Does Edupreneurs Furnishe College Students with Copracticing of Reading Comprehension? Harnessing the Potential of PBL AR M-Games for ESAP Teaching and Learning

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*Abstract*— **To conduct this study, as a part of a large-scale study which investigated the applicability of m-games in postsecondary education, 150 Iranian collegiate ESAP students of Computer Engineering and Mathematics with 50 BA TEFL students from University of Isfahan were selected. In the spring semester of the academic year 2017-2018, a questionnaire survey was carried out and then the students sat for Text Understanding Measures. Afterwards, they were randomly assigned to three groups to practice or copractice the activities through the medium of PBL AR m-game-oriented platforms before, during, or after classroom instruction. Students' tendency for practicing was the major criterion for excluding them from the circles. In so doing, continuous assessment of the students' performance and daily journal kept by the teacher along with interview to appraise accomplishment of goals of the study. Analyzing the data through Random Intercept, Random Slope Model disclosed that PBL AR m-games are not only amenable to teaching and learning ESAP reading comprehension, but fostering entrepreneur, namely edupreneurs. In tandem, copracticing in outdoor situations forges effective relationship between comprehension of ESAP reading materials and doing well in real-world workplaces. In effect, these activities are promising routes for collegiate students to conceptualize workplace facets. In view of that, it was revealed that individual practicing manner could be a misfit for edupreneurs and its consonance with teacher (vs. student)-made activities is a concrete proof for this nonconformity.**

Keywords—copracticing; edupreneurs; ESAP reading; PBL AR m-games; postsecondary education

# Introduction

In the fast-emerging digital technology-oriented milieu, practicing reading materials through printed textbook activities creates few apparent ties to students' future practice. Lim, Traylor, and Ricketts (2017) [1] emphasize, "whether in factories, farms, hospitals, airports, banks, or grocery stores, just about everywhere physical labor is involved, the workplace our children will enter will look vastly different than our own" (p. 2). Education has geared toward teaching Science, Technology, Engineering, and Mathematics (STEM) and learning is predicted to move more and more outside of the online or conventional classroom so becoming more situated, personal, collective, and lifelong [2]. Self-paced, educational technology (Ed Tech)-oriented activities are making content mastery and technical know-how more reachable than ever. It is difficult to find a school or college that has not embraced at least some form of digital-technology-oriented practicing its curriculum [3].

There is a fresh surge of opportunities sweeping through the instructional-learning scenery. Mobiles are a familiar part of the lives of most teachers and students around the world [2]. Students can now read, listen, pause, and replay their favorite activities, and keep a personalized playlist on their mobile devices [4]. Mobile applications (apps) and hardware are at the ready in instructional-learning contexts and have furnished students with new routes to connect and communicate with each other and their teachers, as well as being a vast source for teaching, practicing, and learning [5]. Students can take photos or record sounds they encounter during their extramural pastimes, they can tag these pieces with other visual and/or verbal annotations as well as other personal details and then employ them to develop tailor-made mobile games (m-games) and share them with their counterparts or teachers [6] during their course of education, namely a starting point for grafting entrepreneur to education. In sum, games are available on students' mobile devices and novel ideas come to life as a result of embracing m-game-oriented modules.

## Developing Instructional Lessons around the Digital Educational Games

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The idea of using m-games for education or educational m-games has already been espoused by researchers ([7-9] among others). Educational m-games encompass a wide spectrum of real-life related works and researchers with coining the phrase *rise of a gameful world* ([10], p. 7) are attempting to highlight the penetration of this new generation of games into individuals' life facets. Recent research indicates that these games build content and activities into high levels of interests and they are valuable in boosting a wide variety of learning values (e.g., [11-12]). In this connection and as a way of encouraging students to successful entrepreneur, universities and colleges are encouraging students to take the initiative for developing their skills and displaying excellence in their future career through developing games. On the other hand, others believe that the role of games should be only to help students review the materials they were already taught in the classroom, without making value judgments, that is to say, just a space for practicing. M-games have incredible pedagogical potentials but continues to be a controversial arena, with many teachers divided on how much access they should grant their students, in the first place. Making the most of the m-game-oriented instructional-learning context means improving students' learning experience and avoid falling into falsification the m-game-oriented platform along with other digital technologies should make everything as an alternative to them [13].

## Eduentrepreneurial View on Game-Enhanced Teaching and Learning ESAP

Taking the variegated facilities of mobile devices into consideration in English education, the relatively new interdisciplinary arena of digital technology-oriented English for Specific/Academic Purposes (ESAP) teaching and learning has emerged over the past decade in postsecondary education. Texts and materials available with this course were primarily restricted to developing English communication skills in a specific discipline. For today, due to technology-oriented teaching and learning and thus interdisciplinary nature of education story is different and double pronged. To be precise, the arena furnishes students with opportunities to go into a plethora of careers thanks to their attempts for copracticing and the colearning m-game-oriented ESAP activities and materials. In view of that, college students are invited to come and hear what it takes to become successful young entrepreneurs, namely edupreneurs or education entrepreneurs. Here, instead of receiving information in teacher-led ESAP classroom and from printed textbook, "students are placed as active learners engaged in interpretive and cognitively demanding work [with their partners] while reading and aligning evidence" ([14], p. 7), that is, edupreneurs.

If college students are provided with a meaning-focused goal such as learning how to do something in their future career using ESAP reading materials, applying something they have just learned to a workplace-like environment, or recounting something they have learned to their partners, this keeps their attention openly focused on the meaning of what they have read. Accordingly, it is crucial to ally disparate public and private sector experimentation surrounding digital technologies into a consistent R and D approach ([4]). Our college in terms of fostering the condition for copracticing and colearning of ESAP reading materials via workspace-like m-games needs to adopt proactive approach ([15]). As a matter of fact, the success of m-game-oriented projects is testament to not only the capabilities of capitalizing on games for teaching and learning, but also how new generation of m-games will continue to reshape the entrepreneurial landscape of the postsecondary education.

## Applicabilityof Edupreneurs-friendly AR Games for Teaching ESAP Reading

Now, the idea of realistic applications of the content materials being taught is feasible through the medium of Augmented Reality (AR) m-games. Many teachers employ AR in their classrooms with favorable results. AR m-games, as a new form of physical digital switching, are thought to result in a more in-depth understanding of a topic ([6]), as such AR m-game-oriented activities reinforce embodied students in an engaged variety of physical activities and situations. In a similar vein, there is an apparent link between AR games and prevalent theories of L2/FL learning which underlines specific, real-world subject matters, and relevant bonds to the real world ([7]). Capitalizing on AR m-game-oriented activities for practicing reading materials can be considered a groundbreaking work in ESAP teaching and learning.

