E-books and digital storytelling for Emirati school children: Project-based learning for pre-service teachers

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This paper presents the perceptions of two university professors regarding the use of project based learning (PBL) in teaching a children's literature course. Students enrolled in the class created an original storybook in the form of an e-book as their final project for the course. The data was collected through in-depth interviews with the professors. The interviews with both faculty members led to important findings regarding the benefits of integrating technology and PBL in the course, such as achieving autonomy of learners, collaboration among peers, authenticity of culture integration, and motivation of learners. However, some challenges were observed, mainly the need for more training and time to achieve better results. The paper concludes with some recommendations for future research in areas such as technology use and evaluation of PBL projects.

Introduction

Within the education sector, there has been a progressive and extensive integration of technological tools to serve as aids in concept acquisition. Gone are the days of the traditional use of one-way information transfer where students are the listeners (receptive), and teachers are the sole lecturers (information providers) (Cicconi, 2013). According to Vygotsky's social developmental theory, the learning process is based on the *more knowledgeable other*, thus the learner relies on the identified "other" source that can provide him/her with knowledge (Vygotsky, 1978). Moreover, technology has significantly transformed every learner into his own more knowledgeable other, since with its software and hardware, the learner can actively immerse into programs and platforms to fully interact and even contribute to the information available (Cicconi, 2013).

This being said, initial research findings indicate that integrating information and communication technology (ICT) is not enough alone. The changes in educational methods should cascade to teacher training, practices, and assessment in order to relate to the methods integrated. Trying continuously to overcome both internal and external barriers relating to technology integration can be seen as an ongoing struggle. External obstacles involve the ever-changing status of technology, its availability in different parts of the world, training of teachers, and maintenance. In contrast, internal impediments are mainly concerned with users' beliefs and understandings relating to technology (Alves et al., 2016). After the Bologna Declaration put forth a new educational paradigm, European universities started implementing new active teaching methods to help their students build successful careers (Terrón-López et al., 2016), such as project-based learning (PBL), which has become highly popular in higher education institutions.

PBL, also used to refer to problem-based learning, is a teaching method which is student-centred wherein students are given scenarios and then asked to conduct a project to find appropriate solutions (Ali, 2019). A number of studies have assessed how PBL can be

used by students training to become teachers, but what has been less investigated is how this usage is associated with changes in teachers (Tsybulsky & Muchnik-Rozanov, 2019). Another advancing area of research is the integration of technology tools into teaching and learning methods. For example, a study with Canadian students conducted by Moss and Beatty (2010) found that low achievers were much more engaged and collaborative when blogging, in contrast to their usual participation in class.

Literature review

Project-based learning (PBL)

Project-based learning promotes critical thinking and problem-solving skills. It also fosters interpersonal communication, collaboration, creativity, and teamwork. As such, PBL is an effective method for developing 21st century skills. In contrast to traditional teaching methods, PBL and modern technologies have become fundamental parts of educational reform (Tsybulsky & Muchnik-Rozanov, 2019). PBL places the students' needs and learning styles under the spotlight while encouraging and empowering their autonomy (Choi, Lee, & Kim, 2019). It is an active teaching and learning method which has been embraced by higher education as well as K-12 (Lee, Blackwell, Drake & Moran, 2014). Theoretically speaking, PBL is rooted in constructivism, which regards learning as a natural process where students' interactions and their experiences are what constitute meaning (Dewey, 1938). Based on methodologies of teaching, PBL is specifically considered as an inquiry-based type of learning in which questions and problems constitute the core of the process (Lee et al, 2014; Al-Balushi & Al-Aamri, 2014). Students design their methods interactively and collaboratively in an attempt to answer the questions or solve the problems (Al-Balushi & Al-Aamri, 2014). In fact, PBL enhances students' content knowledge as a direct result of the increased motivation and positive learning attitudes involved in the learning experience (Karaçalli & Korur, 2014).

Technology integration in education

21st century learning is based on student learning experiences which allow for the acquisition of essential socio-cultural, cognitive, and innovative skills. Socio-cultural skills are crucial for collaboration, teamwork, and communication. Cognitive skills foster critical thinking and problem-solving, and innovative skills support the evaluation and usage of ICT (Koh, Chai & Lim, 2016; Raja & Nagasubramani, 2018). As such, technology has transitioned education from a passive/reactive experience to an interactive one. Studies indicate that students who were involved in PBL had higher levels of motivation and engagement throughout the learning process as a result of their ability to collaborate actively with their peers with the help of integrated technologies such as forums, collaboration platforms, and other mobile learning tools (Koh et al., 2016; Jesper, Neilsen & Zhou, 2013). Other studies aimed at investigating whether external rewards during an educational game in the course of a PBL experience led to better engagement and motivation. The results showed significant improvement at the level of motivation as long as the game provided opportunities for the students to improve (Filsecker & Hickey, 2014; Cherry, 2014). Finally, it is undeniable that real life simulated situations help

students visualise the problem and interactively resort to knowledge and experience to find suitable solutions. Therefore, multimedia resources (video gaming technologies, role playing simulations, and *YouTube* videos) offer an array of opportunities to foster problem-solving skills encouraging the construction of new knowledge (Alismail & McGuire, 2015).

