

Designing material for ESP-XR: An augmented reality-based mobile application for English for specific purposes learning

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This study presents the design and linguistic development of ESP-XR, an Augmented Reality (AR)-based mobile application aimed at supporting the acquisition of domain-specific language in Business, Medical, and Legal English. Grounded in Mobile-Assisted Language Learning (MALL), the project integrates a situational syllabus with a Task-Based Approach (TBA) to foster authentic communication and learner engagement. The Business English module is outlined in detail, including the process of defining learning objectives and designing a syllabus tailored for a B2-level audience. Drawing on corpus-informed methods, authentic materials were adapted to create interactive dialogues and AR-based vocabulary tasks aiming to enhance vocabulary retention through embodiment and gamification. While challenges were encountered—particularly in identifying concrete AR-representable items and maintaining textual authenticity—this study outlines the potential of AR-enhanced tools to promote immersive ESP learning.

Keywords: Augmented Reality (AR); English for Specific Business Purposes (ESBP); Gamification; Mobile-Assisted Language Learning (MALL); Task-Based Approach (TBA)

1. Introduction

In recent years, Mobile-Assisted Language Learning (MALL) has been the focus of much research attempting to investigate the advantages and disadvantages of integrating mobile technologies into instruction, and to analyze the pedagogic practicality and suitability of teaching approaches blending in-class instruction and mobile-assisted teaching (Metruk, 2024; Shih, 2017; Yamada et al., 2012).

The growing popularity of educational applications is not incidental: it is grounded in the inherent ‘affordances’, à la Salmani Nodoushan (2021), of mobile technologies, which can foster and facilitate language teaching and learning (Metruk, 2024; Xue, 2022). Key features of mobile technologies such as “portability, functionality, multimedia convergence, ubiquity, personal ownership, social interactivity, context sensitivity, location awareness, connectivity and personalization” are indeed frequently quoted as being

beneficial to language learners (Cook, 2010, p. 2). Specifically, MALL has been claimed to facilitate independent, self-directed learning (Karimi, 2016), as it allows users to manage their own learning curve at their own pace, both inside and outside the curricula of educational institutions: Karimi (2016) distinguishes between formal and informal learning through mobile devices, the former occurring “within the constraints of a designed curriculum and teacher-supplied resources” (p. 770), the latter involving the independent and personalized use of digital resources for the purposes of learning. In this respect, MALL—or more in general mobile learning (m-learning)—is particularly beneficial, as it incorporates the advantage for both teachers and learners to switch from one learning type to the other.

Within the framework of MALL, Augmented Reality (AR) is acquiring an increasing crucial role, particularly in educational contexts. AR has been variously defined as a technology that merges real world and digital content for simultaneous interaction between the two (Anesa, 2025; Bursali & Yilmaz, 2019). More specifically, AR involves overlaying digital material onto the physical world, so that the digital material appears superimposed onto a real environment image which functions as a background (Billinghurst et al., 2001). Typically, AR objects are generated by scanning QR codes or markers, using the camera of a mobile device. Similar to what we said about generic educational applications, applications based on AR technology are mostly used with tablets and smartphones because of the intrinsic affordances of portability characterizing such technology. Many advantages of using AR have been discussed in the literature. According to Dunleavy et al. (2009, p. 20), AR facilitates “the development of processing skills such as critical thinking, problem solving, and communicating through interdependent collaborative exercises.” In their systematic review, Akçayır and Akçayır (2016, p. 5) report that most of their reviewed studies identified enhanced learning motivation, decreased cognitive load, and enhanced confidence and satisfaction as the key outcomes of AR-based educational applications. Remarkably, along the same line as Dunleavy et al. (2009), they emphasize AR’s potential in promoting peer collaboration, student-instructor interaction, self-directed learning, and multisensory engagement (Akçayır & Akçayır, 2016, p. 6).

All these pedagogical contributions—particularly critical thinking, problem-solving and collaboration—are central to the constructivist theoretical perspective (Bruner, 1986; Vygotsky, 2016). In this sense, AR emerges as an innovative tool capable of supporting constructivist approaches to English Language Teaching (ELT), as it can be employed to support both General English instruction and English for Specific Purposes (ESP) instruction, the latter of which, in our opinion, represents a particularly promising domain for the development and design of AR-based applications. This is especially true in view of the fact that ESP remains largely underexplored within the context of

AR-based MALL applications, in spite of the high demand for specialized language knowledge and field-specific communication—for instance in medical, business, and legal contexts in tertiary education and professional contexts (Giofr , 2025).

With these considerations in mind, we decided to focus our efforts on developing an innovative application—called ESP-XR—aiming to provide ESP learners of Business, Medical and Legal English with an engaging tool based on AR technology that supports the development of domain-specific linguistic and communicative skills, and at the same time enhances learners’ engagement through gamification and embodiment.

The following paragraphs outline the main stages of the linguistic development of ESP-XR, with a focus on the design and linguistic development of the business course. In particular, Section 2 discusses the definition of appropriate learning objectives and design of a suitable syllabus for the Business English module. Section 3 explores material design in greater depth and examines the benefits and challenges of incorporating AR and gamification to enhance learner engagement. Finally, Section 4 presents some preliminary conclusions regarding the advantages and challenges of creating ESP content for an immersive, interactive application.

2. Defining learning objectives and syllabi for an experimental application

As it is well known, the ESP approach is built around four established pillars: (1) needs analysis, (2) learning objectives, (3) materials, and (2) methods and evaluation (Anthony, 2018). These core principles are typically represented in a circular loop with bidirectional arrows connecting adjacent pillars, in order to emphasize their iterative nature. In other words, rather than being conceived as independent, sequential stages in a linear cline, the four pillars function as interconnected variables within a dynamic continuum, where each element must be reanalyzed, reassessed and redesigned whenever another undergoes change. Due to the experimental nature of the project, which is still in its trial stage, this study focuses on the second and third pillars of ESP—specifically, defining the course learning objectives and designing suitable syllabi for each module. This foundation enabled us to create appropriate tasks and exercises.