A number of research studies into the use of AR games for language learning have been carried out. Central to this manner of practicing and learning is the idea that AR game-oriented activities can be developed to support students to move in and out of overlapping physical, virtual, and communicative contexts ([6]). AR displays large areas of landscape or rooms that students have to explore or tackle to (i.e., interdisciplinary nature of AR games) and AR games can be considered as self-paced acclimation activities that seem to be the perfect complement to indoor teaching and learning activities. Pedagogically speaking, these new exploratory m-games have the capacity of addressing the interconnectedness of disciplines and fields of study. Clark, Tanner-Smith, Hostetler, Fradkin, and Polikov [14] claim that when AR game is employed for teaching and practicing materials to students of history scene is set so "students would be working with history much like a historian does, countering inadequate views of history as a stagnant collection of facts and repositioning history as a process of making meaning of past phenomena by engaging in practices" (p. 7). In essence, through devising AR m-gam-oriented activities educators are able to put students into the workplace in a way that reinforces an authentic experience but without the dangerous repercussions. These activities, which paves the way for students to roam in a simulated real workplace, also simulates certain types of interactions with the parts of workplace.

## TheoreticalFrameworks

Put in more recent perspectives, in order for college students to truly succeed in their future profession, their college education must emphasize on concrete practice rather than observation. This is more commonly known as teaching through the process of play versus learning. Play-based curriculum allows students take the lead in exploring and asking open-ended questions that ultimately drive them to reflect on their actions, form theories and begin thinking strategically. This theory is predicted to take a bigger role in education in the subsequent years ([16], Eschool News). Most of these contemporary curricula revolve around constructionism as an instructional approach, which is built upon two key principles ([17]), that is to say, students' active role in construct their own understanding and students' constructions of external public entities. Bopp (2006, p. 16) [18] contends, in an m-game-oriented curriculum students "do not like being taught or guided, because the enjoyment of gaming often comes from the enjoyment of solving problems on one's own (or within a team of peers)"; on that account, students should be advised the obvious mimicking of classroom teaching and learning methods in developing m-game-oriented activities should be kept to the lowest level possible. In other words, students need to be creative problem solvers to properly be ready for whatever lies ahead ([19]). Problem-Based Learning or PBL produces better organization of knowledge and empowers students to take charge of their own learning. PBL is a self-directed ([20]) or student-centered approach to education ([21]).

From Edupreneurs view, the major focus in Ed Tech-oriented instructional-learning context is learning by doing to double down on student agency. Encouraging college students to develop self-made AR m-game-oriented ESAP materials and activities can be considered an attempt focused on helping students use digital technology to engage with and improve their communities. Celce-Murcia (2001) [22] points out, teaching reading skills to college students of ESAP involves unique problems and challenges of plausible levels of teaching and learning.

Research shows that having students develop activities could be an entrepreneur activity in and of itself. And AR m-game development is a target point of savvy entrepreneur. The emerging idea and research in pedagogical game design enjoys a parallel relationship to the core organization of PBL ([21]). PBL involves 1) authentic problems that are the vehicle for acquisition of knowledge, 2) student-centered activities, and 3) small group interactions that are 4) facilitated by teachers ([23]).

 Bopp (2006) [18] holds, "gamers do not like being taught or guided, because the enjoyment of gaming often comes from the enjoyment of solving problems on one's own or within a team of peers (p. 16). Every student has a voice in self-made m-game-oriented arena, no matter if they are in general education, special education, gifted, L2/FL, or early-intervention programs. And those voices reach the world ([24], Eschool News). Students need to ask themselves in order to solve the problem ([21, 22]. Actually, as students work together to figure out how to develop activities and learn materials, there are a plethora of conversations about possibilities, negotiations, and plenty of risk-taking going on ([1]). Under such circumstances, students are in charge of self-assessing and peer-assessing problem solving performance ([20, 24, 25, 26]). In PBL m-game-oriented context, teachers act chiefly as facilitators, instead of spreading knowledge, and serving this new role can be challenging ([27]). Gupta (2017) [28] asserts, "the core value of the PBL is that [teachers] allow students to explore and make mistakes in order to learn and grow" (EdTechReview).

Students' future profession, as a real-world event, is a major thread, which allows incorporation of PBL into m-game-oriented instructional-learning contexts in ESAP classes of universities. According to Clark, Tanner-Smith, Hostetler, Fradkin, and Polikov (2017) [14] "these PBL games [includes exemplifying] a subgenre of games broadly enough to be generalizable beyond the design of single game or developer while including a sample of games homogenous enough to plausibly represent something more specific than the omnibus term digital game" (p. 2). Allied with the focus on entrepreneurship, PBL m-game-enhanced teaching and learning is a pleasing manner to establish interdisciplinary investigations and personal connections. It is this very cross-disciplinary nature of PBL that identifies it and bestows it its potency. Meanwhile, to keep entrepreneur at the forefront of the pedagogy, while also fostering ESAP skills and subskills, it is important to emphasize the interdisciplinary nature of current education. Ching, Shuler, Lewis, and Levine (2009) [4] recommend "multisector leadership is needed to connect disparate efforts by research, industry, and policy professionals" (p. 23). Put simply, change in instructional-learning contexts is the result of attempt to bring together the teachers and students from different fields and disciplines into circles where they can share their knowledge and experiences, which fosters interoperability. As said by Gee (2004) [11], "the everyday spontaneous [learning] no longer hooks directly and singly to the world of experience, but hooks to experience now only via a whole network of relationships with other [disciplinary domains]" (p. 660).

This study reflects on the specific theme of Ed Tech, more specifically the use of PBL AR games with mobile technology, as a complement to indoor teaching and learning. The main emphasis is on promoting students' ESAP reading comprehension and elevating their abilities to do well in both college environment and workplace. With this picture in mind, and in an attempt to find out a way to enable students to relate their college course content to their future professions as medical doctors, engineers, technicians, judges, teachers, experts, and so on, the scenes are set against a backdrop of current learning theories that have been employed to synthesize and incorporate ideas across disciplines, as prerequisites of edupreneurs. Besides, to facilitate both the students' understanding and effective use of digital technologies for the purpose of entrepreneur, applicability of self-made m-game-oriented activities was taken into consideration. Generally, establishing circles where every student feels valued and accepted was considered one of the major aims of this study.

# research questions

In an attempt to establish edupreneurs in postsecondary education and tap into the potential of PBL AR m-games for copracticing and colearning of ESAP reading comprehension among collegiate students, this study seeks to address the following questions:

1. What attitudes did students adopt towards learning ESAP reading comprehension through AR m-game-oriented activities?
2. To what degree did the students comprehend the ESAP reading materials in AR m-game-oriented platforms?
3. What portrayed the student contributions in the ESAP reading comprehension course via AR m-game-oriented activities from the teacher and students' perspectives?

# Methods

## Participants

The participants in this study with full factorial design were 150 Iranian collegiate ESAP students from the University of Isfahan. Of these undergraduate students, 36% were students of Engineering (Computer), 36% were students of Sciences (Mathematics), and 28% were BA students of TEFL. As to their gender, 42% were females and 58% were males. The participants' average age in this mixed-aged study was about 20.19. The selected students were divided into three groups to practice ESAP reading comprehension as compulsory two-credit course collaboratively (i.e., copracticing & colearning) or individually. To embrace copracticing in true sense of the word BA students of TEFL became fixed members of each small circle. This way, each copracticing group contained three members from Engineering, Sciences, and TEFL. In these groups students confront with problems in the AR m-game-oriented activities like this:

**Group 1:** Prior to any pursuit of knowledge (viz., before class or BC), by having students apply the content materials that they have already read and/or developed in the career-related situations;

**Group 2:** During the class time (DC). Immediately after the students were taught by teacher through the textbook materials, they were required to practice or copractice the AR-m-game-oriented activities inside the classroom;

**Group 3:** After the class time (AC); this gives students practice in reading the materials they have been taught in the classroom.