Digital storytelling

Wang and Zhan (2010) discussed infusing digital storytelling into the curriculum. They discussed the benefits along with the challenges for using digital storytelling as a means of engaging students in reflective, active, and personally meaningful learning. They contended that storytelling contributes greatly to children's language and literacy development in speech and written composition. Storytelling was initially implemented mainly in early childhood education: by creating and narrating personal stories, young learners can acquire content knowledge and develop language skills in the process of plotting, writing, revising, and narrating their stories (Wang & Zhan, 2010). They quoted Abrahamson (1998) who believed that "Nowadays, the power of storytelling has been widely recognized as an effective, meaningful, enjoyable, and creative way to enhance teaching and learning. Storytelling is found in all types of teaching, thus storytelling is viewed as the foundation of the teaching profession" (p.1). Storytelling, as a pedagogical tool in higher education, takes the needs of students to make sense of experiences and seek meaning from their lives according to Wells (1986) as cited in Alterio & McDrury (2003, cited in Wang & Zhan, 2010).

Ertmer et al. (2012) studied the correspondence between teachers' practices and their pedagogical beliefs when it comes to using technology in teaching. The main result related to student-centred beliefs in authenticity, student choice, and collaboration. Teachers' own beliefs and attitudes about the relevance of technology to students' learning were perceived as having the biggest impact on their success. However, interviewed teachers noted that the strongest barriers preventing other teachers from using technology were their existing attitudes and beliefs toward technology, as well as their current levels of knowledge and skills.

Collaborative work and PBL

PBL has also been proven to improve students' collaborative skills. Recent studies which inspected collaboration and ICT have found that active collaboration is enhanced by interactivity which in turn raises the fun level and leads to active learning, which leads to higher levels of participation among students (Chana et al., 2019; Williams & Beam, 2019). Additionally, using ICT in PBL has resulted in better collaborative problem-solving competence in students (Song, 2018).

In a study by Moss and Beatty (2010), students were able to build knowledge through different perspectives and voices and find solutions to problems, by working cooperatively while using ICT and active collaboration. While in a typical low-technology class, students are expected to master problem-solving through the conventional methods

of teaching which target extensive and tedious drills. In a further study in 2015, in which the control group collaboratively organised and executed specific required tasks as part of the study, Lucas and Goodman (2015) investigated the effects of PBL on higher education students. Their results highlighted how, when working collaboratively and interactively, the practice promoted a higher state of development than that of individualised projects. In sum, collaborative work is very important as it is one of the main 21st century skills relating directly to Vygotsky's (1978) theory of social learning which states that learning is a social process which requires collaboration and support of a group of people and not only the student himself or herself.

In PBL, students work co-operatively in a small group, usually with the assistance of a tutor and with access to other resources to: (a) clarify the problem; (b) identify learning needs to address the problem; (c) undertake individual reading/study; and (d) apply newly acquired insights and understandings to re-address the problem (Pearson, 2006). According to Donelly (2005), when working with PBL, there is student-to-student collaboration and interactions where students are engaged in discourse, authentic problem-based learning, and product-building.

> This integration component helps learners validate their learning experiences and requires a level of reflective articulation that promotes collective knowledge-building and a deeper personal understanding of what is being studied (Donelly, 2005, p.7).

Another important form of interaction is the student to teacher interactions where an interpersonal/social component occurs when learners receive feedback from the facilitator or peers and colleagues, in the form of personal encouragement and motivational assistance. Hence, collaboration as a member of a group working toward three common goals can be a highly effective mode of learning: learning collaboratively, problem solving collaboratively, and achieving individual curricular outcomes collaboratively.

Research objectives

In adopting technology and PBL, three factors play interdependently important roles: the role of leadership, the professional development of the teachers, and the technology support and infrastructure (McKnight et al., 2016). All stakeholders must adapt to the current changes in education. Teachers should take more risks by leaving their comfort zones and move to experimentation collaboratively and creatively in order to equip their students for their future (Leite, 2017). Furthermore, decision-making at the institutional leadership level steers and encourages these innovative practices, for instance by offering incentives to student projects and recognition to teachers' adoption of such methods (Ghavifekr & Rosdy, 2015). Finally, when students and teachers embrace technology with an open mind for a life-long learning experience, results can culminate in not only an effective end product but also one that is enjoyable too (Gonen, 2018).

As such, the aim of this study is to investigate faculty members' perceptions about the technology-rich PBL experience in developing e-storybooks as part of a children's literature course. The two research questions of this study are:

1. What are faculty members' perceptions about the benefits of using technology-rich materials in a children's literature course?
2. What are the major challenges faced by faculty members in their integration of PBL and e-books in their children's literature course?

Method

Context

This study was conducted at Zayed University (ZU), which is one of the three governmental universities in the United Arab Emirates (UAE). The university was founded in 1988 and proudly carries the name of the late Sheikh Zayed bin Sultan Al Nahyan, the Nation's founder. ZU operates in two campuses in Abu Dhabi and in Dubai and caters to Emirati nationals as well as a small percentage of international students. The student body comprises both males and females, but in separate campuses as per the local Emirati customs and traditions which do not allow gender mixing (http://www.zu.ac.ae). In the Dubai campus, all students are female, but the Abu Dhabi campus is literally divided into a male campus and a female campus connected by a bridge to allow faculty members to go back and forth. Any faculty member who teaches in both campuses has an office on each side. The students do not mix but the faculty can teach in either campus regardless of their gender. This is not the same in public schools where females only teach females and males only teach males, except in early childhood/elementary education where females teach both genders. Private schools are gender-mixed for both faculty and students.

