MOBILE BETTING – LEARNING BUSINESS ENGLISH TERMINOLOGY USING MALL

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Abstract

In the last decades, the focus of ESP teaching has been shifting from the grammatical analysis of technical texts to discourse analysis, and, more recently, to learner-centred approaches. This change is quite challenging and demanding for ESP teachers, in particular regarding the choice of effective teaching and learning methodologies and, consequently, the design of meaningful activities. Furthermore, it is also relevant to rethink educational processes to meet the students' needs, in particular given the unceasing digital transformation and its societal impact. In this scenario, the ubiquity of mobile-assisted language learning (MALL) was integrated in the design of a teaching and learning strategy, by using an Electronic Classroom Response System (CRS) within a game-based activity to learn Business English Terminology (BET). The activity was first tested in academic year 2014/15, with students enrolled in a Management undergraduate degree at ESTGA – University of Aveiro. Given the results of a preliminary study, the authors decided to undertake an empirical diachronic research (3 academic years), aiming at verifying if the game-based MALL strategy using a CRS promoted the students' learning success in what concerns i) the identification and use of business English (BE) acronyms and other abbreviations, and ii) the accurate integration of BET in written text. The teaching materials were validated by two former Management students and two specialists (one in ESP and another in English Didactics). A total of 67 students participated in this study and the results of the statistical data analysis – using Pearson's correlation coefficient and the Friedman test – confirm that the strategy supports the study of BE acronyms and other abbreviations, but their accurate integration in written text needs further study.

Keywords: business English terminology; English for Specific Purposes; mobile-assisted language learning; CRS; game-based MALL

1. Introduction

Nowadays, digital technologies are widely used for language learning in formal, non-formal and informal contexts. This promotes the intertwined development of language and digital competences, both identified by the European Commission as key in the promotion of lifelong learning, since their combination may boost (physical and virtual) mobility in a globalised

economy (Directorate-General for Education, Youth, Sport and Culture, 2018). Furthermore, these competences tend to promote employability because businesses increasingly require specialised professionals to be able to communicate and interact within international networks (Makowska, 2017).

The results of several studies (e.g. Kukulska-Hulme & Viberg, 2018; Wishart, 2018) indicate that the use of digital technology for learning may be advantageous "in terms of [learner] engagement, convenience, attainment and enjoyment" (Morris et al., 2016, p. 430) and most times requires minimal user support and training. This also applies to language learning with several authors pointing out favourable pedagogical implications for their use (Barcomb et al., 2017; Chang, 2018; Isbell et al., 2017; Kassem, 2018). As Sharifi et al. (2018) underline, "learners using computer-assisted tools in their English language courses generally demonstrated better learning performance than their peers who received only traditional face-to-face instruction" (p. 432).

Águeda School of Technology and Management – University of Aveiro (ESTGA) is a Portuguese Polytechnic Higher Education Institution whose mission is to prepare highly qualified professionals in technological, administrative and management areas. In order to ensure they have a solid foreign language proficiency that can support their future performance in highly-skilled, multilingual professional contexts, ESTGA's undergraduate degrees include courses of English for Specific Purposes (ESP). However, even though students are generally able to communicate in English, a considerable amount still struggles to use Business English Terminology (BET) accurately.

Based on these premises and scenario, in a previous study, a game-based activity using Electronic Classroom Response System (CRS) was designed and implemented, aiming at strengthening the students' in-depth learning of BET. Data concerning its operationalisation were collected and the results of an exploratory study unveiled that students perceive the use of mobile-assisted language learning (MALL) to learn English for Specific Purposes (ESP) as positive for the development of their language competence (Balula et al., 2015). Thus, the main objective of this paper is to verify if the data collected regarding the same strategy, over a timespan of three different academic years, confirm the results of the preliminary study.