Each group consisted of eight small circles with three male and/or female members from the three fields, who participated in copracticing and colearning of ESAP reading activities and materials. The circles were formed with specific pedagogical goals in mind, to capitalize the skills and experience of all the members and their degree of success in entrepreneur. Also, these groups included 26 individual male and female students from these three fields who had to practice similar activities on their own. They were students who voted for individual practicing manner. This way, the potential of suite of multigames (self-made & other-made games including teacher-made or counterpart-made activities) for ESAP reading comprehension was examined in interdisciplinary and disciplinary situations, respectively. Further, given one of the main reasons for developing tailor-made reading activities which are specially developed for ESAP collegiate students is to take care, at each level of reading proficiency, students can read, practice, and comprehend the ESAP texts and have a very authentic experience, a multi-touch stage was set, wherein students of varying proficiency levels could work together on activities. The interaction between students as members of circles helps students practice in setting wherein novice students take part in developing and practicing activities and more proficient students cane fine tune the supports that students are given ([29]). Hence, students with lower reading proficiency levels were exposed to such stage of activity development. Of course, those members did not took part effectively and hence exert less effort in the activities were excluded from copracticing and were transferred into individual groups where they had to practice other-made activities.

Here, different manners of practicing through PBL AR m-games were mixed with the teacher-led classrooms with the aim of establishing to what extent it is possible to apply m-games in ESAP classes of postsecondary education and promote professional life of collegiate students.

## Instrumentation

The study was formed by gathering data from surveys, students' performance, interviews, and a personal journal written by the teacher documenting his experience.

**Text Understanding Measures (TUMs):** Though full participatory approach was adopted in this study, so all the students were allowed to take part in performing the course, to establish balance in the dyads in terms of members' proficiency levels on the comprehension of the ESAP passages and apriori knowledge of the subject areas these TUMs were developed and performed. To measure the students' ESAP reading comprehension proficiency given the interdisciplinary nature of this study in STEM areas and following Karimi and Atai's (2014) [30] guidance on multiple reading passages comprehension, *Intertextual Inference Verification Task* (InterVT) was employed. Therefore, three real-life domain passages on Computer Engineering and Mathematics were chosen. It was programmed for both valid and invalid inferences by incorporating 20 items, 13 of which could be inferred by merging information from at least two of the passages and seven of which could not be inferred by merging information from at least two of the passages, respectively. These valid and invalid items were inferences drawn and merged by the researchers amid the passages. InterVT is supposed to measure 'deeper situational understanding of the texts' ([31], p. 470). The students were require to check each item to see whether it can be inferred from integrating the pieces of information of the passages (valid inference) or not (valid inference). Their score was calculated by enumerating the correct answers to the items. Kuder Richardson 21 (KR-21) was employed to calculate the reliability of the measure and it was r = 0.76. Evidence of the construct validity of InterVTs was provided by Royer, Carlo, Dufresne, and Mestre (1995) [32].

As for measuring the students who were to practice the activities individually, going by the way Karimi and Atai's (2014) [30] used, *Intratextual Verification Task* (IntraVT) was employed. Again, using four real-life domain passages on Computer Engineering (two passage for students of computer engineering) and Mathematics (two passage for students of mathematics), a task with 20 items was developed. Fifteen items could be inferred from integrating the sentences of each passage (valid inference) and five items could not be inferred from integrating the sentences of passages (valid inference). The reliability of this measure was computed through KR-21 and it was r = 0.78.

**Survey Questionnaire:** Regarding particular ethos of students from various disciplinary domains, a researcher-made questionnaire was developed in Persian (viz., students' first language) and piloted. Topics ranging from how students can contribute throughout the course to what they struggles with, to what they want most in this course were included in this survey. The survey debriefs the effectiveness of the digital technology use on ESAP reading comprehension improvement. By the same token, it gauges how survey participants feel about AR m-game-oriented teaching and learning. In addition, through this questionnaire, students are debriefed regarding their strengths and needs. Students' awareness of the digital technology or information on students' experience and expectations on the use of game-oriented learning are debriefed through this questionnaire as well. These 32 items were presented, applying multiple-choice, yes-no, and Likert scale formats. Reliability analysis of the data garnered throughout the pilot study yielded reliable Cronbach's alpha coefficients of α = .8 for the whole scale.

**Assessment:** To assess the participants' ESAP reading comprehension, the chosen reading comprehension activities of the textbooks, namely *Oxford English for Information Technology* ([33]) and *English for the Students of Mathematics* ([34]), were changed into scalable activities. These activities showed acceptable level of internal consistency (α = .79). The face and content validity of the activities were confirmed by five TEFL and subject area space. It is of note that the same activities were used for all the groups.

**Journaling:** Monitoring students' performance was a requirement of using games for learning; for that reason, parallel with conducting the course, the teacher attempted to include work samples, any data that shows improvement or areas to focus on, and something the students could work on with their partners. In view of that, when a student was struggling with a concept, the teacher kept journals of the student performance to figure out how they were being taught. The teacher made notes about various contributions for feedbacks provided during the activity-development process.

**Focus-group Interview:** This interview conducted with a subset of students from each group to gather qualitative data about students' self-reported experiences in the course. To be precise, the students with highest and lowest scores form the groups were selected to answer the prompts in separate interview session in Persian (viz., respondents' first language). This gave the researchers an opportunity to ask students about their reading experiences.

1. How good were you in understanding ESAP reading materials?
2. What were you most passionate about?
3. How capable you are of joining a group? And how well did you fit into the community? (copracticing students)
4. How could you contribute throughout the course?

## Materials

**Lessons:** They are 16 blended lessons that leverage AR m-game-oriented activities along with printed textbook activities. As to the inside-the-classroom round of these lessons, the materials were taught by the teacher using *Oxford English for* *Information Technology* ([33]) and *English for the Students of Mathematics* ([34]). In the m-game-oriented instructional-learning context, for ESAP classrooms, m-game along other physical artefacts, was employed to simulate naturally occurring events of workspace. The AR m-games included interactive scenes that students had to accomplish in extramural or indoor situations. In the designed AR m-games, reading materials were presented in a written with illustrative and viva voce cues. That is to say, simultaneously, the actions were demonstrated through written clouds or along with each scenes of the m-games, related written materials are popped up. In these activities, career exploration began at the very beginning level and is woven throughout the curriculum. More exactly, the m-games focuses on careers in STEM. This way, during the course, students accomplished cross-curricular activities to experience what it takes to work in a specific workspace. In the other-made m-games, which are ready in prefabricated format, certain profession-related events are presented within the game students react to these events. Generally, the m-games and passages embedded in them were specifically developed to reinforce the learning of specific academic materials.