This study was conducted in the College of Education in the undergraduate program on both campuses. The students in the current study were all females in their junior year in the Early Childhood Education (ECE) degree program in the Education Studies Department and were all training to become ECE teachers. Early childhood education is dominated by females and all elementary teachers in public schools are females. The course, *Literature for Children*, is a required class as per the degree study plan. It is offered in the before last semester prior to the internship. The 3-credit course meets twice a week for 1.5 contact hours each time.

PBL is a major component in the majority of courses pre-service teachers complete during their teacher preparation course of study. PBL and ICT activities in the *Literature for Children* course are complemented in the *Early Literacy* course which is taught in the same semester. The student teachers also have a project in that course which involves planning a complete thematic unit for students in grades 1-3 depending on their own field experience placement. The thematic units are presented digitally with multimedia and activities. These two projects help pre-service teachers in their lesson planning during their teaching internships the next semester.

The main project in the *Literature for Children* course has always been to write an original children's storybook. However, this was the first time PBL and ICT were used together to create an e-book. This innovation in the final project in the *Literature for Children* course has now continued in subsequent years after 2019, especially with the onset of the COVID-19 pandemic. Because all courses shifted online, the project has now become a digital children's storybook. The stories created in the *Literature for Children* course are used by the pre-service teachers in the following semester when they conduct their internships. During the internship, the first full lesson is a read-aloud lesson and so pre-service teachers try out their own books on "real" children in their own courses. The response is generally positive as the stories are original and culturally relevant.

Participants

The participants in this study are the two faculty members who taught the *Literature for Children* course. The faculty member in Dubai is male and his counterpart in Abu Dhabi is female. They both taught only female students. The course introduces students to the elements of children's literature and connects it to the teaching of English in early and middle childhood. The course also endeavours to develop the students' awareness of different cultural values and beliefs through the use of children's literature and their own reflections on their own experiences with literature in their first and second languages. The course project is creating an original children's storybook.

Process

During the Fall 2019 semester, the two participants taught one section each of the *Literature for Children* Course. One section was in Dubai campus and the other in Abu Dhabi campus. As part of their course assessments, students in this course were required to complete a group project in which they create an original storybook suitable for children ages 5-8. The book should have an original theme, an interesting well-developed plot, and a major conflict with a number of characters and original illustrations. Students should also use literary devices such as alliteration, rhyme and onomatopoeia in such a way that the story captures the imagination of children.

For the purpose of this research, the students of the current cohort were asked to produce an e-storybook with interactive audio-visual and print features, or a paper-based storybook. Initially, students were provided with the grading rubric and a specific set of instructions. As this was a graded project, a session on project requirements and rubric expectations was conducted by each faculty member in their own class. After that, one of the researchers who is well versed in the use of technology and e-books in education made a visit to each class on both campuses. The researcher conducted a 1.5-hour workshop in each class to help develop the students' knowledge of the principles and techniques of creating interactive e-books and sharing with them a list of applications for creating media products. The list included applications such as *Storyjumper, Educreation, I-movie, Creative Book Builder*, and *I-Book*. Thereafter, the researcher was available through email to answer students' questions regarding technology integration. Finally, students
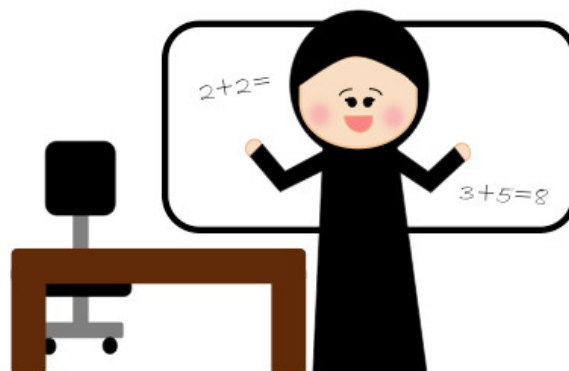
were encouraged to visit the Zayed University IT helpdesk for extra support with technology.