The first stage in the process of defining learning objectives for ESP-XR courses involved gaining a general understanding of the discourse patterns of the genre under investigation, i.e., Business English, as well as the proficiency levels these discourse patterns should be adapted to. As Paltridge (2012) points out, genre has become a key concept in ESP studies, since discourse patterns change significantly depending on the genre (See also Salman Nodoushan, 2020). To ensure a focus on authentic language use that reflects real-life communication

scenarios, as well as the distinctive discourse patterns of each genre, we adopted a corpus-informed approach, inasmuch as the core objective of our research has been to incorporate real data. As regards the level of English required to be able to carry out the course activities, a preemptive and experience-based decision had been made to tailor the three modules for a B2 target audience, as learning discourse patterns for professional purposes usually requires a basic knowledge of the language in question.¹

Once the proficiency levels were determined, we focused on tailoring suitable learning objectives for each module, which translated into designing well-balanced syllabi. Indeed, as Anthony (2018, p. 87) specifies, in order to decide the learning objectives of an ESP lesson, course, or program, it is necessary to consider a series of parameters that “are usually stated in the form of lesson plans, course syllabi, and overall program curriculums.” For the purposes of designing our app, we draw on Anthony’s (2018) well-known taxonomy of syllabus types used in ESP course design, each of which refers to one or more pedagogical approaches that have been adopted at some point in time.

Since the purpose of ESP-XR is to help learners enhance their immediate communicative needs in workplace contexts, and as such, it aims at developing language authenticity, a situational syllabus seemed to be the most appropriate choice for all three modules (business, medical, legal). Anthony (2018, p. 89) defines situational syllabi as “focus[ing] on situations in which the learner might find themselves (e.g., doctor/patient interaction, meeting with an international businessperson) and are usually sequenced based on importance, learner interest, or timing of need,” which lines up with the pre-planned learning objectives of our business course. To develop a suitable syllabus for the business section of ESP-XR, several existing business textbooks were consulted beforehand, particularly Pearson’s *Business partner* and Pearson’s *Market Leader*, both in their B2-level series. Combining the textbooks sources with previous teaching experience, we were able to develop the business syllabus reproduced in Appendix A.

In order to provide appropriate didactic activities through which learners can acquire key grammatical structures and develop functional language, our situation-based syllabus was integrated with a task-based learning approach. Indeed, due to their inherent affordances, mobile technologies provide an ideal platform for designing authentic, realistic tasks that serve as scaffolds, offering learners enhanced opportunities for communication and authentic language acquisition. As Xue (2022, p. 1133) points out “TBLT emphasizes learning by doing,” whereby “newly-acquired knowledge is better integrated into long-term memory and more readily retrieved when associated with real-life events and activities” (Doughty & Long, 2003, p. 58). Moreover, the Task-Based

Approach (TBA) has repeatedly proven to boost students' self-confidence and motivation (Pingmuang & Koraneekij, 2022; Yundayani et al., 2019).

For the purposes of syllabus design, we devised two types of tasks—pedagogical tasks and real-world tasks (cf. Richards, 2006)—which reproduce the classical three-stage TBLT model, as developed by Prabhu (1987), composed of a pre-task (a preparatory activity), a task cycle (meaning focused activity or interactive process action), and a post-task (cf. Achmad et al., 2026; Garcia-Ponce & Tagg, 2026; Salmani Nodoushan, 2008). Accordingly, each unit of the app business module is introduced by teacher-guided lead-in activities designed to brainstorm ideas pertaining to the unit topic and elicit core vocabulary, in case of in-classroom instruction. These are followed by the vocabulary presentation stage, aiming to activate background knowledge and/or introduce keywords and phraseology relevant to the unit topic. This preparatory stage is implemented as a set of e-learning resources published on the project website (where ESP-XR and its markers are also freely available for download).² All these materials can be used flexibly either in classroom contexts or independently by learners, thus leveraging one of the key affordances of mobile technologies: ubiquitous and self-directed learning accessible anytime, anywhere.

The pre-tasks are followed by the core task cycle, which comprises two practical activities within the ESP-XR app, which will be discussed more in detail in the following section, where the challenges of materials design will also be addressed. These are:

1. Listening comprehension tasks in the form of realistic conversations between two avatars, featuring embedded multiple-choice quizzes, and
2. identification of 3D objects representing key items from each unit.

Finally, a post-task was also included which partially departs from the TBLT framework outlined by Willis (1996), inasmuch as it does not comprise a reporting and language-focus stage. Instead, it consists of a production activity in the form of a role-play exercise designed for in-class implementation.

As Appendix A shows, each unit deals with a specific topic that has been deemed to be relevant to B2-level students of Business English. Moreover, the two conversations in each unit depict specific business situations that learners are likely to encounter in their professional career—e.g., job interview, first day at work, business meetings, trade fairs, and so on—thereby aligning with the principles of a situational syllabus.

Finally, it is important to emphasize both the e-learning activities and those included in the app allow for the integration of ESP-XR within constructivist learning approaches. All tasks have been designed to build up on the learners'

previous knowledge, allowing them to assimilate and/or accommodate new information to their existing schemas. According to the constructivist pedagogy, this is what prompts learning, especially when the new information is in contrast with the learners' prior knowledge, in which case learners have to adapt or "accommodate" their newly acquired knowledge to the preexisting (Reyes, 2008). In practical terms, a constructivist teacher could make use of both the additional e-learning activities and those included on the ESP-XR app to foster peer discussions or student-instructor interaction concerning the unit topics, enhance vocabulary acquisition by means of the interactive activities of the app, and ultimately encourage peer collaboration by negotiating ways to simulate real-life scenarios in business. Naturally, all these activities must be supervised by the constructivist instructor in order to scaffold learners within their ZPD (Zone of Proximal Development) (Vygotsky, 1978), thus "providing temporary support for constructing meaningful knowledge structures among their students" (Reyes, 2008, pp. 55-56).