To check if the embedded materials read well, all the AR m-game-oriented activities were piloted.

## Procedure

This teacher research that was conducted by one of the researchers, who was teaching English courses to students of Engineering, Science, and TEFL at the university where the study was conducted. Five English for Specific Purposes or ESP teacher assistants helped this researcher conduct the study.

**Step One-** **Introduction:** Students were informed that the platforms were concerned with student ability to use new reading materials in new working situation. A film was played for them, in which an ESAP reading course was performed through the medium of AR m-game-oriented platform along with a teacher-led classroom. One of the researchers, as the teacher of the course, pointed out that "in classrooms, career exploration begins in the general English and ESAP classes for college students and is woven throughout the curriculum". He added, "practicing inside and outside the instructional-learning context means they make up different parts of learning".

**Step Two- Survey and Reading Proficiency Test**: In January 2017, 150 copies of the questionnaire were distributed to the participants. The time assigned to do the test was 60 minutes for all the participants. The decision on whether to assign students to collaborative circles or not was made at this very initial step. Some students have difficulty succeeding socially. In view of that, immediately after collecting and scoring the participants' papers, circles were identified. Also, it was disclosed that all had experience of online and distance education.

After conducting the survey and identifying the students who were interested in individual manner of practicing, they were invited to take part in TUMs through InterVT or IntraVT to demonstrate their understanding of ESAP reading passages.

**Step Three-Treatment, Continuous Assessment, and Journaling:** This step contains two phases ofin-class and extramural teaching, practicing and learning. And extramural phase was practiced both individually and collaboratively (copracticing).

**In-class learning:** Students did an in-class assignment each session, which, in turn, resulted in data to be gathered for assessing their reading comprehension.

**Individual Practicing:** As respects the individual manner of practicing. In a one-to-one program, the teacher distributes one personal gadget for each student.NPC or NonPlayer Character was adopted. According to Bopp (2006) [18] NPC is controlled by the mobile apps. In this gaming situation, students read the materials displayed in written format as they the game was proceeded and had to answer the reading comprehension questions formulated by the m-games and a gameplay situations was first arranged by the developers where students had to rehearse the materials they had been taught. They needed to solve the predefined embedded problems on their own.

On the other hand, in the collaborative circles, where self-made activities were developed, instead of mapping the predefined m-game-oriented activities directly to the practicing fields, different game-oriented activities were loosely coupled to reading.

**Coperacticing:** Self-made AR m-game-oriented activities were developed in separate sessions in a special workplace before, along, or after the classroom by the students, as instructional opportunities for students to engage in after teaching and practicing in classroom. In the course to direct the very first stage of copracticing platform, the Multi-User Game-Enhanced Contexts or (MUGECs) were adopted to establish interconnection among students and the students were provided with a pool of tools to delve into and tinker with. Also, through mobile devices students could take photos, note down their thoughts, retrieve information, and that they can share these with their peers. Some students were talented artists, so they shone in the persuasive photos and images. Some students were natural public speakers, so their talent lay in the presentation of verbal format of the reading passages. The first and foremost step would be to assign students to make use of Ed Tech, digital games, and mobility to create projects based on their subject. Based on their knowledge and experience students take actions to produce self-made scenes. Scenarios of the m-game-oriented activities deconstructed into different manageable episodes or scenes by the teacher. In each session, different types of AR m-game scenes were developed by the students to be modified and compiled by the teacher as AR m-game-oriented activities. Students made connection between the passages and real-world entities, question from each other, made inference and forged the related matters; this way, students produced the self-made AR m-game-oriented activities for their subsequent practices every other session. As they developed each game episode, they annotated visual and verbal cues. Finally, the teacher got to review the students' self-made activities and materials and make any selection that feels like the right match for the lessons. Many of the m-game scenes were promptly followed by other scenes in which the students must immediately apply the knowledge they had just acquired, that is to say, *the just-in-time principle of teaching/learning* in digital games as Bopp (2006, p. 20) [18] defines. Notwithstanding, the platforms were started by mods wherein students were required to make small changes and tweaks to have overhauls. By passage of time, students were required to devise m-game-oriented activities in collaboration with their counterparts from other disciplines. Here, small circles of students are clustered in mobile-mediated milieus developing and accomplishing self-made m-game-enhanced activities. In sum, students challenged to develop and feed m-game-oriented activities.

When students practiced PBL AR m-games before and after the classroom in outdoor practicing session, they returned to the classroom to learn about new topic. Along these lines they talk about their outdoor experiences and learn more about the topic. Their collective feedback is what tells students if they should keep the intended parts (e.g., photos, sentences, dialogues, etc.) or change them. It has been suggested that setting a proper context with students in advance makes sure that students appreciate the roles and rules. After developing and piloting the m-games students attempted to relay them to their counterparts. Students introduced problems in scenes of game so that end users (i.e., other counterparts) in both individual and copracticing groups could practice learning issues that led them to employ the targeted real-world concepts.

They collaborated with each other to develop some scenes of AR m-game to accompany each assigned passages. When the students copracticed to produce activities, the teacher provided correct feedback and gave students further practice. Then they can share their learnings with the whole class.

The activities were typically conducted in a series of small circle interactions with three members. In this context, students took on primary responsibility for vetting an authentic problem embedded in the m-game by the teacher and recognizing the aspects they were familiar with. And, by searching and defining the demands of workplace, students had to define the gaps in their comprehension of what runs the workplace and attempt to resolve these issues through the exploration of relationships between scenes of the m-games, namely a collaborative solving of the conflicts.

Students generated their own solutions in response to a given problem. Explorations embody real-world facets in the m-game-oriented world, and each activity is tied to the workspace theme. Interestingly, students can examine fields of personal interest as well.

The selected reading passages should not be too difficult so students experience the frustration of not being able to understand the passages. The passages for both individual and copracticing were the passages that paralleled and complemented textbook passages. The embedded passages at a level appropriate to the students' reading ability. In all groups, students entered into a setting where they practice the scenes to pinpoint and solve problems. The architectural design of employed scenes becomes more and more complex. Fulfilling each m-game-oriented activity lasted eight to 12 minutes. Completing and/or producing the AR m-game-oriented activities were prerequisite for authorizing the students to go to the next m-game-oriented practicing sessions. Opportunities to record reading speed were added in m-game-oriented activities for practicing reading passages. Assessment was applied by requiring the students to do the textbook activities in the next session.

Once the practice was well underway, the teacher wrote journals to reinforce correct behaviors or answers. The teacher tried to know the students better and wrote information regarding how effective the groups were in solving the embedded authentic problem.

**Step Four- Interview:** In the very final step of the study, to answer the very last question, the students were asked if they enjoyed the AR m-game-oriented activities. This way, the researchers provided a chance for students, where they can talk about their perceptions of the course. In this step, challenges of this newly introduced channel of teaching and learning were discussed as well.

# Results

The students and the teacher as the primary stakeholders played the major role in data gathering. In this fashion, teacher view was amalgamated with a combination of students' performance, attitude, and perception.