After the workshops, the students were asked to group themselves into groups of 2 or 3. In their groups, they chose a topic for their stories. The students had 5 weeks to complete their e-books and submit them to their instructors. Groups worked on their storybooks collaboratively inside and outside of class.
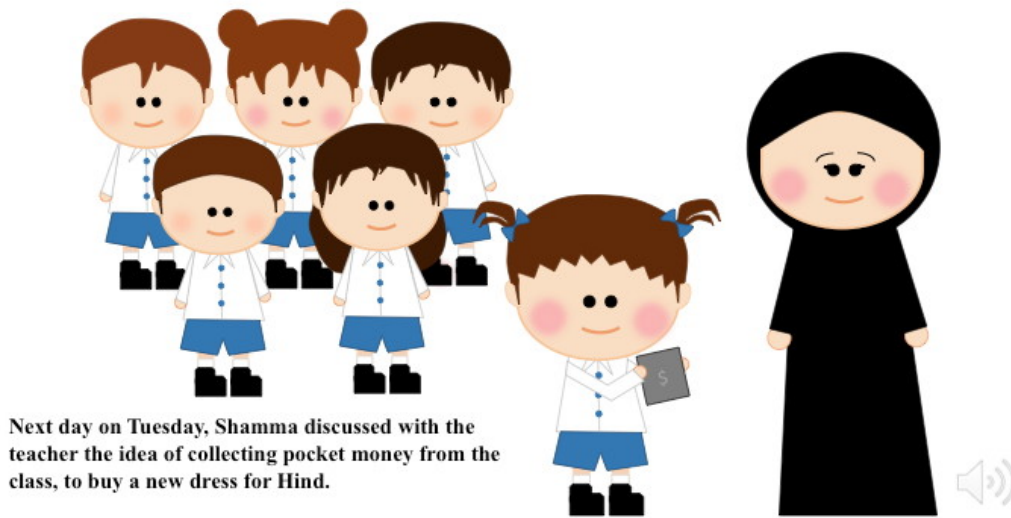
Interactive storybook production project

As participation in the study was voluntary, the students could opt to either create a paper-based book or an interactive e-book. However, the majority of the students on both campuses chose to create interactive e-books. Many opted to create *iBooks*, others chose to have voice-recorded stories in PDF, and some selected to use *PowerPoint* with voice. Some even created animated movie-books with characters made of clay. Illustrative screen pictures from four projects are given below in Examples 1-4. The researchers expected this based on their personal day-to-day observations of students in the program and prior research conducted in the area and in the region. The students seemed to enjoy using multimedia resources to develop their ideas into stories, which they presented as part of their course projects and/or shared on different social networking platforms. Of 18 participants in Dubai, only one decided to work on her own and created a non-digital book; whilst the rest worked in teams of two or three and created eight interactive e-books. The stories mostly had a local theme and included interesting plots with audio-visual components.

Similarly, in Abu Dhabi students in groups of three created 11 interactive storybooks. In most cases, students' stories had a local flavour, either in terms of the selection of setting and characters or in terms of themes and values integral to the culture. The groups implemented a variety of applications, most of them included in the list shared by the instructors with *Storyjumper* being a popular choice among them.
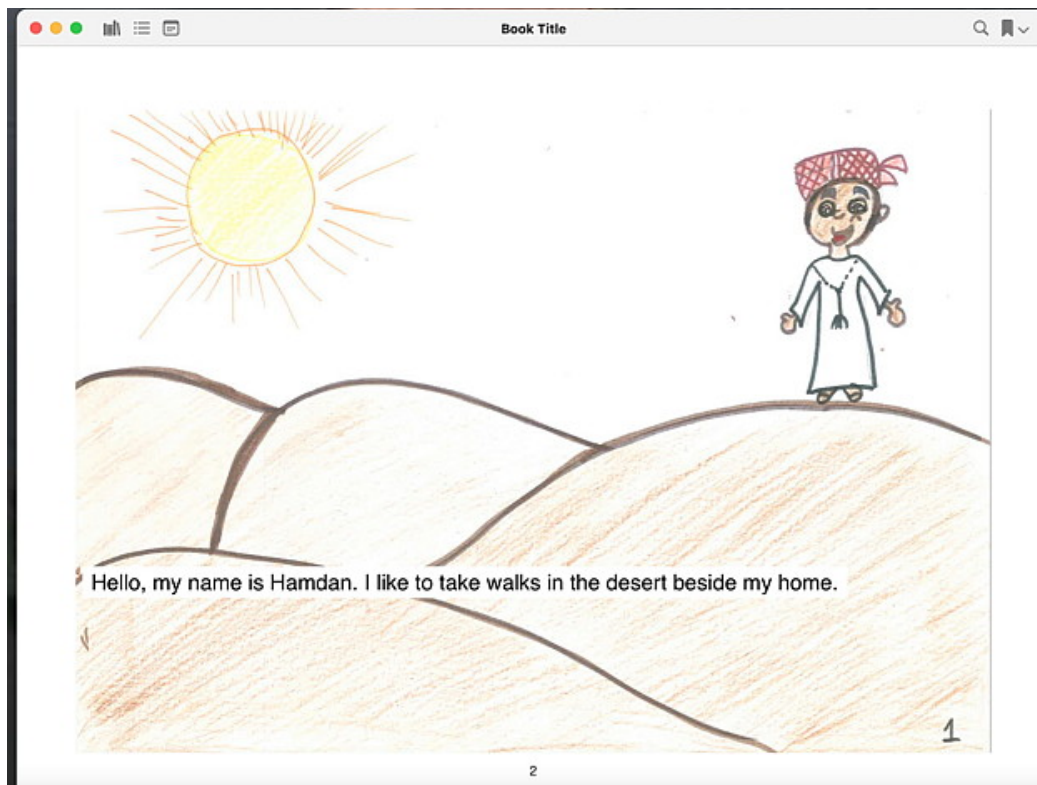

Today on Monday's class our teacher asked us an interesting question!. She asked why do you think this week is special?