2. Trends in ESP teaching

ESP emerged in the 1960s due to the development of world economy, technological development, and internationalization processes at various levels (Hutchinson & Waters, 1987). Richards and Schmidt (2010) define ESP as "a language course or program of instruction in

which the content and aims of the course are fixed by the specific needs of a particular group of learners" (p. 198). Consequently, in ESP teaching it is common to resort to methodologies and materials that are specific to the subject on which it focuses (Dudley-Evans & St John, 1998; Ramírez, 2015).

Historically, in the 1960s, approaches to ESP teaching were mainly grounded in the grammatical analysis of technical texts while in the 1970s – in discourse analysis. It was only in the 1980s that approaches started to be more learner-centred (Ramírez, 2015). The categorisation proposed by Hutchinson and Waters (1987) for the different approaches to teaching English (see Figure 1) has been often revisited, but still remains a reference today.

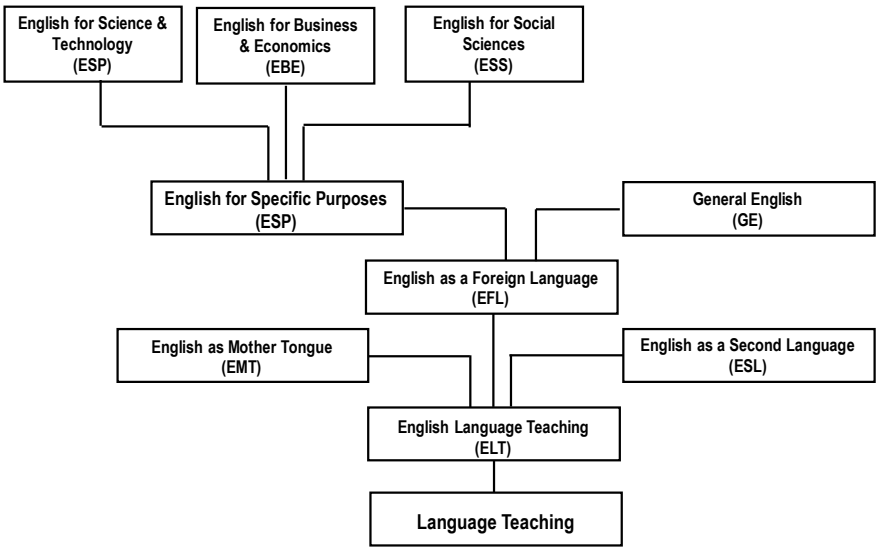

Figure 1. English Language Teaching Tree (Hutchinson & Waters, 1987, p. 17, adapted)

In addition to the categories presented in Figure 1, the authors also consider that each ESP branch should have two sub-categories added, namely English for Academic Purposes (EAP) and English for Occupational Purposes (EOP), with different specificities according to the area. Dudley-Evans and St John (1998) added a layer with the definition of the concept in terms of absolute and variable characteristics, as presented in Table 1.

Table 1. ESP characteristics (Dudley-Evans & St John, 1998)

ESP characteristics	
absolute	**variable**
• meets the specific needs of the learners; • makes use of the methodology and underlying	• the discipline is designed according to other specific disciplines;

activities of the discipline it serves; • focuses on the specific language needed to carry out these activities in terms of: grammar, lexicon, record, speech and genre.	• in teaching situations, you may use a different methodology from General English; • it may have several target audiences (adults, working professionals, secondary or tertiary learners, etc.), but with intermediate or advanced level in terms of language proficiency.

Similarly, in the last decades, several authors have developed the theoretical assumptions established by Hutchinson and Waters (1987), as well as their practical implications in various processes and contexts – e.g. Dudley-Evans and St. John (1998); Orr (2002); Belcher (2004); Richards and Schmidt (2010), Ramírez (2015); Haryati et al. (2019); Munir (2019); Lebedev et al. (2020). From a theoretical point of view, Belcher (2004) states that ESP teaching can fit into, or even intersect, three approaches:

- sociodiscoursal – in which the focus of pedagogical options is the textual gender theory (genre theory and genre-informed pedagogy), valuing the relationship between language, function and context;
- sociocultural – in which situated learning theories are emphasised, i.e. social interaction and collaboration, according to the culture and context of the proposed activities;
- sociopolitical – which fits into critical pedagogy, i.e. focuses on the development of critical awareness and thinking, taking into account social, economic, political, human and moral implications.