## Vetting the students' responses to the questionnaire

To address the first research questions, the participants' answers to the attitude questionnaire was analyzed. The results can be described as follows:

About 76 percent of the students valued the conventional method of teaching and said that new digital technology-oriented teaching and learning methods do not drive down the value of the conventional teaching methods. In the meantime, the students who preferred practice individually valued the conventional teaching methods more. Analyzing the students' responses to the second item of the survey showed that the vast majority of the students (92%) opined that grafting extracurricular activities on to ESAP classrooms can instill much confidence in them. They would like to see educational decision makers highlight the use of technology-oriented learning by providing more Ed Tech-based resources, in proportion to students' current needs. The same population of the students added, students' active role in practicing contexts furthers the partnership between students and teachers. Also, they believed that shouldering responsibility of developing self-made activities on students provides them with the opportunity to explore more related fields and tracking their own progress.

A smaller majority of the students (78%) agreed with application of educative games for teaching and learning ESAP reading comprehension, as they said that reading comprehension is multifaceted skill and many aspects of real-world workspaces have been portrayed in games, so, practicing real-life related matters through these games helps them come to realize the meaning of these matters.

Luckily, almost all of the students indicated that the drawbacks of digital games have been mitigated as time passes. From these students' perspectives, the anytime, anywhere availability of m-game-oriented activities can reinforce deeper learning opportunities and elevate a more cohesive learning experience. They recommended that mobile has made the gamification of ESAP much easier and thus, m-games show great promise in providing real-life scenes. The majority of the students felt it enhances the teacher-student communication through allowing the relationship to transcend the classroom in a more time-efficient way, shrinking the need for face-to-face consultation.

For practicing ESAP reading comprehension, about 86% of students favored m-games, with computer games second. Along these lines, most of the students said m-games (compared with other mobile-oriented media as film, SMS, etc.) for practicing ESAP reading because they believed that game gives competitive edge to inspire them to do better. Moreover, they added that m-games provide immediate feedback, so it can maintain their enthusiasm level high. They reiterated that by using m-game-oriented activities, teachers can externally represent the facets of real life for students. Besides, in the words of these students, tailor-made m-game-oriented activities can facilitate retrieval of the information that was not practiced in the classroom.

Sixty two percent of the students identified interconnection between ESAP reading comprehension and students' behavior in the professional life, the good comprehension of ESAP activities and materials is a springboard for success in future life. They advocated that using m-games instructional-learning context for teaching and learning ESAP reading can be changed into more practiced-centered one.

A great majority (91%) of the students held that active role is the key to being successful in any work-related matter. Meanwhile, about 80 percent of the students believed that teacher role is more important than before. All the students who reported tenuous relationship with their FL English teachers had very little interest in ESAP reading comprehension and were not willing to make the least effort to improve their ESAP.

At first, 58% of the students said that developing activities before classroom may have an unpleasant consequence. However, tech-savvy students chose to develop and do the activities before classroom. Just over half of the participants (57%) primarily preferred to practice via other-made game-oriented activities. Even a small number of students who were not interested in collaborative practicing manner thought students' self-made activity development is impossible and counterproductive to try to facilitate reading comprehension.

About 70 percent of the students endorsed the use of AR m-games for teaching and practicing ESAP materials regarding their future career-related needs. They conceived that mimicking real-world phenomena in AR m-game-oriented activities contributes purposeful works. The survey students were split on the purpose of using AR m-games in ESAP teaching and learning. Forty-eight percent said purpose of AR m-game-oriented activities is to set the scene for promoting collegiate students' comprehension of the ESAP reading materials, and 52 percent said its purpose is to prepare collegiate ESAP students for their future profession. On the other hand, when it came to the nuts and bolts of running only AR m-game-oriented (and removing the common classroom) platform the students' opposition rises to 94 percent.

 As far as collaboration with other peers for developing AR m-game-oriented activities was concerned, students who voted for collaborative manner of developing and practicing activities (i.e., copracticing) outnumbered those who voted against this manner of practicing. The congruent students mentioned that coopracticing opens windows in front of them. Nonetheless, pointing to the symbiotic relationship between ESAP reading and STEM learning, 67% held that collaboration of students of subject areas with English language teachers leads into better instructional-learning context compared with the context, where subject area specialist collaborates with English teachers for activity development (18% of the students chose this manner of activity development). Pursuant to their saying, they asserted that presence of subject students in copracticing scenarios stimulates apriori knowledge, especially if it is done prior to classroom where they are provided with opportunities to explore and solve problem. For now, the students pointed to their apriori knowledge of their subject areas as a key element of reading comprehension as a result of copracticing the activities. Like this, a similar population was in favor of presence of subject area specialist with students of TEFL. They held that active presence of students in the scene of activity development informs the situation about students' needs. On their words, the presence of teacher, as expert, is necessary. However, they did not deem it advisable to develop activities with total absence of specialists.

Students' active role and careful attention to address their needs rotate as wheels of copracticing axel. More than 90% of the students who favored collaboration for developing activities in AR m-game-oriented platforms answered, in essence copracticing of ESAP reading activities is persuasive factor for discussion within small circles, so, setting interdisciplinary scenes for copracticing AR m-game oriented activities in ESAP instructional-learning contexts equals mint conditions for creating rich entrepreneur opportunities as students cooperate to produce new self-made AR m-games to tackle the needs and present these m-games to their counterparts, namely (viz., edupreneurs).

Nearly all of the students were of the opinion that work and fun go well together, and AR m-game-oriented teaching and learning platform can foster this relationship. They felt that, as a result of practicing workplace-related issues via AR m-games, students have the opportunity to expand themselves or change their nature of work. Besides, according to these students' answers, it was revealed that bringing work-related issues in ESAP reading passages and embedding them in self-made AR m-game-oriented activities accommodate students' learning and professional by boosting their ability to exert quick and effective adjustment in light of each other's comments. The students answered said that possibility of simulating workplace aspects will definitely give students a chance to experience the use of the authentic target language lends insight into the challenges facing students in their future career.

## The Success Rate of Students In ESAP Reading Comprehension

Table I demonstrates the descriptive statistics including the mean score and standard deviation of all the three groups.

*TABLE I. DESCRIPTIVE STATISTICS OF STUDENTS' PROGRESS IN DIFFERENT GROUPS*

|  |  |
| --- | --- |
|  | t |
| 1 | 16 |
| Score | Score |
| M | SD | M | SD |
| Practicing Manner | Individual | 14.1 | 2.4 | 16.2 | 2.2 |
| Copracticing | 14.6 | 2.0 | 17.5 | 1.9 |
| Game Type | TM | 14.4 | 2.2 | 17.1 | 2.1 |
| SM | 14.0 | 2.5 | 16.0 | 2.3 |
| Group | BC | 14.6 | 2.0 | 17.6 | 2.0 |
| DC | 14.3 | 2.3 | 15.9 | 2.4 |
| AC | 14.0 | 2.4 | 17.0 | 1.8 |

*Note.* M = mean; SD = standard deviation; BC = before classroom; DC = During Classroom; AC = After Classroom; TM =teacher-made activities; SM = student made activities.