Next day on Tuesday, Shamma discussed with the teacher the idea of collecting pocket money from the class, to buy a new dress for Hind.

Example 1: *PowerPoint* with voice recorded story

Hello, my name is Hamdan. I like to take walks in the desert beside my home.
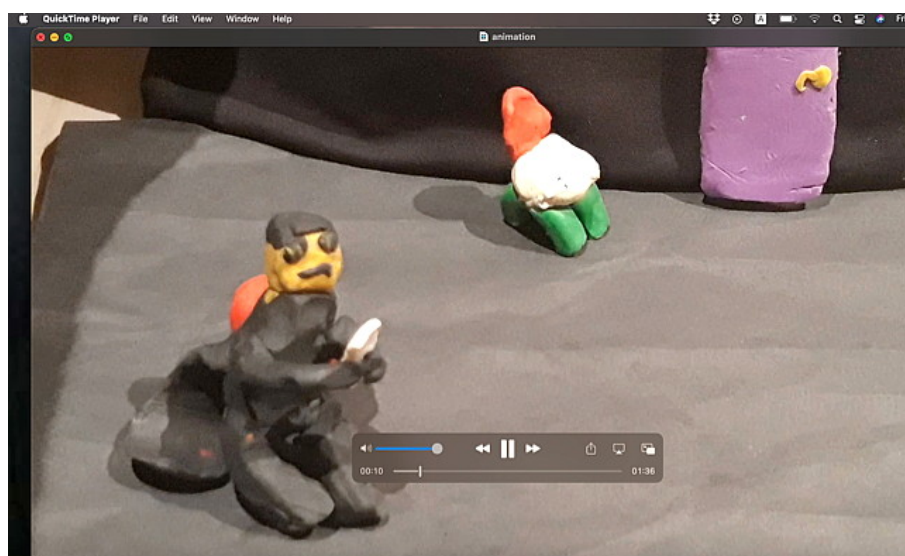
Example 2: *iBook* with voice

Example 3: Screen-casted book on Quick player

Example 4: Animated storybook movie

Data collection and analysis

Data for this study was collected qualitatively through one-on-one interviews. The researcher conducted an in-depth interview with each of the participants via *Zoom*. Each one of the two participants responded to various open-ended questions, which were asked

in an informal setting discussing the course and the project that the students had worked on. The interviews were recorded and transcribed by the researcher. The answers were coded and analysed using a content analysis approach. The codes were organised into a classification scheme and then analysed. Themes and sub-themes were extracted from both interviews.

Results

Benefits

Overall, the two participants' responses regarding their perceptions about the general benefits of using PBL in the storybook project were positive, reflecting strong insights about the perceived benefits of PBL. Upon analysis, the benefits were categorised under four headings: engagement, e-aspect of the project, project extension, and cultural relevance. Figure 1 is a summary of these advantages along with their sub-categories.
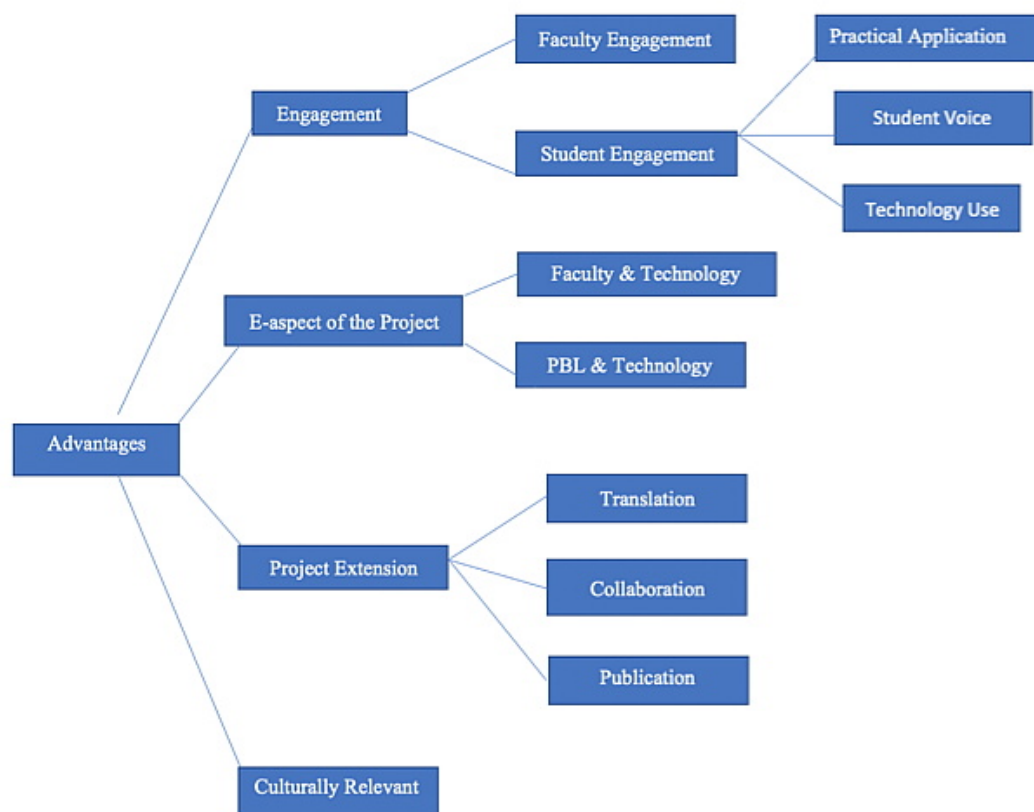

Figure 1: Benefits of PBL

Engagement

Faculty engagement
Both instructors said that they will miss the course, especially that they enjoyed teaching literature. For them, it was an amazing experience because they were proud of their students' achievements which were unexpected. Participant #1 said,

> For me, it was an amazing experience to tell you the truth. I feel proud of what many students actually achieved and as I said I didn't expect that some of the stories be done that well.