3. Designing materials for the business English module

Although some scholars prefer to take a broader approach when defining Business English as a specialized language, since, as Perinčić Tičić and Oštarić (2024, p. 100), state quoting Nickerson and Planken (2016), "Business English applies to all written or spoken interactions conducted in English while doing business," Business English is undoubtedly characterized by domain-specific vocabulary, and phraseology to the point that we can refer to its users as a "Discourse Community" (Paltridge, 2012, p. 348, quoting Swales, 1990). Indeed, as Swales (1990) points out, Discourse Communities are groups of people that share certain common goals and common ways of reaching these goals. They consist of 'expert' members whose job is to teach new members 'how things are done', who regularly meet and engage in communicative events and share the same vocabulary or 'jargon' (Jones, 2024). Discourse communities utilize genres, namely sets of values, beliefs and behaviors, which are reflected in their linguistic choices and textual production (Gavioli, 2005; Widdowson, 1998b) to reach their common goals. Their shared jargon is therefore an actual, authentic representation of specific discourse communities, a point that is of particular relevance to us.

Indeed, our chief interests lay in providing as faithful a representation as possible of the language as authentically used by business discourse communities worldwide. In other words, we aimed for authenticity.

3.1. Authentic vs created material: Striking a balance

As mentioned above, authenticity—which involves identifying the actual textual productions of a discourse community—is an important issue to be

considered when designing appropriate teaching materials for an ESP course, one that has spawned a number of studies and research aiming at identifying pedagogical best-practices in ESP contexts. Authentic learning is defined by Herrington et al. (2014, pp. 401-402), as a pedagogical approach that “situates learning tasks in the context of real-life situations, and in so doing, provides opportunities for learning by allowing students to experience the same problem-solving challenges in the curriculum as they do in their daily endeavors.” The debate between authentic and contrived, prescriptive materials is an old and long-standing one. Thus, if most researchers have endorsed the use of authentic materials in ELT contexts (cf. Carter et al., 2011; Clarke, 1989; Gilmore, 2007; Guariento, 2001; Maley, 2011; Widdowson, 1990), others are more critical (see Freeman & Holden, 1986; Prodromou, 1996; Widdowson, 1996, 1998a, 2003; Williams, 1983). According to Widdowson (1998a, p. 10), for instance, authenticity is a complex and crucial point in ESP teaching, since, if learners are exposed to authentic texts too early in their learning process, they are likely to miss the entire stage whereby the necessary skills to make language abstractions are developed. In other words, they may end up not being able to “abstract from actual linguistic data,” which in turn is a key stage that allows learners to apply certain genre-specific language structures to other situations.

On the other hand, several scholars support the inclusion of authentic and up-to-date materials in ESP classes. Buzarna-Tihenea and Nădrag (2018), for example, claim authentic materials enhance and foster learners’ motivation, as “they are proof that the language is used for real-life purposes by real people” (Nuttall, 1996, p. 172). Ruiz-Garrido and Palmer-Silveira (2015) instead turn their focus on the importance of authentic materials in English for Specific Business Purposes (ESBP) courses by analyzing the advantages of exposing a group of business students of a Spanish university to authentic company’s annual reports. They claim that the “need to use those [authentic] materials in the English language classroom is even higher when we have to deal with specific groups, such as those involved in the English language in professional settings, as many firms are looking for those prospective workers who could efficiently locate, manage and communicate business information” (p. 88). As a consequence, they argue, using authentic materials in the language classroom may contribute to the learners’ future success in their professional life.

Another interesting approach that has emerged in recent years is to base learning materials on frequency wordlist taken from corpora or sub-corpora. The main advantage of taking such an approach is that corpus-informed materials allow for the inclusion of authentic morpho-syntactic, semantic and even pragmatic elements typical of the language used in specific areas of specialization or in certain situations. Thus, in his analysis of positive evaluation in the language of Human Resources, Reich (2021, p. 149) states,

“[A] course can either be based completely on authentic materials, or textbooks can be used but complemented with authentic materials. The topics should be carefully selected, based either on corpus data or consultations with HR specialists to reflect the current situation in the target domain.”

On the basis of all the discussions presented above, we opted for an authentic approach grounded in corpus-informed teaching materials. Specifically, after selecting the relevant topics necessary to compile our Business English syllabus (see Section 2), *Sketch Engine*—one of the most widely used corpus management and text analysis tools—was consulted for the corpus analysis, in order to extract frequent keywords in business contexts. To achieve this, the following searching criteria were applied:

- Reference corpus: English Web 2021 (enTenTen21)
- Focus subcorpus: English Web 2021 (enTenTen21) > Topic: Economy, Finance & Business
- Rarity: 100 common words
- Minimum frequency: 200 words
- Exclude these words: a list of English function words was copied and pasted in the relevant input field in order to exclude them from the counting and final results.

The rationale behind setting 100 for rarity and 200 for minimum frequency was to strike a balance between rarity and relevance. Indeed, this approach helped us exclude terms that were too rare or overly specific (i.e., names of specific companies or acronyms such as “emini,” “asx,” or “mno”) deemed to be far too niche and irrelevant to be included in an ESP course for B2-level students, while retaining words that appear frequently enough to be useful for authentic conversations. Moreover, setting a minimum frequency filter of 200 ensured some level of representativeness, by excluding terms that, despite having high keyness, appeared only a few times in the corpus and as such did not represent relevant vocabulary for the target audience. The result was a list of 1,000 keywords, which were then narrowed down to the 500 most frequent to meet our objectives. The refined list of keywords was then used to create business conversations centered around each unit’s topic or situation: in order to do this, we decided to use *ChatGPT* as a tool to generate conversations that not only covered the pre-selected topics, but also sounded as authentic as possible.