In either case, the pedagogical options associated with ESP teaching are quite challenging for the teacher. Thereof, it is important to stress that the role of teachers is highly demanding as it implies coordination with various interlocutors (Belcher, 2004; Haryati et al., 2019; Lebedev et al., 2020), in particular to:

1. undertake a needs analysis
2. organize the course

2.1. define pedagogical objectives and teaching/learning methodologies

2.2. design diversified activities

2.3. research/adapt/create materials that meet the needs of the area

2.4. define the process for evaluating the students' learning

Concerning the needs analysis, Haryati et al. (2019) stress that it is key to identify and assess the language forms that learners are expected to use whenever they are asked to understand and produce oral and written statements using ESP. It is from the results of this

process that the teacher can organise the whole curriculum unit, seeking to meet the present and future needs of learners.

As regards course organization, the results of the needs analysis should underpin the definition of the learning outcomes, teaching/learning methodologies, as well as activities and materials. Thus, ideally, their design/creation/selection should integrate/reuse elements of the teaching approaches of the discipline it serves. In this respect, studies also recall that ESP teachers should always assume themselves as specialists in the area of languages and linguistics, rather than the scientific area(s) in which they work (Lebedev et al., 2020). This implies that teachers have to be flexible to deal with different scientific areas, which are often unfamiliar to them at various levels (lexicon, record, speech, textual, genre, etc.). They also have to have good interaction and communication skills, for example: be able to ask for clarification from colleagues of other areas, to make a rapid response to change and to manage their interaction with new information, learners, colleagues, etc. (Haryati et al., 2019).

Concerning course resources, such authors as Munir (2015) recall that these should: i) allow for language to be worked on from a functional and contextualised perspective, ii) use realistic and authentic language, iii) promote the students' intentional use of language, orally and in writing, and iv) include different formats (text, image, video, audio, etc.), seeking to meet different learning profiles. Moreover, assessment of students should include both the learning process and the learning products through meaningful, diversified, context-based activities, i.e. take into consideration both their continuous improvement and their learning products (e.g. results in tests, oral presentations, etc.).

Rus (2019) underlines that there are advantages in using what he calls "authentic assessment and alternative assessment" (p. 371), as it enables learners' language competence to be assessed through activities very close to real scenarios. Some practical examples can encompass: portfolios, job interview simulations, oral presentations, technical reports, videos and interdisciplinary projects (Rus, 2019). Digital technology may also be an important means to create innovative teaching/learning/assessment resources to promote the interest of learners in the learning object(s), by opening up possibilities of contact with the real world. The integration of digital technology can thus enable the development of skills and the construction of new knowledge (individual and collective) in a more authentic, meaningful and sustainable way.

Moorhouse and Kohnke (2020) recognise that the "affordances and pedagogical benefits of technology in the English for Specific Purposes (ESP) and English for Academic Purposes (EAP) classrooms are widely acknowledged" (p. 1). Furthermore, Rus (2019) explains that the

use of digital technology may be paramount, since the use of multi-channel and multi-format resources can promote the students' motivation for learning. This assumption contributes to the proliferation of Computer-Assisted Language Learning (CALL), since it offers a multidisciplinary approach, crosscutting technology and pedagogy. In fact, the use of digital technology can enhance the needed proximity between ESP and other scientific areas in terms of teaching and learning strategies. These dynamics may have great impact on students' perception, especially as for the role of ESP within their future professional contexts, by contributing to raise their professional awareness and empowering them to be self-confident and to gain control over their performance in future real-life scenarios.