According to Table I, though application of AR m-game-enhanced activities resulted in better student achievement, the mean scores of the students in each group is different, which, in turn, can reveal whether one type of instruction contributed to ESAP reading comprehension. As for the practicing manner and game type, story was the same. Students who copracticed or practiced the activities before class (BC) achieved the excellent progress (Mean16 = 17.6, SD16 = 2). Students who copracticed or practiced the activities after class (AF) made slower progress (Mean16 = 17, SD16 = 1.8). And, the rate of progress was the least in the second group, wherein students copracticed or practiced the activities within class (Mean16 =15.9, SD16 =2.4). Within these three groups, students who copracticed the activities made better progress than their counterparts (Mean16 = 17.5, SD16 = 1.9) who did the activities individually (Mean16 =16.2, SD16 = 2.2). Individual manner of practicing the activities and teacher-made (vs. student-made) activities went well together (Mean16 = 17.1, SD16 = 2.1).

To conduct a fine-grained analysis of m-game-oriented platforms, after calculating and comparing the goodness of fit measures of Fixed Effect, Random Intercept, and Random Intercept Random Slope Models, *the* *Random Intercept Random Slope Model* fitted well to the observations (Table II).

 TABLE II: *GOODNESS OF FIT MEASURES FOR THE THREE MODELS*

|  |  |  |  |
| --- | --- | --- | --- |
| Information Criteria | Fixed Effect | RandomIntercept | Random InterceptRandom Slope |
| -2 Log Likelihood | 10284.10 | 4105.2 | 2874.342 |
| Akaike's Information Criterion (AIC) | 10306.10 | 4129.2 | 2900.342 |
| Schwarz's Bayesian Criterion (BIC) | 10306.21 | 4129.3 | 2900.495 |
| Hurvich and Tsai's Criterion (AICC) | 10380.72 | 4210.6 | 2988.524 |
| Bozdogan's Criterion (CAIC) | 10369.72 | 4198.6 | 2975.524 |

 Taking a brief glimpse at ANOVA Table (Table III), a linear trend of progress in ESAP reading comprehension points to the students' continuous progress in all three groups during the course (Sig. = .000).

TABLE III. *TYPE III TESTS OF FIXED EFFECTS*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Source** | **Numerator df** | **Denominator df** | **F** | **Sig.** |
| Intercept | 1 | 150.044 | 4014.415 | .000 |
| t | 1 | 150.044 | 499.939 | .000 |
| Pra. Man. | 1 | 150.044 | 1.318 | .253 |
| GT | 1 | 150.044 | .001 | .982 |
| Group | 2 | 150.044 | .682 | .507 |
| Pra. Man. \* t | 1 | 150.044 | 2.107 | .149 |
| GT \* t | 1 | 150.044 | 4.847 | .029 |
| Group \* t | 2 | 150.044 | 25.403 | .000 |

*Note*. Pra. Man. = Practicing manner; GT = Game Type; df = degree of freedom.

As is shown in Table III, the main factors did not enjoy any significant relationship with students' progress at *p* < 0.1. Instead, these interaction of these factors, except practicing manner, with session (t), indicates their significant effect on students' progress. That is to say, interaction of group (before, during, & after class) and game type with session produced significant effect on the students' ESAP reading comprehension.

As a result of copracticing in an AR m-game-oriented setting, an average of 0.021477-point increase in ESAP reading comprehension proficiency was seen per session. Nonetheless copracticing and practicing did not result in significant differences in students' progress (Sig. = 0.149). Put simply, students' passive role in individual m-game-oriented scenarios ended at significant disadvantage and copracticing played a bigger role in ESAP reading comprehension. In the individual manner of practicing, students who practiced the activities with the help of teacher-made activities performed significantly better than their counterparts (Sig. = 0.029) who practiced through student-made activities (and their rate of progress was .03 score higher than their counterparts). Misreading was evident as a result of individual practicing of materials in student-made-oriented activities. Overall, part of the success hinges on the way students practiced the activities.

TABLE IV. PARAMETER ESTIMATES OF THE RANDOM INTERCEPT RANDOM SLOPE MODEL

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Estimate** | **Std. Error** | **df** | **t** | **Sig.** |
| Intercept | 13.429846 | .437266 | 150 | 30.71 | .000 |
| t | .204691 | .014692 | 150 | 13.93 | .000 |
| [Pra. Man. = Cop] | .505529 | .440372 | 150 | 1.148 | .253 |
| [GT = SM] | -.011538 | .501579 | 150 | -.023 | .982 |
| [Group = 1] | .514000 | .442982 | 150 | 1.160 | .248 |
| [Group = 2] | .308000 | .442982 | 150 | .695 | .488 |
| [Pr. Ma. = Cop] \* t | .021477 | .014796 | 150 | 1.452 | .149 |
| [GT = SM] \* t | -.037104 | .016853 | 150 | -2.202 | .029 |
| [Group=BC] \* t | -.001684 | .014884 | 150 | -.113 | .910 |
| [Group=DC] \* t | -.092706 | .014884 | 150 | -6.229 | .000 |

*Note*. Cop = copracticing; Pr. Ma. = Practicing manner; GT = Game Type; df = degree of freedom. BC and AC = copracticing and practicing AR m-game-oriented activities before and after class, respectively; SM = students who practiced their counterparts m-age-oriented activities individually.

Before- and after-classroom (BC & AC) practicing and copracticing shared for better ESAP reading comprehension and there was no significant difference between their progress rates in ESAP reading comprehension (Sig. = 0.91). Students' good rate of progress in after classroom (AC) group indicates that grafting classroom-based teaching and learning onto AR m-game-oriented activities allows students to demonstrate learning after a virtual experience (applying what they have already learned in accomplishing textbook activities). Difference between the progress rate of DC and AC group was significant (Sig. = .000) and as a result BC.

## Teacher Journal

The teacher outlined his notes as follows:

Practicing reading materials through m-game-oriented activities has the potential to add real value to students' ESAP learning experiences beyond the conventional course notes and the customary drill-and-practice exercises. All things considered, I introduced AR m-game-oriented activities as a pleasurable activity for the students, which, in turn, fostered mint conditions for them to have authentic reading experience. I saw an increase in student engagement in all the groups. I believe that the college students accepted the implementation of AR m-games in their ESAP learning very well. Of course, some older students tended to downplay the role of m-game in EASP teaching and learning. However, on the whole, there was a temptation for students to use these new generations of digital games for ESAP learning.

Copracticing and developing self-made AR m-game-oriented (vs. individual manner of practicing through other-made) activities provided extraordinary opportunities for students especially when they were guided by their truly talented peers. Attempt for the purpose of developing self-made materials and activities allowed students to spend more quality time together.