As a caveat, we would like to emphasize that complete authenticity was impossible to achieve, due to specific constraints related to both the app design and the course learning objectives. On the one hand, the conversations had to be tailored so that they could fit the app design—two avatars discussing business issues in a business meeting room. As a consequence, a conversation

could not include exchanges between more than two people. On the other hand, it became necessary to adapt and modify each dialogue, so that they could embed multiple-choice quizzes, one of the two tasks part of the app learning process. This last aspect required particular attention when considering authenticity, as all conversations had to be carefully adapted so that the correct answer could be inferred easily enough by learners by drawing on either their encyclopedic, context or co-text knowledge: this inevitably required a certain degree of text manipulation at the expense of utter authenticity (for more details on quiz design, see section 3.3).

Two brief extracts from separate conversations are provided below, as an example:

- (1) Ms. Langley: Good morning, Shinji. Thanks for taking the time to review our annual report. Let's sit and go over the details together at the [conference table].

To start, here are the key performance highlights: our total assets have increased by 12% compared to last year, liabilities have been carefully managed, and as a result, we've significantly strengthened our ____.

Q: What is the most appropriate term to complete the sentence based on the financial highlights provided?

- a. Equity
- b. Investments
- c. Loans

- (2) Rachael Kowalski: Good afternoon, Mr. Tyrell. Thank you for taking the time to meet with me today.

Mr. Tyrell: Good afternoon, Rachael. The pleasure is mine. I'm curious to hear about your _____, since it sounds like a new groundbreaking idea. Let's dive in.

Q: How are new small tech-companies known as?

- a. Start off,
- b. Set-up,
- c. Start-up

The extract in (1) is taken from the first of the two conversations composing the activities for unit 3, whose main focus is "Finance," whereas passage (2) is taken from the second of the two conversations composing the activities for unit 2, focusing on "Presenting facts, figures and graphs." The ensuing first conversation is titled "Discussing an annual report summary for shareholders," while the second is titled "Making a Successful Pitch to an Investor."

As we can see in (1), the excerpt of conversation immediately before the question provides enough details for the learner to assume what the correct answer is: indeed, “assets” and “liabilities” are mentioned in the previous co-text, so that “equity” can be easily inferred as corresponding to the correct option. In this case, both previous encyclopedic knowledge—provided by the additional material uploaded on the project website—and the co-text guide the learner towards the correct answer, hence aligning with the scaffolding principle occurring at the “designing-in level [where] careful planning, selection and sequencing of materials and tasks ensures that learning opportunities are created where students can operate within their ZPD” (Hammond & Gibbons, 2005).

Moreover, on account of the same principle, additional material was provided to support students’ learning curve. Thus, each unit is presented with an accompanying glossary, use-of-English and functional language companions and a cultural box—all uploaded onto the project website—with the intended purpose of providing learners with the basics and core notions to navigate and interpret the app contents and tasks effortlessly, or, in other words, to help users negotiate meanings and construct their own knowledge (cf. Vygotsky, 1978).

This way, we were able to create questions, such as the one shown in (2), for which the correct answer is not immediately inferable from the immediate surrounding co-text. Still, it can be easily identified by learners who can either draw on the glossary uploaded as e-learning material onto the project website or can refer back to the brief scenery description provided before the conversation starts.

3.2. Augmented reality items: Advantages and challenges

As mentioned in section 1, one of the main affordances of ESP-XR is the ability to interact and manipulate objects in Augmented Reality. Research in Second-Language Acquisition and Neuro-science has extensively demonstrated that vocabulary is more easily memorized and retained when word meanings are illustrated by means of accompanying gestures. In this respect, Macedonia (2014) claims that long-term memorization of words is fostered by the internal kinetic image that performing a gesture may trigger in the learners’ mind. Moreover, in a study on the influences of AR attributes on consumers’ brand associations, Wu et al. (2024) argue that Augmented Reality facilitates an “authentic representation of mental imagery that embodies products and experiences, resulting in consumers’ clear cognitive associations with the brand” (pp. 10-11). In their study, embodiment is defined as the ability for consumers “to simulate physical interaction with the products effectively and efficiently,” (p. 1) whereby effectiveness is qualitatively defined by the degree

of physical control and interactivity of an AR object, whereas efficiency is quantitatively determined by the physical interaction responsiveness.

In line with previous research on the positive effects of gesturing and embodiment on vocabulary retention, ESP-XR has been designed to incorporate AR objects pertaining to the three areas of specialized discourse which build up the core content of our app, i.e., business, legal, and medical English. In what follows, we will be detailing the challenges related to identifying objects for the business module.

All AR objects are embedded in a 3D environment, in our case a business meeting room (see Figure 1), which is displayed when users launch the app and activate its contents by pointing the tablet's camera at a designated marker (see Figure 2).

Figure 1.

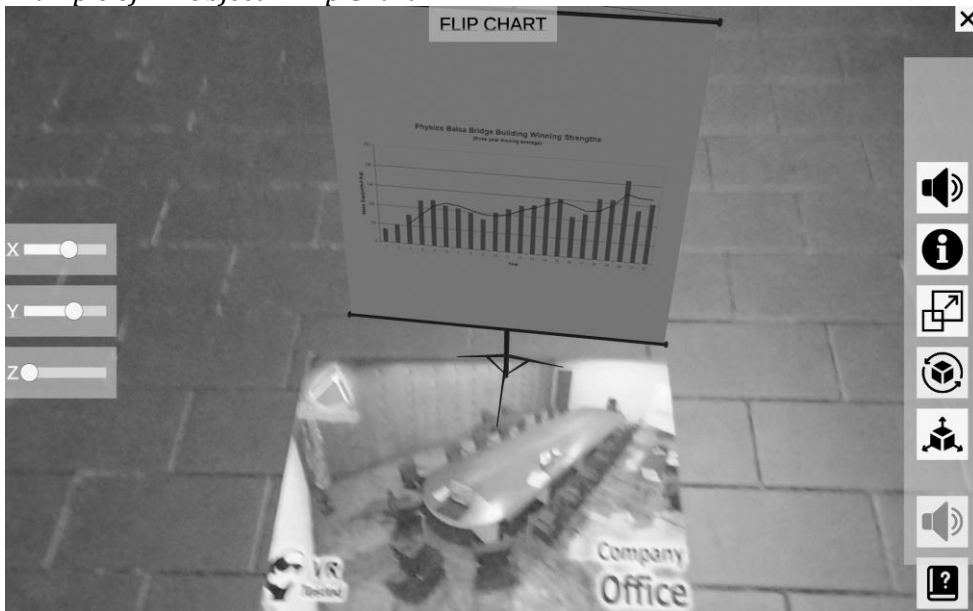
Opening 3D Environment—Business Meeting Room³