In the last decade, there has been a shift to Mobile-Assisted Language Learning (MALL), since it facilitates learning wherever and whenever one desires (Chang, 2018; Akayoğlu, 2019; Şad & Göktaş, 2014). The tendency is for most Higher Education students to own mobile devices and use them to access information and to communicate. Thus, the potential of mobile technology and Bring Your Own Device (BYOD) learning initiatives can contribute to reach an equilibrium between intrinsic and extrinsic motivation, i.e. between must-do and want-to-do (Bird, 2015). In what concerns classroom interaction, teachers often either direct questions to specific students or expect them to volunteer to answer them. In practice, this tends to imply that self-reliant, proficient students respond more spontaneously and promptly, whereas students that are less self-confident and skilled are 'put on the spot' (Moorhouse & Kohnke, 2020). In this respect, Akayoğlu (2019) states that "many studies in the field of CALL and MALL have reported on the effective nature of digital language learning environments for learner-centred language learning" (p. 22), by setting grounds to promote students' autonomy, active involvement, confidence and responsibility for their own (and, sometimes, collective) learning achievements, etc.

2.1. Game-based MALL

Nowadays, mobile solutions for language learning are being continuously developed and updated and their growing availability and user-friendliness has been translating into an increasing integration of MALL in educational contexts. Moreover, the results of several research studies underline educational advantages in its use, namely as to student's engagement, motivation and learning (Medina & Hurtado, 2017; Licorish et al., 2018; Blume, 2020; Chiang, 2020). Thus, the use of MALL can play an important part in the curiosity, focus and interest-generated engagement; the drive to engage and interact with learning (motivation)

and "the knowledge and skills that students attain that are directly attributed to their involvement and participation in the course" (learning) (Licorish et al., 2018, p. 7).

In some educational scenarios, MALL is also employed to explore "pedagogical approaches in which games are used to achieve educational outcomes through incidental learning" (Licorish et al., 2018, p. 2), i.e. game-based learning. In fact, the results of several research studies indicate that the key elements underpinning game-based teaching and learning strategies (e.g. playfulness and just-in-time feedback) tend to maximise the students' focus and sense of control (Plump & LaRosa, 2017; Licorish et al., 2018). Wichadee and Pattanapichet (2018) even emphasise that "the application of digital games can transform any contents that are boring or difficult like aspects of grammar or vocabulary to be interesting and easier to understand" (p. 89). Nonetheless, the effectiveness of game-based learning seems to depend on the students' perceptions of its attractiveness, accessibility, usefulness and quality (Medina & Hurtado, 2017; Plump & LaRosa, 2017; Licorish et al., 2018).

MALL implies the use of predetermined online teaching/learning materials and/or authoring programs, which frequently offer a do-it-yourself approach. Nowadays, teachers who have no knowledge of computer programming can already use them to generate pre-set activities for learners and most of them run on mobile devices. CRSs belong to this type of software and usually enable teachers to use a single platform to put forth learning materials, launch questions and discussions, poll students, provide student feedback, track attendance and automate grading. Some examples of CRSs are: *The Answer Pad* (https://app.theanswerpad.com/homepage.html), *Socrative* (https://socrative.com/), *Top Hat* (https://tophat.com/), *Quizizz* (https://quizizz.com/) and *Kahoot*! (https://kahoot.com/).

In a literature review undertaken by Fies and Marshall (2006), several authors report the benefits and shortcomings of CRSs "in terms of instructor and learner attitudes, instructor sensitivity to learner understanding, and learning outcomes" (p. 103). Wichadee and Pattanapichet (2018) as well as Plump and LaRosa (2017) underline that CRSs do not require extensive training and tend to be user-friendly. Kay and LeSage (2009) also emphasise that their use may enable the design of creative, interactive activities to boost student motivation through BYOD teaching and learning initiatives. The possibility of having anonymous or private participation may also be an advantage, once teachers can follow the students' progress without exposing them and they "are free to provide input without the fear of possible public humiliation, and without having to worry about more vocal students dominating the discussion" (Fies & Marshall, 2006, p. 106). Notwithstanding, other studies (e.g. Marklund & Alklind,

2016; Wichadee & Pattanapichet, 2018) state that a clear definition of the participants' role and tasks is paramount for the success of every teaching and learning strategy.