Participant #1 went on to comment further on personal engagement by saying,

> I was engaged because I could teach literature. We could talk about plot and characters, which are things I have been trained to teach and at the same time the pedagogical aspect of how to use these things.

Moreover, Participant #2 mentioned,

> Observing and seeing what happened, I really enjoyed that… what are the benefits? The number one benefit was engagement and this engagement of the students as I said is engagement of a different type but more intensive engagement with the assignment.

Student engagement
The participants believed that their students learned a lot from this project. What was even more important was that they applied what they had learned. They indicated that the students were enthusiastic about the work. One more benefit on the students' level was particularly obvious with the more reserved and timid students who had worked on the projects. Many of these students worked very hard on the e-books and as Participant #2 said, "They worked hard on such project. They had opted to do the voiceover and that's very demanding." As Participant #2 indicated,

> I am saying that they were more engaged on the developmental level, cognitive level and of course more emotional. That's what I noticed … that they were more engaged; like for example nobody came to me and said we don't want to use technology, or this is difficult. Nobody.

Furthermore, Participant #1 explained,

> I think that based on the nature of the project, being a PBL and using technology; they were engaged. More in comparison with the previous projects in the course.

In terms of the practical application of the project, there were many benefits worth mentioning. Students were able to create their own characters and plots using literary devices, which made them better at literature. Hence, the students were able to create fun, amusing, and pleasant stories that they can use in their own teaching practice. They even advanced in the language while working on the project according to both participants.

In addition, student voice is another significant aspect of the benefits of such a project. Participant 1 explained that "It's interesting that almost all of them have female characters in their stories." The stories have a strong cultural influence, "most of them are Emirati stories or have an Emirati setting or Emirati characters or even Emirati girls travelling abroad." It is worth mentioning also that the stories reflected the younger generation, especially the female characters, Participant 1 continued,

> ... they don't overcome the limits, the boundaries of their lives, but still, they have more freedom, and they are more outgoing; they can do things. They do things that all Emirati girls don't necessarily have the chance to do in real life.

Finally, the main point of student engagement was technology use. As described by the participant teachers, the project was useful, engaging, empowering, and rewarding because of the consolidation of the knowledge earned. It is empowering in the sense that "you give students possibilities, and they make choices based on these possibilities", and engaging in the sense that "nobody came to me and said they didn't want to use technology or that it was difficult." It was enjoyable for the students to use their own phones and *iPads* to create their own videos, recordings and illustrations. "They were producing something, but they were also interested. They were extremely creative in this regard."

E-aspect of the project
According to Participant #1,

> ... the e-aspect enhanced the content a lot, otherwise the stories would have been more like ordinary and banal. But now this e-aspect changes the story itself, making it more appealing, especially for young learners.

Interestingly, Participant #2 mentions

> When you give the students the platform, the freedom, they become more aware of themselves and they present themselves as reading the story… they are enabled to present themselves on another platform, in a different way.

The final product was technology based and "it looked more complete and more glamorous."

Participant 1 explained further,

> I feel proud of what many students actually achieved … I didn't expect that some of the stories to be done so good and I didn't expect the e-aspect of the book to be so nice. It really made a difference to me if they just gave me a printed version of their story… now it was just closer to my heart because I do as well video and film in my research, so I kind of show other elements going on.

Faculty and technology
Both participants indicated that they were reluctant at first to use the new addition to the course, the PBL and technology. However, once done, they both agreed that the whole

experience was a enjoyable and enriching. Participant #1 said "I am more of a traditional teacher, but I really liked the final product a lot." Participant #2 stated

> I look forward to more projects as the one achieved. This was really very rewarding, and I enjoyed the change to the project very much. I look forward to more projects if I teach this course again.

PBL and technology

According to the participants, students were able to incorporate the PBL approach with technology very well. Some of their comments included, "some of them could actually use the plot diagram to create the story, so they actually grasped that"; "The students were becoming comfortable with technology"; and "they can initiate similar projects with their students in the future and be able to help them hands-on."

Specifically, Participant #2 commented on the usefulness of using technology in PBL in future teaching practice of the students,

> Students are much more comfortable with technology now and they know how to do two or more things at the same time. They can use technology in order to also maybe later on when they teach, they can also initiate similar project with their students, and they will be able to help them hands-on.

Project extension

The project was collaborative in nature for students, Participant #1 said, "Students exchanged information in class about other books." It allowed for collaboration among teachers too, "This project has created more collaboration among all since it provided a platform for us to talk to each other and work collaboratively." Participant #2 declared, "I think that's what academia should be about. I have a place where I can talk about my interests, and you value my views. This project allowed us to do so."

