Total Views (to Date)	
Emirati Episodes	36,000
Cambridge Episodes 1	48,393
Bear Hunt	6100
Total	**90,493**

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 31 October 2023 doi:10.20944/preprints202310.2058.v1

Table 3. Storytime Survey Results.

Storytime Survey Results					
The survey was only sent to viewers within the Ministry of Education in the UAE. Number of responses 1563					
	Strongy Disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly Agree**
I scanned the 3D objects in the video.	0%	1%	0%	3%	96%
I have used AR before UAE storytime.	8%	85%	1%	1%	5%
I posted on social media as a result of the 3D objects (augmented reality).	25%	20%	40%	12%	3%
Using these 3D objects (augmented reality) increased my interest in the story.	1%	3%	9%	81%	6%
Using the 3D objects (augmented reality) helped me understand what the story was about.	0%	1%	11%	15%	73%
I think that augmented reality is easy to use.	4%	3%	14%	74%	5%
I want to see more UAE Storytime episodes.	0%	3%	3%	11%	83%
I normally read a story at least once a week.	5%	46%	33%	10%	6%

The Programme started in May 2020 and ran 16 episodes over an 8-week period during the evenings reaching a total of 90,493 views across 20 countries including UAE, UK, USA, India, Egypt, Venezuela, Jordan, Saudi Arabia, Philippines, Kuwait, Oman, Morocco, Turkey, Iraq, Pakistan, Algeria, Bangladesh, Indonesia, Brazil and Botswana. The first Cambridge episodes were most popular with 48,393 viewers, followed by the Emirati episodes which gained 36,000 viewers and finally the Bear Hunt reached 6100 viewers. The total reach data was also supported by a survey that was sent out to UAE Ministry of Education student parents and gathered a total of 1563 responses. Responses indicated that students engaged with the initiative; the majority of viewers (99%) stated that they scanned the QR codes to access the 3D objects, confirming that the objects were accessible and user-friendly. It was also apparent that AR enhanced the learning experience as 88% of learners agreed that the 3D objects allowed them to better understand the meaning of the story. Likewise, 95% of learners stated that the AR increased their interest in the story. Interestingly, only 16% of the target audience indicated that they were habitual readers and a total of 97% of participants stated that they would like to watch more series, which illustrates the positive impact that UAE Storytime had on motivation and literacy engagement, and in turn, supports Ramesh's (2018) theory [13].

As well as literacy engagement, there was also a focus on learner agency as UAE Storytime encourages learners to take control of their own learning. Allowing learners to make decisions and solve problems creatively will consequently support them in accessing and using technologies to enhance their learning in wider contexts. Such skills are essential with the advance of technology as learners need to be equipped with the tools to navigate and access relevant information.

It was evident that the Programme also enhanced social well-being as it engaged family members in the learning process–this was evidenced by the social media interaction by parents and guardians. A sense of community of learning together was also established on a global level as learners and parents from across the world joined in the initiative. The parental engagement supports Osorio, Eryilma & Sandoval-Hernandez (2021) who found that parents are more engaged in their

 doi:10.20944/preprints202310.2058.v1

children's learning when well-structured technological tools are provided by educational establishments [14].

5. Limitations

The results clearly present a positive correlation between the use of AR and literacy engagement, which supports literature around the use of digital tools to enhance learning. However, the study could be further enhanced to capture reading comprehension statistics to verify the following question: 'Using the 3D objects (augmented reality) helped me to understand what the story was about'. Likewise, the digital content could have been made more accessible for different platforms; the 3D objects worked with Apple devices but were temperamental with Android devices. Further research on how to develop cross-platform objects would allow for a wider audience reach.

In terms of the digital transformation, there were limited challenges. The collaboration with our partnering entities and voluntary commitment worked especially well. It was an example of humanity coming together in uncertain times. The Project was planned and executed in a short time frame during the initial phases of the Pandemic; there was a 4-week turnaround from the planning to the implementation stage. In terms of content, the introduction of AR to engage in literacy worked particularly well as it encouraged learners who may be less engaged with traditional literary texts. The bespoke nature of the 3D objects added value, particularly with the UAE-based stories as our Emirati children could relate to the objects coming to life; such objects are not readily available on other platforms.

6. Recommendations

This initiative could be implemented as part of the wider curriculum to engage learners further. For example, learners could create the 3D objects as part of their Computer Science course, they could write the stories as part of their Arabic or English course, and they could practise delivering the stories via their drama course. Such a concept would encourage an integrated and collaborative approach to learning and assessment.