Finally, it is important to underline that CRSs by themselves are no more than tools and innovative teaching and learning processes result from overall pedagogical approaches (Nicol & Boyle, 2003; Fies & Marshall, 2006). Thus, the next section starts with a brief description of the teaching and learning strategy used – especially in what concerns the activities defined for the students – in which group-based approaches are combined with individual CRS use.

2.2. ESP teaching/learning: strategy design

The scope of activities that can be included in an ESP teaching and learning strategy is wide; nonetheless, the selected activities should articulate to achieve the defined learning outcomes, in this case, the development of in-depth understanding and (consequent) proficient use of BET. The strategy presented to the students is divided into three different types of activities, seen as complementary, namely:

- **activity 1** (in group) – the analysis of real, up-to-date, business-related news articles, resorting to online collaborative concept-mapping (using *CmapTools* – https://cmap.ihmc.us/);
- **activity 2** (individual and in group) – the discussion (orally and in writing) of BE online case studies (see http://businesscasestudies.co.uk/case-studies/by-topic/);
- **activity 3** (individual) – the identification and use of specific, technical terms and phrases in the scope of BE (using the CRS *Socrative* – https://socrative.com/).

As aforementioned, ESP teaching implies a close interaction with other scientific areas. Moreover, particularly in Higher Education, teaching and learning activities tend to be more effective when they encompass multifaceted, realistic challenges (Johnson et al., 2015). Hence, activity 1 results from the close articulation between the courses of Economics and ESP, in which the development of competences that crosscut both courses is articulated. As depicted by Melo and Balula (2015), in activity 1 students were organised in groups to develop different types of competences in the scope of both courses: cognitive competences (by using conceptual knowledge), functional competences (by putting into practice technical know-how) and personal competences (by developing their soft skills). In practical terms, the activity subdivides into three tasks, in which students are asked to:

1. select a recent news article from an English newspaper or magazine in the area of Economics;

2. write a report in Portuguese comprising a critical analysis of the news article, integrating the contents of Economics;
3. present and discuss the report orally in English (before both teachers) using an online collaborative concept-mapping tool (*CmapTools*) – which would include a) the selection of the news article; b) a brief summary of the news article; c) an analysis of the BET used; d) a critical analysis of the news article's content, focused on the theoretical framework studied in Economics.

In short, students were asked to develop tasks that implied the integration of high-level competences (in ESP and Economics) by operating on authentic, real-life cases, in which complexity is added through the need to articulate manifold theoretical concepts, information resources, as well as different languages. Furthermore, on the one hand, it was an effective way to prevent plagiarism, since the study object is 'fresh news' and the probability of having works that can be copied by students from the internet is very low (or even non-existent). On the other hand, it concurs to the development of students' critical thinking and analytic competences, focused on up-to-date events in their field of study.

In what concerns activity 2, several BE online case studies were selected in articulation with the Economics teacher to introduce and apply BET in context during classes. This was crucial to empower students to communicate accurately (conveying information, interacting/discussing) using ESP at various levels (lexicon, speech, textual genre, etc.).

This study focusses on activity 3, which operates upon a selection of BET, taken from business case studies and business documents (invoices, orders, quotations, etc.) in the areas of Economics, Marketing and Logistics. This clearly added value to the teaching and learning process, since it allowed students to contact directly with several online information sources in their field of study. It is important to underline that the BET addressed was selected based on the results of the needs analysis undertaken with colleagues from the different areas and was validated in terms of content and structure by two former Management students and two specialists – one in ESP and another in English Didactics.