Participant #1 talked about the possibilities this project offers at the level of Arabic literature,

> The stories can also be used in Arabic teaching if they translate them in the future. And given that there is not a lot of Arabic literature for fun, maybe translating them into Arabic would interest the students.

He also said, "We can have some space in the college website to upload some of these stories so they would be easily shared with parents and other teachers in different classes."

In addition to the possibility of translation, the possibility for publishing was also mentioned. Participant #1 believed that,

> The result of the final project was a glamorous end-product that can be published and used in the practicum courses. They now know how to do it and they can teach it to their own students by using the activities they already prepared.

He added that students would "feel proud if the cover at least was shown in the university newsletter." Participant #2 added, "The students will feel proud that their works are published and will be available for parents and maybe for teachers to use with their children or students."

Cultural relevance

Another important aspect of the project was that it fitted with the Emirati culture. Participant #2 indicated, "There is this cultural tendency in the students that they like to use technology… it makes it much easier for them to create illustrations." She goes on to explain, "Emirati children are not used to print culture so much; hence, the e-book kind of resonates with a local culture that is based on oral tradition, so this auditory element, I think, is closer to the Emiratis."; "They are accustomed to using technology all the time: their mobile phones, their *iPads*, etc.…. they are technologically advanced", said Participant #1, "they make a lot of movies, and they publish their life into a story on *Instagram*."

Participant #1 added that "students at this age, particularly like their own space, they want to be alone using their own devices. They like their privacy but at the same time they use technology for social purposes to share their lives publicly." He added "they are well versed in the use of technology. They were extremely creative in using technology and the stories since they like using their technological devices." He admitted that "They were able to complete the project so successfully because they were given the chance to use technology. Technology and being ahead of the rest are an element of the UAE culture."

Challenges

The project had its challenges in many aspects. These can be divided into three categories: training, project logistics, and stressors (Figure 2).

The first area of challenge identified by the participants is training, which extends to both faculty and students. For students, one challenge was time constraints. The teachers thought if students had more time to work on the project and the technology itself, it would have given better results. Another difficulty was that students needed more training in the use of the technology, which would have made their work easier. Participant #2 stated, "We needed to provide them with more let's say training from people who know about how to use technology in that regard. If they had more training, they would give better projects." The teachers also mentioned their own inability to manipulate the technology skillfully. They specified they needed some training to be able to create e-books themselves and to be able to help their students. Participant #1 said "I am not good with technology, so I had to learn how to do things before I can help my students. Still, I think I could use more practice myself."

A second challenge highlighted by the participants is the project logistics, namely class size and course pre-requisites. A large number of students in one class working on such a project "made it somewhat difficult to help as much as I wanted to help them overcome

the obstacles they were facing" as per Participant #2. Moreover, Participant #1 mentioned,

> The number of books students had to read before they worked on the project was quite big. The students complained that there were too many books to read, and they had to stay in contact with hard copy books. I believe my students hardly have real contact with hard copy books. They had to learn the aspects of the storybook in a hard copy and then transfer those elements to their own e-books. It's a long process.
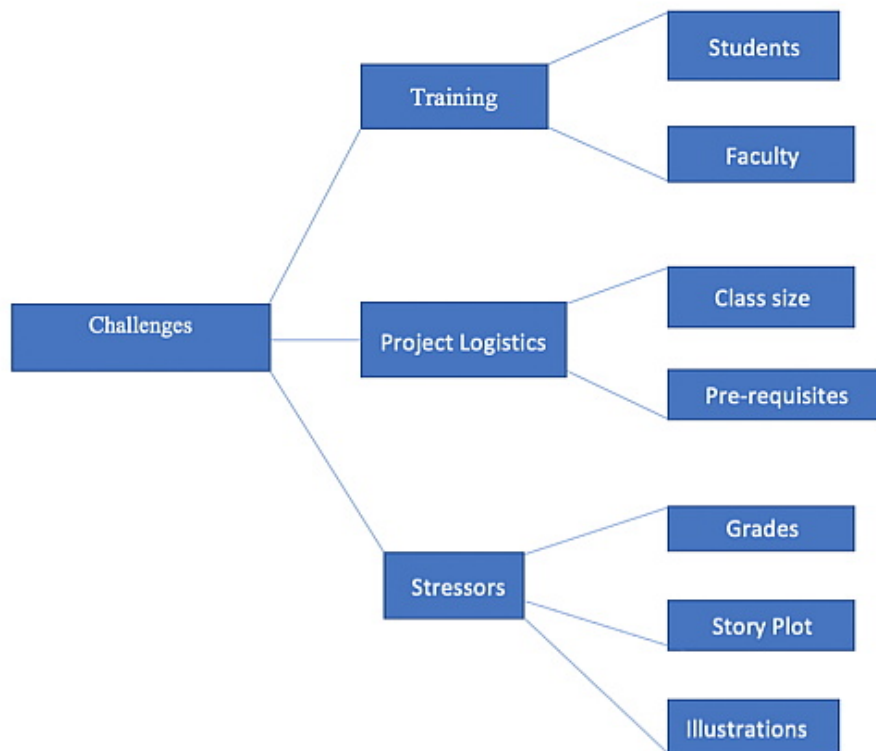