Using these self-made AR m-game-oriented platforms allowed me to learn along with the students and promote my knowledge of m-game-oriented teaching and learning. Interestingly, in a self-made m-game-oriented context, my prompts shrank over time, showing an affirmative shift towards increased student responsibility over time. Adopting the role of observer in the course of activity development enabled me to have first-hand experience with the students. So, under such circumstances while vetting the outcome of students, I was well aware on which question items students had taken a longer time to reply and which items they have quickly conjectured or answered. I could focus on the action that students actively select and control to reach the prime goals. In the interim, I could figure out areas in need of improvement and devise a way to intervene. By using m-game-oriented modules assessing students' ESAP reading comprehension was done in more comprehensive way than by just having students do the exercises of the books to find out if they have understood. As a result of practicing reading materials through AR m-game-oriented activities I could carry out students' constant evaluation process to check if they could deal successfully with the professional expectations in the new era (future professional life) and effectively addressing their daily challenges and responsibilities in their ongoing professional life.

Students' active role in developing self-made AR m-game-oriented activities helped them draw meaning from the real-world passages and interpret it properly. In self-made contexts, the students saw each other as engaging, involved, and students who bring a lot of passion and energy to the instructional-learning contexts. The students displayed greater confidence in the subject matter after practicing ESAP materials through AR m-game-oriented (self-made & other-made) activities. They evinced more efforts to enhance their ESAP reading comprehension.

 As regards developing AR m-game-oriented activities by the collegiate students themselves, another great lesson I learned is to never underestimate what students are capable of. Conceivable workplaces were brought about as a result of engaging students in developing materials and activities together and in cooperation with each other. In these instructional-learning settings with students were the main organizer of the scene. They could paint gaudy pictures and capture helpful feelings and dialogue to produce their own self-made activities. This was arena in getting reluctant students to stick with the ESAP content and not become overwhelmed or frustrated. By the time these types of students' self-made activities were presented to their counterparts, as other-made activities, to be practiced individually, they appeared more successful and warmly welcomed (compared with ready-made activities); that being the case, direct application of developing the students' own self-made AR m-game-oriented activities to thriving entrepreneur was obvious. In the main, the interdisciplinary arena of teaching and learning ESAP reading comprehension is a good fit for edupreneurs especially when intermingled with AR m-game-oriented activities. Correspondingly, the collegiate students' copracticing and cooperation with each other played a larger role in the ESAP instructional-learning context to foster a sense of community amongst students. The students' collaborative attempt for producing and distributing activities not only boosted collaborative spirit but also persuaded them to do need analysis more accurately and thus producing more reader-friendly activities. In effect, they were more expandable in their working team as in the time of need, they were the ones who drive the company or institute out of times of crisis.

Copracticing in the self-made context students with variety of clues to understand the embedded reading passages. This manner of practicing helped the students make more informed decisions than if they were practicing in the same context individually. Copracticing provided students with opportunities to self-assess their own self-made products and publish it for others. In this platform, students were able to make prediction for more successful performance in academic and professional situations.

More specifically, devising self-made activities inspired students to pursue the efficiency of PBL AR m-game-oriented in learning process. In PBL AR m-game-oriented setting wherein students copracticed to produce and do the activities, indoor and outdoor situations worked in tandem. To identify the problems and develop self-made activities students needed to utilize learning resources on their own, but it was of help if I showed a few good sources to get them started. The review of the materials through AR m-game-oriented activities provided students with a rich vision of their future workspace, and thus [identifying solutions to problems](http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwi2-futwaDYAhXDhrQKHYYqDusQFggkMAA&url=http%3A%2F%2Fwww.fao.org%2Fwairdocs%2Fx5405e%2Fx5405e07.htm&usg=AOvVaw3LCHJNZ5bR2jnQPvN-ZJux). Also, practicing PBL m-games before entering into classrooms was a better platform for practicing ESAP reading materials. Working with self-made m-games from the beginning gave students the added advantage that they can address the needs of their future careers using ESAP reading with a certain degree of proficiency.

The stark difference that I noted among the groups is the extent to which students in different groups misread the ESAP reading materials in their future professional life. I can conclude that ESAP reading comprehension intersects with students' success in their future professional life.

## Examining The Selected Students' Responses to the Interview Responses

Again, as far as the third research question is concerned, talking to some of the students in the interview session, we came to know that lots of them are interested in using their mobile devices in order to practice ESAP reading materials whenever and wherever it is possible. They enjoyed doing reading activities through the AR m-games and felt more motivated to spend time on practicing reading activities through AR m-games. That is to say, students reported that practicing ESAP reading comprehension through AR m-games made them want to read more. Besides, they stated that through application of AR, objects on the ground of workshop comes to life. They operationalized ESAP reading comprehension as a route toward doing well in professional setting. This interview prompts elicited such answers as:

The selected students (from self-made groups) mentioned that they found the self-made instructional-learning context highly engaging. These were virtually unanimous that during the production of self-made activities, they frequently tapped their apriori knowledge. Students from copracticing for developing and practicing self-made AR m-games are great addition to the ESAP instructional-learning context seeing as from their view self-made m-games make the context more dynamic while enabling them to develop their ESAP reading comprehension. They added, copracticing of activities gave them to look at the ESAP reading skills from multiple perspectives. On their words, copracticing gave them a much richer and more accurate account of the way content is used. Also, they were of the opinion that by copracticing and colearning, they were able to discover what life is like for their counterparts around the world. These students said, conversely, student passive role in an ESAP reading comprehension undermines one's performance.

On the other hand, the students who were interested in individual manner of practicing and did the PBL AR-m-game-oriented activities individually proclaimed that if teachers assist students to make decisions individually employing Ed Tech, students will get used to fabricating their own ways of accomplishing activities. These selected students from the individual groups, who practiced ESAP reading comprehension through other-made AR m-game-oriented activities, were grateful for practicing through their counterparts' self-made product, that is, successful entrepreneur. The relationships between students were dynamic and became more self-regulated rather than other (teacher)-regulated. On the words of the selected students, actually, working together to develop activities and materials, giving students the opportunity to form a close relationship with both their fellow students and their teacher, that is to say, an incentive for positive behavior.

As said by the selected students of copracticing group, in the self-made AR m-game-oriented platforms, they learned ways of using the contents for both their future professional needs and capitalizing on AR m-games for the purpose of entrepreneurship. These selected students noted, when they demonstrated success in a new instructional-learning milieu, they showed more interest in meaningful learning of materials. If the activities were interesting to them, then they were far more likely to want to practice and read through them. Students perceived the AR m-game-oriented activities to be most useful for developing ESAP reading as well as arenas for developing and presenting game-oriented activities.

Students of the copracticing group held favorable perception towards PBL AR m-game-oriented platforms but students from individual group who practiced through other-made activities seriously needed training courses in learning through common teacher-led classrooms. As a result of copracticing the activities, students claimed that they learned how to design problems and embed them in their own self-made activities to be solved by other students.

# Discussion and Conclusions

Findings showed that when digital game-oriented activities are frequent enough, clearly matching with instruction, together with feedback, and properly gauging collegiate students' learning, they are considered proper means to reinforce and measure learning. Despite the differences in the way of practicing the reading materials through the medium of AR m-games and the different attitudes students adopted, students seemed to converge on the same path.