Figure 2.
Marker for the Business English Module



Figure 3.
Example of AR Object—Flip Chart



Each conversation triggers a set of distinct AR items referenced with it, so that users can experience both activities, conversation simulation and vocabulary acquisition, at the same time. Within the environment, the designated AR items are marked by a red diamond, which, once tapped on, activates the AR content, i.e., objects that can be manipulated and interacted with. A technical description of the item is also available, both in textual and audio format, thus providing multimodal access to learning contents. As mentioned previously, AR objects have been included in the app design with the purpose of enhancing learners' understanding and retention of highly specialized vocabulary that may be difficult to memorize when presented out-of-context in a purely textual format. In this respect, additional utilities are also provided to support the learning process: items can be magnified or scaled down, as well as manipulated and rotated along the three axes (see Figure 3 above).

However, despite the diverse benefits gesturing and embodiment offer for learners' lexical retention, identifying suitable lexis to transpose into AR interactive objects was not without its challenges. Some design constraints needed to be taken into account: first, the selected words had to refer to concrete entities, since they needed to fit within the 3D immersive scenario displayed at launch; second, these words had to appear in the conversations, in order to further support the learning process. In both cases, it became necessary to adapt the dialogues at the expense of authenticity. However, the most significant difficulties we encounter in the process of incorporating AR objects was identifying concrete items belonging to a business register to transpose into AR objects. Typically, the business register is indeed characterized by abstract notions denoting, among others, economic transactions and performances, business deals, negotiations, stock market trends and so on, concepts that cannot be easily transposed as concrete objects, without losing the word-image correspondence that, according to the dual-coding framework of psychology, facilitate memorization (Paivio, 1971). As a consequence, we opted for lexical items referring to office objects, stationery products, documents or visual elements such as graphs, pie charts, i.e., elements that could be easily represented on paper-shaped items without compromising the one-to-one correspondence between word and referent.

3.3. Gamification elements

Pedagogical approaches that include the use of games in learning contexts are not new, as games have long been considered one of the most effective means for students to comprehend, assimilate, and retrieve concepts (Bruner, 1986; Raffone, 2025; Salmani Nodoushan, 2009; Vygotsky, 2016). As such, it did not take long for developers to recognize that the principles of gaming—particularly video-gaming—could be applied to MALL applications to enhance learner engagement, motivation and performance in language learning. This is

probably why applications such as *Duolingo*, as well as platforms that support the design and integration of quizzes into classroom contexts, such as *Kahoot!* have been so successful among language teachers and learners in recent years and are regularly used in educational contexts (Ajisoko, 2020; Flores, 2015; Wichadee & Pattanapichet, 2018).

The term “gamification” refers to the incorporation of game-like elements into applications that are not inherently designed for gaming purposes (Flores, 2015). As a rule, applications that make use of gaming elements to enhance the learning experience have to include one or more of the following features in their design: a point system, badges, leaderboards, a progress bar, a performance graph, quests, levels, avatars, social elements, and other reward systems (Flores, 2015). Most research focusing on gamification agrees that, when applied to educational contexts, those elements contribute to boosting students’ motivation, engagement and performance (Flores, 2015; Palomo-Duarte et al., 2016; Raffone, 2025; Wichadee & Pattanapichet, 2018).

On the basis of all these considerations, we deemed it essential to incorporate a gamification element into the design of our activities. Specifically, we designed ESP-XR with the subsequent organizing principle in mind represented by the icons shown in Figure 4.

Figure 4.
Icons Used to Trigger Content in the ESP-XR App



As shown in Figure 4, learners are first prompted to tap the icon on the far left, whose function is to load the content of the selected unit. Once the unit is selected and the contents uploaded, the initial 3D scenario—in our case a business meeting room—updates to include diamond-shaped markers. At this point, learners can engage in either one of the two designed activities. Ideally, they would begin by tapping the ‘information icon’, which allows them to listen to and/or read the unit learning objectives, and look through a list of the interactive objects: these objects have to be identified within the initial 3D environment, as part of the first designed activity (see section 3.1). Once identified and tapped, the status of the AR items in the list changes to green, indicating that the item has been correctly identified. Albeit very simple and basic in its conception, this green tick provides valuable feedback to students who are thus encouraged to continue with their identification task. Furthermore, since most objects are highly technical, subject-specific and

likely to be unfamiliar to learners, we decided to make the task slightly more accessible by visually highlighting the AR elements with diamond-shaped markers, thus ensuring that the activity remains manageable and does not undermine the overall learning process. Indeed, as Flores (2015, p. 48) points out “Players are likely to be motivated if Gamification enables the feeling of flow by adapting the level of difficulty to ones’ individual skills and competences.”

The second icon starts the conversation selected in stage 1. As mentioned in section 3.1, all conversations include a gamification element in the form of embedded quizzes with multiple-choice questions. The questions are related to the immediately preceding exchanges occurring between the two avatars, who represent different business figures, such as a manager, an applicant, a CEO, a CFO and so on. At the end of each conversation, learners are given their score and feedback about right vs. wrong answers, thus fulfilling one of the core pillars of gaming—“a feedback system which provides information about progress towards the goal” (Flores, 2015, p. 48)—which is also what prompts motivation. At the moment, the gamification element connected to the quizzes is fairly simple, merely providing a score and immediate feedback system. In the future, we may want to further develop this element by integrating a badging system or even leaderboards.