3. Methodology

The teaching and learning activity presented above (activity 3) was first tested in academic year 2014/15 (2nd semester), with 1st year students enrolled in a Management undergraduate degree at ESTGA – University of Aveiro. Given the encouraging preliminary results of an initial exploratory study (see Balula et al., 2016), the authors decided to undertake an empirical diachronic research, for which a research timespan of three editions of the course was defined.

Hence, the main goal of this paper is to confirm the initial findings, i.e. to test the following hypotheses:

H1 The students' motivation to learn BET using a CRS, promotes their learning success in what concerns the identification and use of BE acronyms and other abbreviations.

H2 The students' motivation to learn BET using a CRS, has a significant impact on the students' accurate integration of BET when producing written texts.

3.1. Research design

The empirical study of this research was divided into three different phases – Familiarization, Use and Evaluation (Balula et al., 2015), as presented in Table 2.

Table 2. Phases of the empirical study

Phases	Description
1 – Familiarisation	a) Understanding how to use the CRS (app installation, etc.)
	b) Testing the CRS (test quiz)
	c) Understanding feedback tools
2 – Use	Quizzes (8 weeks – Q1 to Q8)
3 – Evaluation	Evaluation questionnaire

In *Phase 1 – Familiarisation*, the teacher provided instructions regarding the app's installation and use, as well as presented the tools' functionalities. This took place in a face-to-face session, and, in the end, the teacher demonstrated how their global performance would be analysed. *Phase 2 – Use* (see Table 2) encompassed answering 8 online quizzes, which aimed at the identification and use of BE acronyms and abbreviations, as well as the use of BE terms and phrases in context. The quizzes included 2 multiple-choice and 2 short-answer questions of increasing complexity (from Q1 to Q4), and were answered by the students following a game-based approach. The BET included in the quizzes answered throughout the semester was never repeated, i.e. the idea was not to adopt a 'drill and practice' strategy, but to motivate students to develop their own learning and consolidate their BET learning. It was also crucial to define, from the beginning, a fixed schedule to answer the quizzes, since it allowed students to answer them anywhere (in class or not). The CRS used was *Socrative*, in particular because its free version includes game-based elements (i.e. *Space race*) and it allows for downloading the students' answers.

Finally, in *Phase 3 – Evaluation* (see Table 2), participants answered a short questionnaire, which included questions focusing on usability, usefulness and motivation issues, as to their experience with game-based MALL to learn BET.

3.2. Participants

The participants of this study were first-year students enrolled in the ESP course of a Management undergraduate degree at ESTGA – University of Aveiro. From the total of 67 students that participated in this study, 42% (n=28) were male and 58% (n=39) were female. They were between 18 and 30 years old and 13% (n=9) were working-students. Participation was not mandatory and data collected were anonymised.

3.3. Data collection and analysis

Socrative allows for dynamic reporting on students' performance over time and regarding different topics. This functionality – *Socrative reports* (.xls files) – was used to export data for the three academic years included in this study. Afterwards, data were treated externally by means of descriptive statistical analysis and the Pearson coefficient was also analysed. The latter was the statistical method used to determine the degree of linear-correlation between the variables considered, i.e. how well the line regression (trend line) represented the data (using *Microsoft Excel*).

In the first analysis, the Pearson correlation coefficient was computed and the non-response statistical significance was assessed in order to measure the strength of the linear association between percentages of non-responses and the order of quizzes. In the second stage, to test the validity of H1 and H2, the Friedman test was used to compare the correct answer rates between consecutive years, to detect differences in correlated samples. Finally, the simple linear regression was used to measure the strength of linear association between the rates of (in)correct answers collected in the eighth-quiz sequence per academic year.