Figure 2: Challenges of the project

Finally, the participants spoke of general stressors which affected the project. These included grades, story plot, and illustrations. The teachers tried to face the grade issue by telling the students that "the e-aspect will not affect the grade." Effectively, the e-aspect of the books was not included in the rubric as this was the first-time e-books were being produced in this course. However, another challenge was the students' ability to create the story line at the beginning. Participant #2 clarified, "They took a long time to decide on their storyline. Some of them came to my office 2 or 3 times with different scenarios and asked me to help them decide." Participant #1 said,

So, you see the use of technology and the incorporation of technological resources such as sound and other were not an issue for the students. What I noticed was that they had difficulty thinking of how many characters to include and how to write the story. Except for students who were artistic in the first place, their biggest fear and concern were illustrations.

Discussion

Since PBL and technology were introduced to the educational system, autonomy of students has been a major objective in an evolving educational environment. With autonomy, PBL and technology, many components came into play such as critical thinking, problem solving, real-life situations (authenticity), reflective and active student involvement, collaboration (teamwork), creativity, motivation, and acquisition. Hence, findings from the current study offer a wide range of proof that the participant teachers and their Emirati pre-service student-teachers have achieved the above by using PBL with technology in the children's literature class. The participants gave the children's literature course final project in the form of a collaborative project using technology to create a story. The main benefits that resulted because of the creation of e-books were autonomy and collaboration and each of these aspects is the core of introducing PBL and technology in the final project. In this study, these were all evident in the final product.

Choi, Lee & Kim (2019) discussed students' autonomy being encouraged and empowered through PBL and this was very clear in the final e-books. Both professors mentioned many times that students were working on the project on their own with little help needed. Additionally, increased motivation leads to enhancement of learning according to Karaçalli and Korur (2014) and this was clear in the students' final products. Both professors were happy to see their students evolve on both language level and literature level. Students were able to successfully use what they had learned throughout the course in their final products. Engagement of students was obvious throughout the process and the teachers were amazed by it and as Lee et al. (2014) believed, the success rate of students' engagement is worth all the effort.

Al-Balushi and Al-Amri (2014), Alharbi et al. (2018) and Kokotsaki et al. (2016) indicated that collaboration and authenticity are major parts of successful use of PBL in classes. This was achieved in the current project through the cultural element. The data showed that the e-books were in close connection to the culture of the students. Thus, they needed to answer questions that related to their own real-life situations or solve authentic problems collaboratively to achieve the result they did. In the process, the learners were able to reflect on their own culture and express any concerns they had through their e-books. They were able to take culturally relevant real-life situations and problems and solve them the way they wished. Moreover, Koh et al. (2016) and Jesper, Neilsen & Zhou (2013) believed that integrating technology with teaching leads to high levels of motivation and ability to collaborate actively with peers. This was very clear in this project as the students in the study actively collaborated with each other and were highly motivated to complete their project and represent their culture in an accurate and positive way.

Regarding challenges that students and teachers faced, it is worth mentioning, as Ertmer et al. (2012) found out by interviewing teachers using technology in teaching, that the most important barrier was their attitude and level of knowledge of technology and how skillful they were at it. Hence, this would directly lead to students being afraid of the final grade and even feeling the need for more time to achieve better results.

Limitations

Although the study yields important data to consider when including technology in project-based learning, there are some limitations that may be mentioned. The first limitation is the sample size. Data would have been richer if more than two teachers had tried this approach. However, this being the first time this project is implemented, it can be considered a pilot for future re-iterations of the e-book. In addition, the duration of the project was only one semester, which is relatively short. Another limitation is lack of student data. It is preferable if students who did these e-books could have been more involved in the study findings. Their opinions and experiences would have been a valuable addition to the paper. The last limitation to be mentioned is the measure used to collect data. In-depth interviews provided valuable information but adding another tool for collection of data would have been recommended. The self-reported data is limited by the fact that it rarely can be independently verified. In other words, the study relied on what two faculty members said throughout the interview at face value. Moreover, self-reported data contain several potential sources of bias that should be noted as limitations such as selective memory or telescoping (recalling events that occurred at one time as if they occurred at another time) or even attribution.

Recommendations

Hence, future research is recommended such as an in-depth study of the students' work and procedure in creating e-books and assessment of such work, in order to learn more about the use of technology and PBL in the UAE. Also, research to explore the impact of working on e-books on the course as a whole and particularly on how students can benefit in their careers of such a project can be valuable. There is a need to explore whether there are efficient ways to make the project even more interesting and achievable because some students had some trouble in some areas to finalise the work. Thus, it is advisable to work more on preparing students to use technology easily and move further in the usage of advanced technological tools. Teachers also need more preparation in the use of technology to be able to help their students further.

Conclusion

The aim of this study was to explore the use of PBL and technology in a university context in the UAE. A qualitative approach was adopted, and the study provided insights into the benefits and challenges in such a process. Although this was a relatively small-scale exploratory study, confidence in the generalisability of the findings is enhanced by the high level of consistency in the findings obtained through the notable consensus among participants.

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