The third and fourth icons respectively provide a description of the initial 3D environment, both in textual and audio formats to support multimodal learning, and a reset button that allows to go back to the default settings. Finally, the last icon opens a static view of the initial environment.

As a caveat, we would like to point out that the application is still in its developing stage, which explains its simple design and concept: this is also the reason why we decided to start with straightforward gamification settings that, as mentioned above, will be further expanded with the release of future versions.

4. Conclusion

This study has presented the design, development and initial implementation of ESP-XR, an innovative AR-based application aimed at supporting the acquisition of domain-specific language in the fields of business, law and medicine. More specifically, our project has demonstrated the didactic potential of integrating mobile technologies and Augmented Reality to support immersive, multi-modal learning within specialized professional contexts. In this respect, we have shown the importance of defining appropriate learning objectives and designing relevant syllabi, before the actual app development begins. Specifically, we have demonstrated that a situational syllabus combined with a task-based learning approach represents the best possible

solution to fit our set of learning objectives, i.e., promoting the acquisition of authentic, domain-specific language input while also fostering motivation and engagement through interactive and multimodal experiences.

The linguistic development of the Business English module in particular has shown that corpus-informed materials can be effectively used to enhance engagement, motivation and performance in language learning, even though in some cases authenticity had to be traded off to fit the constraints of an immersive application aimed at domain-specific language acquisition. Moreover, the inclusion of AR objects has provided an element of interactivity that has been proven essential in language learning as it allows learners to subconsciously acquire knowledge through gesturing and embodiment.

However, in spite of all these advantages, the development of ESP-XR has been fraught with several challenges, the most important of which is the problematic identification of suitable AR objects for the business and the legal modules, given the abstract nature of much of their register. Similarly, while the current gamification features provide immediate feedback, thereby enhancing motivation, future releases should consider expanding the reward systems and incorporating adaptive difficulty levels.

Overall, ESP-XR highlights the benefits of blending MALL and AR technology to support ESP instruction and contribute to the ongoing development of XR-based language learning solutions, helping to advance new and effective approaches to digital instruction. Further research will be focused on refining and updating materials on the basis of currently ongoing user experience testing.

Notes

1. See the *Cambridge English for Professionals* catalogue, for example, which offers English courses for various professions from B1 to C2 levels.
2. <https://esp-xr.eu>
3. The assets shown in Figures 1-3 come from the *Company Office* package developed by *3D Everything*, downloaded from the Unity Asset Store (<https://assetstore.unity.com/packages/3d/props/interior/company-office-35086>) and adapted for use in our application.

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References

- Achmad, D., Muslem, A., Yusuf, Y. Q., & Fitriani, S. S. (2026). Enhancing elementary EFL students' writing skills through interactive technology and task-based learning: A study with AhaSlides integration. *International Journal of Language Studies*, 20(1), 47-72.
- Ajisoko, P. (2020). The use of *Duolingo* apps to improve English vocabulary learning. *International Journal of Emerging Technologies in Learning (IJET)*, 15(07), 149. <https://doi.org/10.3991/ijet.v15i07.13229>
- Akçayır, M., & Akçayır, G. (2016). Advantages and challenges associated with augmented reality for education: A systematic review of the literature. *Educational Research Review*, 20, 1-11. <https://doi.org/10.1016/j.edurev.2016.11.002>
- Anesa, P. (2025). Extended reality in language learning and interpreting: From solutionism to a social constructivist bricolage. *International Journal of Language Studies*, 19(1), 1-26.
- Anthony, L. (2018). *Introducing English for specific purposes*. Routledge/Taylor & Francis Group.
- Billinghurst, M., Kato, H., & Poupyrev, I. (2001). Collaboration with tangible augmented reality interfaces. In *HCI International* (Vol. 1, pp. 5-10).
- Bruner, J. S. (Ed.). (1986). *Actual minds, possible worlds*. Harvard University Press.
- Bursali, H., & Yilmaz, R. M. (2019). Effect of augmented reality applications on secondary school students' reading comprehension and learning permanency. *Computers in Human Behavior*, 95, 126-135. <https://doi.org/10.1016/j.chb.2019.01.035>
- Buzarna-Tihenea (Gălbează), A., & Nădrag, L. (2018). The Advantages of Authentic Materials in the ESP/ EFL Classroom: Newspapers. "Ovidius" *University Annals. Economic Sciences Series (Online)*, XVIII(1), 145-151.

- Carter, R., Hughes, R., & McCarthy, M. (2011). Telling tales: Grammar, the spoken language and materials development. In B. Tomlinson (Ed.), *Materials development in language teaching* (pp. 78-100). Cambridge University Press. <https://doi.org/10.1017/9781139042789.005>
- Clarke, D. F. (1989). Communicative theory and its influence on materials production. *Language Teaching*, 22(2), 73-86. <https://doi.org/10.1017/S0261444800014592>
- Cook, J. (2010). Mobile phones as mediating tools within augmented contexts for development. *International Journal of Mobile and Blended Learning*, 2(3), 1-12. <https://doi.org/10.4018/jmbl.2010070101>
- Doughty, C. J., & Long, M. H. (2003). Optimal psycholinguistic environments for distance foreign language learning. *Language Learning & Technology*, 7(3), 50-80. <https://doi.org/10.64152/10125/25214>
- Dunleavy, M., Dede, C., & Mitchell, R. (2009). Affordances and limitations of immersive participatory augmented reality simulations for teaching and learning. *Journal of Science Education and Technology*, 18(1), 7-22. <https://doi.org/10.1007/s10956-008-9119-1>
- Flores, J. F. F. (2015). Using gamification to enhance second language learning. *Digital Education Review*, 27, 32-54.
- Freeman, D., & Holden, S. (1986). Authentic listening materials. In S. Holden (Ed.), *Techniques of teaching* (pp. 67-69). Modern English Publications.
- Garcia-Ponce, E. E., & Tagg, C. (2026). Role of in-service teacher education in implementing TBLT in an EFL context: A case study in a Mexican university. *International Journal of Language Studies*, 20(1), 25-46.
- Gavioli, L. (2005). *Exploring corpora for ESP learning*. John Benjamins Publishing Company.
- Gilmore, A. (2007). Authentic materials and authenticity in foreign language learning. *Language Teaching*, 40(2), 97-118. <https://doi.org/10.1017/S0261444807004144>
- Giofré, V. (2025). Evaluating VR-enhanced language learning apps: Pedagogical approaches and practical implications for ELT. In P. Anesa (Ed.), *Extended reality, AI, and discursive formations* (Vol. 12, pp. 36-61). CELSB. https://doi.org/10.13122/978-88-97253-11-2_p36