4. Findings and discussion

As aforementioned, the first analysis undertaken regarded the correlation between the non-response rate and the increasing complexity of questions for which the Pearson correlation coefficient was computed. Notice that the Pearson coefficient was adopted instead of the Spearman coefficient since normality was not rejected in all samples considering a 0.05 level of significance. Every Pearson correlation coefficient found for both the quiz response datasets

(i.e. the identification and use of BE acronyms and other abbreviations – from now on referred to in this paper as *Memory-dataset* – and the students' accurate integration of BET when producing written text – from now on referred to as *Meaning-dataset*) are not statistically significant ($p>0.05$). This shows that the non-response rates did not vary significantly in any of the analysed academic years (Y), and, thereof, the strategy does not seem to have a direct impact on the participants' non-responses. In other words, the non-response rate does not seem to be determined by the quizzes themselves, which may indicate that they tended to match the students' expectations in terms of structure, content and difficulty level. This is very important, since it underpins the liability of the results of the procedures undertaken to test the hypotheses defined. Moreover, the analysis of the data collected in Phase 3 (Evaluation) also shows that 100% of the participants also considered the *Socrative* platform user-friendly.

In order to assess hypotheses H1 and H2, after applying the Friedman test the first conclusion reached was that the correct answer rates in the 8 quizzes have different patterns across the three academic years, only as to the use and identification of BE acronyms and other abbreviations (memory $p=0.008<0.05$). The results of this test unveiled that, statistically, there are clear differences in the three matched samples concerning the *Memory-dataset*. In this case, a *post hoc* Wilcoxon signed-rank test was conducted, applying a Bonferroni correction, which revealed a significance level of $p<0.017$. There were no significant differences between Y1 and Y2 ($p=0.711$); however, there was a statistically significant increase in the correct answer rate from Y1 to Y3 ($p=0.008$) and from Y2 to Y3 ($p=0.016$).

An analysis of the evolution of the correct answer rates from Quiz 1 to Quiz 8 by academic year was undertaken using the simple linear regression model in order to identify and quantify the quiz-to-quiz evolution of the correct answers in each academic year. Table 3 presents the regression modelling results for the *Memory-dataset* scenario.

Table 3. Simple regression modelling results – Memory-dataset

Academic year (AY)	Slope (p-value)	Determination coefficient
1	0.051*** (0.009)	70.9%
2	0.056** (0.012)	67.8%
3	0.050** (0.012)	67.8%

*** statistically significant at a level of 0.01; ** statistically significant at a level of 0.05

As to the *Memory-dataset*, the regression model is statistically significant in the three academic years. In other words, in Y1 there was an increase of 5.1 percentage points in the rate of correct answers between consecutive quizzes ($r^2=70.9\%$); in Y2 the rise was about 5.6

percentage points between quizzes (r^2=67.8%); finally, in Y3 there was a growth of 5.0 percentage points (r^2=67.8%), as depicted in Table 3.

As regards H1 (*Memory-dataset*), the results of individual tests undertaken for each academic year point out that the participants improved their performance from Quiz 1 to Quiz 8, i.e. the correct answer rates increase was statistically significant. Thus, there seems to be evidence that the use of CRSs is efficient and effective to cement the students' learning as to the use and identification of BE acronyms and other abbreviations. Furthermore, in Phase 3 (Evaluation) a great majority of the participants considered the strategy useful, especially for learning BET – i.e. 96% (n=22) in Y1, 91% (n=21) in Y2 and 100% (n=21) in AY3 edition. Besides, most of the participants also considered the strategy galvanising, once they felt more motivated to review the topics studied throughout the semester – i.e. 65% (n=15) in Y1, 87% (n=20) in Y2 and 90% (n=19) in Y3.

Concerning H2 (*Meaning-dataset)*, the results of the Friedman test were not similar to those found for the *Memory-dataset*, since no statistical differences were detected (p=0.355>0.05). Nonetheless, an analysis of the evolution of the correct answer rates from Quiz 1 to Quiz 8, by academic year was also undertaken using the simple linear regression model. The regression modelling results for *Meaning-dataset* scenario are displayed in Table 4.