7. Conclusions

The results of UAE Storytime indicates that the initiative was a success particularly in student engagement and literacy development. With a focus on reading for pleasure, the Programme enables students to engage and enjoy reading; such engagement is critical to students' growth in an array of contexts. Engaging in reading for pleasure also impacts positively on emotional wellbeing as it gives readers a more developed understanding of people, the world, life experiences and how these can connect to themselves. It also helps readers to build self-confidence, self-esteem and empathy. The networked collaboration provided through YouTube and the interactive games also increases social wellbeing as valuable interactions are enabled.

Adopting such a practice will support entities who are working towards SDG4.6 and SDG 4.4.1, along with breaking down barriers to literacy and digital transformation. It will support in creating a reading culture both at home and across the curriculum, using quality digital tools for creation and communication (UNESCO, 2022) [15]. The nature of UAE Storytime is scalable and is a future proof concept that could be expanded across the curriculum amongst many contexts in preparation for a digital future.

8. Further Reading

- UAE Storytime–YouTube Channel: https://www.youtube.com/watch?v=IEAj4nd3o7o (21st July 2022)
- Ministry of Education Website: https://www.moe.gov.ae/En/ImportantLinks/Forms/pages/uaestorytime.aspx
- News publications:

https://www.dubaichronicle.com/2020/07/11/young-learners-at-home-join-story-time-with-cambridge/

Funding: This research received no external funding

References

1. OECD. Measuring Distance to the SDG Targets 2019: An Assessment of Where OECD Countries Stand. OECD Publishing: Paris, 2019. Available online: https://dx.doi.org/10.1787/a8caf3fa-en (accessed on 15th July 2022).
2. Zhang, J.; Sung, Y.-T.; Hou, H.-T.; Chan, K.-E. The development and evaluation of an augmented reality-based armillary sphere for astronomical observation instruction. *Comput. Educ.* **2014**, *73*, 178–188.
3. Clark, C.; Rumbold, K. *Reading for Pleasure a Research Overview*; The National Literacy Trust: London, UK, 2006
4. Twist, L.; Schagan, I.; Hogson, C. Progress in International Reading Literacy Study (PIRLS): Reader and Reading National Report for England 2006. NFER and DCSF. 2007
5. Clark, C.; Teravainen, A. *Young People's Reading in 2016 Findings from Our Annual Literacy Survey*; The National Literacy Trust: London, UK, 2017
6. Klawitter, A. 5 Challenges Students Face with Online Learning in 2022, (2022). Available online: https://meratas.com/blog/5-challenges-students-face-with-remote-learning/ (21st July 2022).
7. Ramesh, A. Using technology as a bridge towards building peace and happiness in "The blue dot: Digital Pedagogies for building peaceful and sustainable societies. Issue 8, July 2018.
8. Park, S.; Khoshnevisan, B. Literacy meets augmented reality (AR): The use of AR in literacy. In Proceedings of the Global Conference on Education and Research (GLOCER) Conference, Sarasota, FL, USA, 21–24 May 2019; Volume 3, pp. 93–99.
9. Klopfer, E.; Squire, K. Environmental Detectives—The Development of an Augmented Reality Platform for Environmental Simulations. Educ. Technol. Res. Dev. 2008, 56, 2, 203-228. ISSN 1042-1629.
10. Yeh, H.C.; Tseng, S.S. Enhancing multimodal literacy using augmented reality. *Lang. Learn. Technol.* 2020, *24*, 27–37.
11. Yilmaz, R.M. Augmented reality trends in education between 2016 and 2017 years. *State Art Virtual Real. Augment. Real. Knowhow* **2018**, *81*, 97.
12. Pan, Z.; López, M.; Li, C.; Liu, M. Introducing augmented reality in early childhood literacy learning. *Res. Learn. Technol.* 2021, *29*, 2539.
13. Saltan, F. The use of augmented reality in formal education: A scoping review. *Eurasia J. Math. Sci. Technol. Educ.* 2017, *13*, 503–520. http://doi.org/10.12973/eurasia.2017.00628a.
14. Osario, E.; Eryilmaz, N.; Sandoval-Hernandez, A. Parents' acceptance of educational technology: Lessons from around the world. *Front. Psychol.* **2021**, *12*, 719430. http://doi.org/10.3389/fpsyg.2021.719430.
15. UNESCO. Transforming of Education Summit: Future of Education. In *Briefing Paper*; UNESCO: London, UK, 2022.
16. United Nations Department of Economic and Social Affairs: Sustainable development. Available online: https://sdgs.un.org/goals (accessed on 21st July 2022).