- Guariento, W. (2001). Text and task authenticity in the EFL classroom. *ELT Journal*, 55(4), 347-353. <https://doi.org/10.1093/elt/55.4.347>
- Hammond, J., & Gibbons, P. (2005). Putting scaffolding to work: The contribution of scaffolding in articulating ESL education. *Prospect*, 20(1), 6-30.
- Herrington, J., Reeves, T. C., & Oliver, R. (2014). Authentic learning environments. In J. M. Spector, M. D. Merrill, J. Elen, & M. J. Bishop (Eds.), *Handbook of Research on Educational Communications and Technology* (pp. 401-412). Springer New York. https://doi.org/10.1007/978-1-4614-3185-5_32
- Jones, R. H. (2024). *Discourse analysis: A resource book for students* (3rd ed.). Routledge. <https://doi.org/10.4324/9781003377405>
- Karimi, S. (2016). Do learners' characteristics matter? An exploration of mobile-learning adoption in self-directed learning. *Computers in Human Behavior*, 63, 769-776. <https://doi.org/10.1016/j.chb.2016.06.014>
- Macedonia, M. (2014). Bringing back the body into the mind: Gestures enhance word learning in foreign language. *Frontiers in Psychology*, 5. <https://doi.org/10.3389/fpsyg.2014.0146>.
- Maley, A. (2011). Squaring the circle—reconciling materials as constraint with materials as empowerment. In B. Tomlinson (Ed.), *Materials development in language teaching* (2nd ed., pp. 379-402). Cambridge University Press. <https://doi.org/10.1017/9781139042789.020>
- Metruk, R. (2024). Mobile-assisted language learning and pronunciation instruction: A systematic literature review. *Education and Information Technologies*, 29(13), 16255-16282. <https://doi.org/10.1007/s10639-024-12453-0>
- Nickerson, C., & Planken, B. (2016). *Introducing business English*. Routledge.
- Nuttall, C. (1996). *Teaching reading skills in a foreign language* (13th imprint). Heinemann.
- Paivio, A. (1971). *Imagery and verbal processes*. Rinehart & Winston.

- Palomo-Duarte, M., Berns, A., Cejas, A., Dodero, J. M., Caballero, J. A., & Ruiz-Rube, I. (2016). Assessing foreign language learning through mobile game-based learning environments. *International Journal of Human Capital and Information Technology Professionals*, 7(2), 53-67. <https://doi.org/10.4018/IJHCITP.2016040104>
- Paltridge, B. (2012). Genre and English for specific purposes. In B. Paltridge & S. Starfield (Eds.), *The handbook of English for specific purposes* (1st ed., pp. 347-366). Wiley. <https://doi.org/10.1002/9781118339855.ch18>
- Perinčić Tičić, N., & Oštarić, M. (2024). Challenges in designing a business English course: Using content area topics to customize course materials. *Elektronički Zbornik Radova Veleučilišta u Šibeniku*, 18(3-4), 99-111. <https://doi.org/10.51650/ezrvs.18.3-4.4>
- Pingmuang, P., & Koraneekij, P. (2022). Mobile-assisted language learning using task-based approach and gamification for enhancing writing skills in EFL students. *Electronic Journal of E-Learning*, 20(5), 623-638. <https://doi.org/10.34190/ejel.20.5.2339>
- Prabhu, N. (1987). *Second language pedagogy*. Oxford University Press.
- Prodromou, L. (1996). Correspondence section. *ELT Journal*, 50(4), 371-373.
- Raffone, A. (2025). Gamifying English language learning through interactive storytelling and MALL technologies. *Language Teaching Research*, 29(5), 2204-2224. <https://doi.org/10.1177/13621688221110206>
- Reich, P. (2021). Positive evaluation in the language of human resources: Textbooks versus reality. *Language Learning in Higher Education*, 11(1), 133-152. <https://doi.org/10.1515/cercles-2021-2005>
- Reyes, S. A. (2008). *Constructivist strategies for teaching English language learners* (1st ed). Corwin Press.
- Richards, J. C. (2006). *Communicative language teaching today*. Cambridge University Press.
- Ruiz-Garrido, M. F., & Palmer-Silveira, J. C. (2015). Authentic materials in the business English classroom: Annual reports. *Kalbotyra*, 67(67), 86. <https://doi.org/10.15388/Klbt.2015.8944>