Table 4. Simple regression modelling results – Meaning-dataset

Academic year (AY)	Slope (p-value)	Determination coefficient
2014/15	-0.029 (0.286)	18.6%
2015/16	0.044** (0.031)	56.6%
2016/17	0.008 (0.741)	2.0%

** statistically significant at a level of 0.05

As presented in Table 4, as regards the *Meaning-dataset*, the results of the regression model are statistically significant only in AY2. In fact, in Y1 and Y3 the slope parameter is not statistically significant (p=0.286 and p=0.741, respectively) with very low determination coefficients (r^2=18.6% and r^2=2.0%, respectively). In Y2 the increase in the correct answer rate was estimated at 4.4 percentage points between quizzes (r^2=56.6%). Although there is a positive evolution throughout Y2 in a quiz-to-quiz analysis, the increase is lower than the values estimated for the *Memory-dataset*.

Regarding the results of the procedures used to test H2, they do not justify the claim that the students' motivation to study BET using a CRS has a significant impact on the students'

accurate integration of BET when producing a written text, since the correct answer rates' increase was not statistically significant (from Quiz 1 to Quiz 8).

Summing up, the results of this study confirm the preliminary results of the exploratory study developed for the 2014/15 academic year (Balula et al., 2016). In other words, they confirm that the students' motivation to learn BET with the use of a CRS promotes their learning success in what concerns the identification and use of BE acronyms and other abbreviations. However, the activity does not prove to be effective in students' accurate integration of BET when producing written texts. This is reinforced by the students' results in their final written test, since in the years before implementing the activity the classes' correct answer rate concerning BET identification and use was, on average, 34%, and since then it was between 66% and 79%.

7. Conclusion and implications for future

Digital transformation is impacting learning processes worldwide and mobile devices are bound to stay, not only for informal learning, but also for formal education. For the particular case of ESP teaching and learning, there are already manifold digital tools to support, for instance, multilingual translation; nonetheless, these are only instrumental and do not fully replace or address teaching/learning. There are also many studies that focus on different tools used to assist the teaching and learning process, however, few provide evidence as regards the impact of their use in the language learning process. Furthermore, when designing teaching/learning strategies, it is crucial to put forward authentic and attractive activities so as to successfully bridge in-class and out-of-class learning. To achieve that, it is essential to provide just-in-time, meaningful feedback to learners, to promote continuous learning, as these are of utmost importance in the development of foreign language competence.

The use of MALL to approach BET makes it possible to poll students, track attendance, provide formative and summative feedback as well as grade results, in real time and online. The strategy used also promoted the participation of working-students and other regular students that could not attend classes and showed that having real-time classroom analytics has a positive impact on the students' learning. Besides, the activity was not considered time-consuming – neither for the teacher nor the students – and it promoted the students' intrinsic motivation to study the subject matter. Additionally, because the activity was assumed as a game, it fostered positive competition among students. Students sometimes even called the teacher's attention to the fact that it was 'time to BET', clearly assuming it as a moment to take action promoting active learning.

Finally, the results of this study provided clear evidence that approaching BET using a game-based MALL approach can actually facilitate foreign language learning, especially when it comes to terminology. Nonetheless, the use of a CRS to promote students' language competence with the aim of the integration of BET in written text still requires further research. For this purpose, and also to address the students' listening and speaking skills, the integration of audio and video functionalities are to be considered in future studies.

In what concerns limitations of the present study, even though this was a diachronic study, it involved a reduced amount of participants, all from the same degree and Higher Education institution. Besides, one of the researchers was the students' teacher, which somehow may have influenced the students' performance. Thus, further research with a wider group of students (from different institutions and/or with different teachers) is needed to confirm whether the results of this work may be generalised.

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