It was disclosed that one of the top tips for engaging collegiate ESAP students is to establish condition for developing self-made activities and to invite students practice and learn through their own products (rather than other-made product), namely endow students with more active role. To the extent that students took the lead in developing activities, their ESAP reading comprehension and performance were elevated. This accord with our earlier observations, which showed that developing pedagogical activities through the medium of digital technology by FL English students themselves provoked their interest and curiosity and helped them navigate through the reading materials of their own specific discipline ([35]). This finding further support the idea that the more students feel they have a say and a valid part in their own progress, the more likely they are to commit to being champions of that progress. The best way to promote reading comprehension and students' performance is by incorporating students' voice from the onset. And students' voice came through the own self-made activities in this study. All these routes aid in the development of self-made activities that give collegiate students a global voice to demonstrate their individual strengths.

It was far more useful when the teacher reported as students moved to the small-group exercise using their mobile devices to fabricate their own self-made activities, teaching and practicing was well underway and students were able to fully comprehend the ESAP reading materials. This supports the suggestion that "[students] should have a say in what they learn and they should feel comfortable enough to have a candid conversation about what they need or what they do not know" ([36] Eschool News).

It was revealed that pivotal elements appropriate for edupreneur as a given purpose can be achieved through establishing small interdisciplinary circles for designing and developing self-made AR m-game-oriented activities. It led to activities tailored to collegiate ESAP students' most pressing needs, and it aided them own the materials and activities discussed and depicted in each session. In tandem, students were able to envision themselves working in workspace. Developing self-made materials and activities really opened the students' eyes to the ways m-games can change the world. In parallel, they were encouraged to take initiatives to connect instructional-learning activities with real world professional workspace. As the result of students' performance in natural inquiry showed, practicing ESAP reading materials paved the way for collegiate ESAP students to be successful adults in their future professional life (i.e., career readiness) while pursuing a fulfilling education; so, they can be individuals who contribute to real-world society and thrive. In accordance with the present results, previous studies have demonstrated that to get a better understanding from those who are actually practicing with m-games fostering collaboration among students seems beneficial.

Self-made PBL AR m-game-oriented activities and students' cooperation for coporoducing and copracticing the ESAP reading materials and activities were solution encouraged conversation between partners and teachers from different subject areas and helped bridge the subject matter and ESAP reading comprehension gap that is prevalent amongst collegiate students. This study shows, using collaboration platforms in this way of learning (viz., copracticing) proposes a fresh way to make sure that students get in touch with each other and learn together. The result correlates fairly well with Atai and Fatahi-Majd (2014) [37] that in the process of self-made activity development, students are engaged in an interplay between disciplinary domains and the correct solution for the problem in professional situations of the real life is primed. Under such circumstances, student learning was accompanied by feedback. Besides, when students practice self-made materials and results are less than favorable, students had many opportunities to adjust the performance to better achieve the goal. Similarly, when students were assigned to practicing ESAP reading materials through PBL AR m-games before classroom, they started to draw connections with real-life events to normalize the embedded scenes and facilitate their comprehension. These casts light into how learning is developed out of interaction that is embedded in the practicing field. In this fashion, the best part about copracticing is that given it is specifically developed for use in college ESAP classrooms, which, in turn, lays the foundations for entrepreneurship. Seeing as many savvy entrepreneurs see potential in m-game development, developing self-made m-games has a range of capacities for college students who want to establish small businesses and entrepreneur. In view of that, for some entrepreneurs, developing m-games has taken on a new meaning. Proposing the idea of developing self-made AR m-games in postsecondary education allowed students from different disciplines play role in developing m-games.

Results showed that better explanation lies in *the theory of synergy* which refers to the interaction of disciplines that when combined generate a major impact that is larger than the sum of the individual disciplines. This is how they can gain deeper and more meaningful engagement with reading materials. Interdisciplinary instructional-learning platforms provided a proper balance of learning opportunities and collegiate students who did other-made AR-m-game-oriented activities individually were deprived of such an interdisciplinary desirability. Self-made m-game-oriented activities that crosses several different disciplines go with the interdisciplinary nature of ESAP. On balance, the students' self-made activities act conjointly in helping them constructing and producing inferences in new instructional-learning settings ([38]).

As to the underperformance of older students it could be argued that the expectation that the digital games would be of little help to their learning gave rise to their initial lack of interest in practicing and learning through AR m-game-oriented activities, though most of them later developed better attitudes and desired to practice reading ESAP via m-game-oriented platforms. With reference to *Unified Theory of Acceptance and Use of Technology*, Ho, Chou, and O'Neill (2010) [39] give explanation for such a result that performance expectancy has significant impact on students' decision to learn L2/FL through a digital-technology-oriented module. This means that those who expect digital technology to have a favorable impact on their performance in learning L2/FL are more likely to access and use a L2/FL learning digital technology-oriented activity. Another factor with a significant effect on students' digital technology-oriented learning intent is social influence, that is to say, other individuals' attitudes towards digital technology-oriented practicing will have a bearing on students' own attitude and intent.

The students' well doing in natural inquiry and thus their well-preparedness for future professional life challenges confirmed the flipped learning approach that multimodal materials and/or activities learned and rendered by students in as extracurricular situations contribute much to information absorbing ([13]). Through reviewing the materials in m-game-oriented activities, students can encounter them over and over again; so, students reproduce in their own mind the materials to be comprehended and learned. Nonetheless, individual practicing of other-made AR-game-oriented activities undermined the students' ESAP comprehension and doing well in professional life. This may be owing to the fact that such other-made m-game-oriented activities make it unattainable for students to read with the degree of automaticity required for comprehension. It is of note that concerning the application of counterpart- (vs. ready)-made activities as other-made type the story was different as these student-made type of activities facilitated students' comprehension and envisage of real-world workspaces. Having said that, students who copracticed to develop and practice the materials through their own self-made products still outdid their counterparts who had practiced through their counterpart-made activities. Baas, De Dreu, and Nijstad (2008) [40] report that positive mood states are activating the brain zones affecting the ability to think creatively and solve problems. Relaxed and neutral states of the mind negatively influence creative thinking process (cited in Yarbrough, 2017, EdTechReview). In sum, reading activities of the kind that prepared by students take them "beyond a mere comprehension check to an analysis, discussion, or application of actual content" as Nation and Bonesteel (2012, p. 4) [41] claim as well. A student who is cognizant of the internal construction of an instructional-learning platform can deeply comprehend the materials. In practice, individual practicing manner and entrepreneur are incommensurable.

The authorities needs to double down on the use of Ed Tech in postsecondary education. AR m-game-enhanced activities are accurate options for prospective students. Similarly, regarding the potential of AR m-games for fostering entrepreneur, it seems necessary to increase the importance of using AR m-game-oriented activities. Meanwhile, it is of note that AR m-game-oriented activities alone cannot fix all ESAP teaching and learning challenges. There are plenty of things authorities can do behind the scenes to improve the experience of these students. In short, there is now clear evidence to show that the manner of using m-games can predict successful learning in the Ed Tech-oriented instructional-learning contexts. It can be said that m-game-oriented activities are educationally effective if they help students to construct their own understandings by playing an active role in devising these pedagogical activities. These activities can be expanded to other languages and ages so that students can launch their own future profession and learn in the process.

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