- Salmani Nodoushan, M. A. (2008). A framework for task-oriented language instruction. *Journal on School Educational Technology*, 3(3), 5-16.
- Salmani Nodoushan, M. A. (2009f). The Shaffer-Gee perspective: Can epistemic games serve education? *Teaching and Teacher Education*, 25(6), 897-901. <https://doi.org/10.1016/j.tate.2009.01.013>
- Salmani Nodoushan, M. A. (2020). English for specific purposes: Traditions, trends, directions. *Studies in English Language and Education*, 7(1), 247-268. <https://doi.org/10.24815/siele.v7i1.16342>
- Salmani Nodoushan, M. A. (2021). Test affordances or test function? Did we get Messick's message right? *International Journal of Language Studies*, 15(3), 127-140.
- Shih, R.-C. (2017). The effect of English for specific purposes (ESP) learning-language lab versus mobile-assisted learning. *International Journal of Distance Education Technologies*, 15(3), 15-30. <https://doi.org/10.4018/IJDET.2017070102>
- Swales, J. (1990). *Genre analysis: English in academic and research settings* (12th imprint). Cambridge University Press.
- Vygotsky, L. S. (1978). *Mind in society: Development of higher psychological processes* (edited by M. Cole, V. Jolm-Steiner, S. Scribner, & E. Souberman). Harvard University Press. <https://doi.org/10.2307/j.ctvjf9vz4>
- Vygotsky, L. S. (2016). Play and its role in the mental development of the child. *International Research in Early Childhood Education*, 7, 3-25.
- Wichadee, S., & Pattanapichet, F. (2018). Enhancement of performance and motivation through application of digital games in an English language class. *Teaching English with Technology*, 18, 77-92.
- Widdowson, H. G. (1990). *Aspects of language teaching*. Oxford University Press.
- Widdowson, H. G. (1996). Comment: Authenticity and autonomy in ELT. *ELT Journal*, 50(1), 67-68.
- Widdowson, H. G. (1998a). Communication and community: The pragmatics of ESP. *English for Specific Purposes*, 17(1), 3-14.

- Widdowson, H. G. (1998b). Context, community, and authentic language. *TESOL Quarterly*, 32(4), 705-716.
- Widdowson, H. G. (2003). *Defining issues in English language teaching*. Oxford University Press.
- Williams, E. (1983). Communicative reading. In K. Johnson & D. Porter (Eds.), *Perspectives in communicative language teaching* (pp. 171-188). Academic Press.
- Willis, J. (1996). *A framework for task-based learning*. Addison Wesley.
- Wu, J.-F., Dong, J., Wu, Y., & Chang, Y. P. (2024). Shopping through mobile augmented reality: The impacts of AR embedding and embodiment attributes on consumer-based brand equity. *Information & Management*, 61(6), 103999. <https://doi.org/10.1016/j.im.2024.103999>.
- Xue, S. (2022). A conceptual model for integrating affordances of mobile technologies into task-based language teaching. *Interactive Learning Environments*, 30(6), 1131-1144. <https://doi.org/10.1080/10494820.2019.1711132>
- Yamada, M., Kitamura, S., Shimada, N., Utashiro, T., Shigeta, K., Yamaguchi, E., Harrison, R., & Yamauchi, Y. (2012). Development and evaluation of English listening study materials for business people who use mobile devices. *CALICO Journal*, 29(1), 44-66. <https://doi.org/10.11139/cj.29.1.44-66>
- Yundayani, A., Kardijan, D., & Herawan, T. (2019). Integrating ICT in English for academic purposes materials through task-based approach. *International Journal of Emerging Technologies in Learning (IJET)*, 14(17), 29. <https://doi.org/10.3991/ijet.v14i17.10753etc>.

Appendix A: Syllabus for the ESP-XR Business Module

Unit 1_Organizations, Roles & Responsibilities

Lead-in: Ask pre-work students to brainstorm ideas on different ways you can get a job (i.e., sending CVs to companies, looking at job advertisements, being headhunted, doing an internship etc.).

Vocabulary: Departments in a company, roles and responsibilities.

ESP-XR:

1. Conversation 1.1—Job interview
2. Conversation 1.2—Showing someone (a new employee) around a department

Revision activities: role-play.

Unit 2—Finance

Lead-in: Elicit discussion on students' attitudes to money, saving and investment.

Vocabulary: Financial terms + trends.

ESP-XR:

1. Conversation 2.1—Discussing an annual report summary for shareholders
2. Conversation 2.2—Financial crisis management

Revision activities: role-play

Unit 3 - Presenting facts and figures

Lead-in: Elicit discussion on presentations students have given at work or during their studies.

Vocabulary: Trends & charts.

ESP-XR:

1. Conversation 3.1—Describing and analyzing graphs & trends
2. Conversation 3.2—Making a successful pitch to an investor to get a loan or investment

Revision activities: role-play

Unit 4 - Trade Fairs

Lead-in: In pairs or small groups, ask students to discuss the following questions:

- Have you ever attended or participated in a trade fair? If yes, what was it like?
- What do you think are the key elements that make a company's trade fair stand successful?
- Why do companies choose to exhibit at trade fairs?

Vocabulary: words related to trade fairs and logistics.

ESP-XR:

1. Conversation 4.1—Planning to exhibit at a trade fair
2. Conversation 4.2—App demonstration at a trade fair

Revision activities: role-play

Unit 5_Negotiating

Lead-in: Brainstorm ideas on different attitudes and approaches to negotiation.

Vocabulary: Useful phrases for reaching agreement in a negotiation.

ESP-XR:

1. Conversation 5.1—Negotiating an agreement at work/ a new deal
2. Conversation 5.2—Dealing with difficulties in negotiations (problem-solving meetings - 4 green)

Revision activities: role-play

Unit 6_Mergers & acquisitions

Lead-in: Brainstorm ideas on the pros/cons of acquisitions for companies and their staff, shareholders, suppliers, customers.

Vocabulary: Words describing mergers and acquisitions.

ESP-XR:

1. Conversation 6.1—Planning a joint venture
2. Conversation 6.2—Discussing advantages and disadvantages of acquiring a new company

Revision activities: role-play

Unit 7_International marketing

Lead-in: Elicit discussion on brands students know, their image, target segment, slogan & advertising campaign.

Vocabulary: Marketing words.

ESP-XR:

1. Conversation 7.1—Research and discuss an advertising campaign
2. Conversation 7.2—Discussing a brand-awareness campaign

Revision activities: role-play

Additional Unit—Bitcoin in the Financial Sector

Lead-in:

Elicit a discussion on digital currencies and how technological innovation is reshaping the financial industry. Prompt learners to consider the role of Bitcoin in business transactions, investment, and regulation.

Vocabulary:

Key concepts and terminology related to Bitcoin:

ESP-XR:

1. **Conversation 9.1—Introducing Bitcoin to Clients**
2. **Conversation 9.2—Discussing Risks and Regulations**

Revision Activities: Role-play: