



**Trabajo Fin de Máster en Tecnologías de la Información y Comunicación
en la Enseñanza y el Tratamiento de Lenguas**

MALL-Based LMS: A Comparative Study of Canvas and Moodle

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Abstract

This study focuses on Learning Management System (LMS) implementation in higher education EFL/ESL contexts. Canvas and Moodle are well-established LMSs, but their potential beyond content repository remains largely unexplored due to lack of constructive applications which result in negative attitudes. Therefore, at the center of this research are three goals concerning tool affordances: identification, examination, and comparison; as such, analytical, descriptive, and comparative methods were employed to reach a comprehensive discussion of the way these two systems operate, considering quality and quantity. Four items were addressed to assess feature usefulness: User Interface, Learning Tools, Analytics, and Assessment and Feedback. In spite of some factors that hinder mobile environments, our findings show how they can enhance language learning styles and strategies through numerous functions. Further research could be conducted on account of these contributions to investigate the interplay between perspectives, digital literacy, and software fixes.

Keywords: Learning Management System (LMS), Canvas, Moodle, English Teaching and Learning, Online Learning

Resumen

El presente trabajo estudia la implementación de Sistemas de Gestión de Aprendizaje (SGA) en contextos de la enseñanza-aprendizaje del inglés como segundo idioma (ESL) o idioma extranjero (EFL) en la educación superior. Tanto Canvas como Moodle son dos SGA consolidados, cuyo potencial más allá de un repositorio sigue siendo mayoritariamente desconocido debido a la falta de uso constructivo, resultado así en percepciones negativas hacia la herramienta. Por tanto, este estudio se centra en tres objetivos: identificar, examinar, y comparar las posibilidades que ofrecen. Consecuentemente, los métodos analítico, descriptivo y comparativo fueron aplicados para obtener una visión detallada sobre la manera en que estos dos sistemas operan cualitativa y cuantitativamente. Para evaluar la utilidad de las funciones se tuvieron en cuenta cuatro elementos: Interfaz de Usuario, Herramientas de Aprendizaje, Analíticas, y Procesos de Evaluación. A pesar de que algunos factores obstaculizan entornos móviles, nuestra investigación demuestra un posible enriquecimiento de estrategias y estilos de aprendizaje a través de varias funcionalidades. Futuras investigaciones podrían llevarse a cabo en base a estas aportaciones para seguir explorando la correlación entre perspectivas, alfabetización digital, y mejoras de software.

Palabras clave: Sistemas de Gestión de Aprendizaje (SGA), Canvas, Moodle, Enseñanza y Aprendizaje del Inglés, Educación Online

Introduction

Innovation, diversity, and transformation are concepts frequently associated with the digital world. It has created an ample communicative dimension allowing manifold ways of living and, therefore, working and studying. Spatiotemporal distance is becoming less of a concern, and, in turn, society grows much more accustomed to computerized means. Such apparent omnipresence heavily influences the pedagogic context, which is often amidst new promises and proposals akin to technological development.

How does this phenomenon condition pedagogy, especially language teaching and learning? Information and Communication Technology (ICTs) integration has set the path for new frameworks and updated practices in the English as Second Language (ESL) / English as Foreign Language (EFL) domains: mobile tools, social network sites, Open Educational Resources, Massive Online Open Courses, or Learning Management Systems (LMSs). This work will focus on the latter within a Mobile Assisted Language Learning (MALL) approach in higher education contexts.

Mobility refers to the ever-changing, flexible, and ubiquitous approach to learning, aided by the emergence and innovation of different hardware, software, and tools. The anywhere-anytime vision is representative of the field's main goal, which altogether embraces a wireless, customized, and independent study (Burston, 2014). Similarly, LMSs are intended to be an online channel supporting all the required components for an education which is not exclusively face-to-face, likely to cater the needs and preferences of different academic profiles (Atif et al., 2016; Walker et al., 2016). Several options are currently available on the market; however, following the data provided by Hill (2021, 2022), Canvas and Moodle have been the top-rated platforms for the last five years. On that account, the choice was made considering these as indicators of a wider and relevant audience.

When referring to an LMS or an VLE, many authors use them interchangeably (Al Harbi, 2016; Panagiotidis, 2018; Williams, 2022). Nevertheless, Barnes (2014) notes the fact that while VLEs are inherently educational tools used across different ages and subjects, LMSs were also designed to cover training periods in organizations. By definition, they often share similar features, but the clue to distinguish them will depend on user necessities (either geared towards constructivist or behaviorist theories). For the purpose of this paper, targeting higher education, the term LMS will be used as a synonym of VLE. Moodle, founded in

2001, and Canvas in 2008, are both open-source platforms which have similar integrated features. These can be used according to three main factors: pedagogic principles, learner and teacher profiles, and digital competences (Mpungose & Khoza, 2022). A common perception among researchers is that Moodle seems to be outdated in terms of layout and user-friendliness, while Canvas is deemed too restrictive for content creation and management (Fauzi et al., 2020; Ghosh et al., 2019; Grossi et al., 2018; Khatser & Khatser, 2022; Lamichane et al., 2019; Santiana et al., 2019).

Efficient implementation is a complex process where teaching practices, student uses, and ICTs must align. The present study seeks to:

- Identify the most relevant functions for EFL/ESL in higher education of each platform.
- Examine how the selected features operate.
- Compare and contrast the findings to provide an in-depth realistic perspective of their infrastructure.

In light of the above-mentioned purposes for this research, the outcome is a systematic insight into the affordances of the two LMSs within a MALL framework in higher education. We believe little updates have been made about the effects these spaces can have on learning experiences, which largely depend on the instructor's digital literacy.

To achieve said goals, the research methodology was analytic, comparative, and descriptive. Characteristics from each LMS were selected and analyzed for their relevance in the language learning domain; then, a comparison between the two systems was carried out to assess affordance quality and quantity; lastly, a descriptive approach was applied to discuss the results of the prior evaluation in order to ascertain the strengths and weaknesses of these educational technologies.

Research spotlights a general lack of MALL and LMSs application, connotating how the expectations attributed to instructional enhancement have not been widely met despite their presence in higher education (Demir et al., 2022; Godwin-Jones, 2017; Kruger et al., 2015; Kukulska-Hulme, 2016; Palalas & Hoven, 2016; Reid, 2019; Reinders & Hubbard, 2013; Walker et al., 2016). The main obstacles to the accomplishment of practices such as MALL-

based LMSs are user readiness and ICTs pedagogic adoption (Basabrin, 2019; Chen et al., 2021; Fathema & Akanda, 2020; Hung et al., 2015; Metruk, 2020; Steiner & Mendelovitch, 2017).

Studies addressing attitudinal weight from both sides reveal digital competence to be the measuring standard on which a tool will be evaluated, that is to say, all benefits and drawbacks will inevitably stem from the knowledge shown when using online means. By definition, the most evident advantage of LMSs is the extension of communication channels among faculty and students, e.g., announcement, chat, comments, discussion boards, instant messaging, e-mails (Cavus, 2007), then ensuing ubiquitous access (Walker et al. 2016). An evolving broad function range – analytics, assessment, and feedback in particular – also enables multiple formats for participation and collaboration, for instance, multimedia content creation, peer review, and roleplaying (Atif et al., 2021; Bailey et al., 2017; Bell & Federman, 2013; Demir et al., 2022; Ghosh et al., 2019; Levy, 2009; Melton, 2019). These features include data storage and mining for progress tracking, which aid in error early detection and performance monitoring (Atif et al., 2021; Duin & Tham, 2020). However, lack of faculty basic training aimed at higher expertise in the long term may lead to a gradual rejection or abandonment, added to by cross-platform / device unavailability and technical issues (Atif et al., 2021; Basabrin, 2019; Del Prete et al., 2018; Fathema & Akanda, 2020; Godwin-Jones, 2012; Pujasari & Ruslan, 2021; Reinders & Hubbard, 2013; Soeung et al., 2020). If integral functions, e.g., analytics, are not used strategically (Chen et al, 2021; Duin & Tham, 2020), and tasks do not bring value to the classroom, i.e., interaction is static (Atif et al., 2021; Cavus, 2007), then the platform is not framed properly within an instructional approach.

The potential of a resource can only be fully and meaningfully attained through pedagogical principles; though these often go unnoticed by students, they have a direct impact on their learning which is why they must not be overlooked by teachers. Literature has discerned how positive and negative aspects of LMSs parallel those of MALL. The methodology permits uninterrupted learning environments, especially ubiquitous access which equals a more flexible and spontaneous usage (Çakmak, 2019; Hsu, 2013; Kukulska-Hulme & Viberg, 2018; Rudzewitz et al., 2020; Yurdagül & Öz, 2018) that is, different locations and time periods in and out of class; it supports multimodality when delivering and creating content (Crompton & Traxler, 2015; Lustek, 2019; Karasimos, 2022), boosting the

learning experience by increased engagement and material contextualization (Demouy et al., 2016; Tayan, 2017). Among the disadvantages, the most frequent are device and resource interoperability issues as well as User Interface (UI) and User Experience (UIX) failure (Palalas & Hoven, 2016; Sarrab & Aldabbas, 2012; Ushioda, 2013); moreover, distractions and disturbances were found to be a point of concern within a general consideration of academic integrity breach (Basabrin, 2019; Metruk, 2020; Viberg, 2015).

On the whole, tool and theory are mutually dependent: instruction will be made effective through the platform, which will simultaneously reach its potential through adequate pedagogy. MALL should enable LMSs to become a tool for knowledge flow instead of a plain repository, while LMSs should support MALL strategies. For a better visualization of the two spheres, the table below summarize the aspects abovementioned:

Table 1

LMS & MALL Advantages and Disadvantages

LMSs Advantages	LMSs Disadvantages
Broad function range	Analytics not used strategically
Data storage and mining	Cross-platform and cross-device unavailability
Extension of communication channels	Lack of constructive application
Multiple formats for engagement	Static interactivity
Ubiquitous access	Technical issues

MALL Advantages	MALL Disadvantages
Flexibility and spontaneity	Academic integrity breach
Learning experience boost	Device/resource incompatibility
Multimodality support	Distractions and disturbances
Uninterrupted learning environments	Deficient digital skills
Ubiquity	UI and UIX negligence

With mobile strategies requiring homogenous yet multifaceted places to be carried out, LMSs prove to be a good option for productive implementation (Khan et al., 2017; Kukulska-Hulme, 2017; Praseteya, 2021; Rhode et al., 2017; Tafazoli et al., 2019; Turnbull et al., 2020). Thus, a threefold contribution ensues from this work: detect suitable characteristics, suggest meaningful practices, and address future challenges.

1. Theoretical Framework

The classroom as the physical in-person learning place is no longer the predominant version. Intricate networks have built a continuum education model in which the study location remains constantly available online. Virtual Learning Environments (VLEs) have significantly contributed to a feasible transfer of content, practices, participants, and resources onto web-based sites (Cassany, 2018). Kurilovas et al. (2016) specify the elements VLEs expect to deliver: communication and management tools, individual spaces, and flexible access.

This section covers two main concepts: LMS and MALL methodology. Each will be defined and contextualized on the basis of distance and online education as the underlying approaches; teacher and student perspectives will be explored given how they are paramount to the understanding as well as to the outlining of the advantages and disadvantages implied. Lastly, the implications and challenges of a MALL-based LMS will be addressed.

1.1. LMS definition and contextualization

Being part of ICTs, an LMS aims to deliver certain core services: a unified academic space, multi-directional communication, and learner autonomy. It is designed to seamlessly transition traditional mechanisms online, in order to facilitate and simplify the teaching-learning process beyond time and space (Khatser & Khatser, 2022; Reid, 2019; Saputro, & Susilowati, 2019). As a result, new forms of access, management, and collaboration without required in-person classes are made possible (Al Khoeri et al., 2021; Godwin-Jones, 2012; Kannan & Munday, 2018; Piña, 2013; Reinders & Hubbard, 2013). Suitable for modern didactic approaches, both teacher-centered and student-centered learning paradigms are supported (Chen et al., 2018; Ishikawa et al., 2014; Veluvali & Surisetti, 2021). Instructors can enable gradual knowledge acquisition and skills development jointly – rather than a finished product – through enhanced strategies, reinforcing the students' active and autonomous role (Kapsargina et al., 2020; Lustek, 2019).

At the beginning, LMSs were identified as a reflection of the physical classroom; nevertheless, they have now become an extension and an essential tool for inside and outside environments (Khatser & Khatser, 2022). Understood in simple terms as a course management platform (Reid, 2019), an LMS performs three roles: manage the content, manage the participants, and enable synchronous and asynchronous access (Lustek, 2019).

Al Yafaei (2019) described the factors on which those previous functions depend: platform infrastructure, student digital competence, and teacher digital competence. These will determine whether it facilitates or hinders tasks, namely material exchange, communication, and progress tracking (Fakhrutdinova, & Nurkhamitov, 2016).

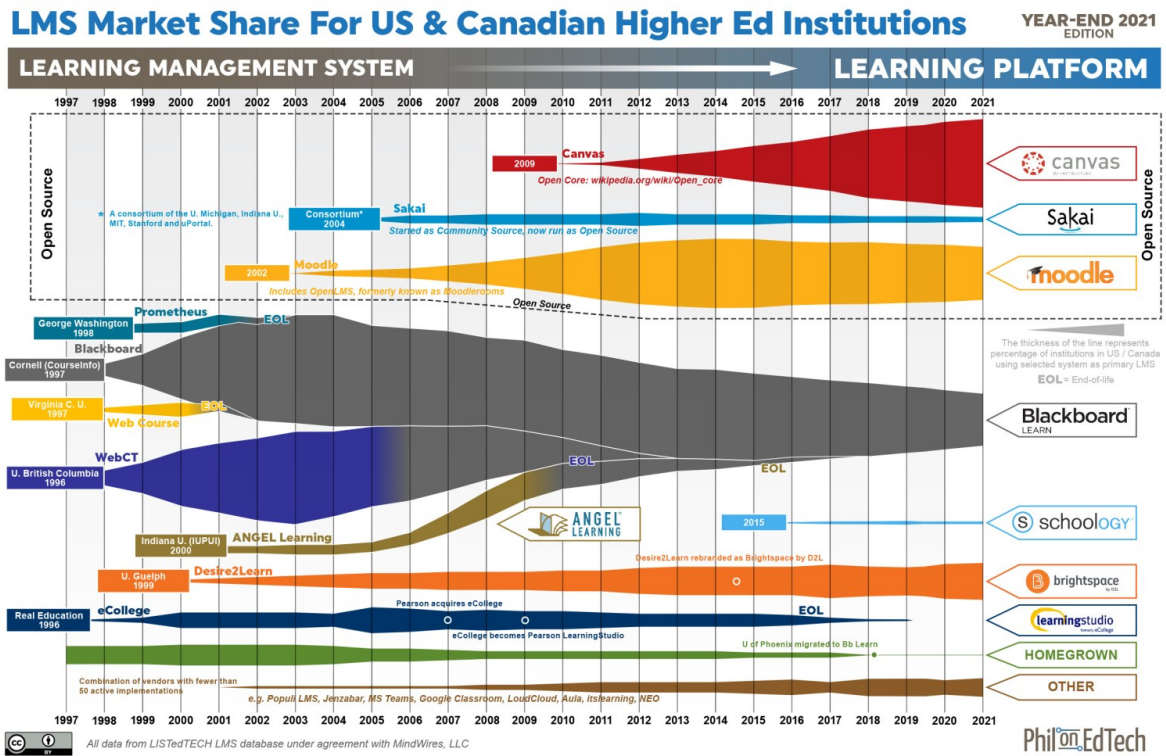
As materials and resources became digitalized, both in-person as well as remote sessions can be perpetually connected, fostering interaction and collaboration (Aldiab et al., 2019; Ghosh et al., 2019). For this reason, it is important to consider the criteria higher education institutions follow when choosing an LMS in particular. Back in 2005, Coates et al. enumerated a number of reasons why institutions decided to include LMSs in their methodology. An increasing competition among centers drove them to look for a space which would allow experimenting with the latest technology. This way, their educational strategy would improve through the modernization of resources, tools, and experiences. In the long run, what is sought is the implementation of an LMS that will strengthen digital competences, academic integrity, and collaborative opportunities between faculty and students (Aldiab et al., 2019; Grossi et al., 2018; Kharrudin et al., 2016; Lindsay, 2017). The rate of success largely depends on pedagogic practices and needs as well as usability expertise.

While it is the most institutional sphere, formal and informal setting are not mutually exclusive when enabled to operate perpetually (Cassany, 2018). Primary features include announcements, assignments, quizzes, and grades which can all be enhanced through course material delivery and interactive functions i.e., discussion forums, videoconferences, group / individual learning environments, and third-party app integration. All activity is stored and projected on analytics: educators gain insight to interpret indicators regarding student performance and course efficiency, whereas students track their progress based on grades and feedback. LMSs can be regarded as the ubiquitous source of all data and communication, an all-in-one place for teaching and learning refinement.

Two main perspectives can be distinguished when it comes to evaluation LMS efficiency: teacher and student. The LMSs at issue are Canvas and Moodle; the choice was contingent on the evidence laid out by Hill (2022) in his study of the most common platforms in higher education, as the following graphic illustrates:

Figure 1

Learning Management System Use in Higher Education Institutions



Hill (2022)

Al Khoeri et al. (2021) attribute Canvas the quality of a robust LMS offering “instructor innovation, student engagement, and widespread connection and collaboration” (p. 316). Such attributes are backed by several other studies which also highlight its adequacy for contemporary pedagogical styles, especially via cloud-based programming and third-party apps (Duin & Tham, 2019; Fauzi et al., 2020; Ghosh et al., 2019; Grossi et al., 2018; Santiana et al., 2020). Moodle is equally described to benefit learners by providing an electronic space where customized packages and integrated plug-ins are available to target different instructional types (Al Yafaei, 2019; Berbar, 2019; Dogoriti et al. 2014; Godwin-Jones, 2011; Kadoic & Oreski, 2018; Khatser & Khatser, 2022; Prasetya, 2021). At the core, both softwares provide the same opportunities, yet a parameter that sets them apart is how Moodle requires instructors to be familiar with programming at a basic level for a better experience whereas Canvas is beginner-friendly. Demir et al’s study (2022) explains a significant statistical difference between the two platforms when it comes to user satisfaction regarding ease of use.

1.1.1. LMS Teacher Perspective

Instructors are the ones who have a first-hand experience with an LMS. How effective it will be rests on their effort for the most part. Their core responsibility is to manage factors supporting a structured and autonomous learning; in fact, these are teacher-driven tools targeting learner-centered strategies, so it is by no means an isolated process for students, but rather a technique to draw their commitment (Godwin-Jones, 2011). Hence, discerning between the manifold options it offers and how they can be implemented is a fundamental step (Levy, 2009) to avoid settling for a limited use without exploring the rest of functionalities – which are usually deemed as either unnecessary or complex, generally led by an underlying fear of technology reaching three possible scenarios: acceptance, satisfaction, or dissatisfaction (Fathema & Akanda, 2020).

Walker et al. (2016) carried out a study of 19 teachers experimenting with an LMS for the first time. They highlight how gradebook and assessment were both in the benefits and drawbacks categories: they sped up the workload, but the choices were constrictive. Additionally, management functions and technical issues sometimes hindered simple tasks. These challenges can be a point of reference for software designers when upgrading certain features. Given that a “panacea of features” (Walker et al., 2016, p. 47) was not found, it is the teacher’s duty to decide how this technology can be constructive by taking advantage of its strengths rather than focusing on weak points that cannot be simply solved, because, in the end, the techniques chosen will impact either positively or negatively since opportunities reside not only on the LMS, but chiefly on the instructors understanding and application of it.

Fathema & Akanda’s (2020) extensive research among 507 educators revealed that the vast majority did not try advanced routes, particularly those without prior experience or appropriate level training, which conditioned LMS potential. They showed a positive attitude towards multimedia formats, communication speed, ease of use and organization when managing files, but the discussion forums were cluttering, and the gradebook was not as flexible as expected because it did not streamline assignment group weights when, for example, adding extra credit tasks.

In Kadoic & Oreski (2018), a correlation between analytic variables and final scores was observed; teachers were able to monitor student behavior patterns with the intention of

detecting the difficulties some learners would have, and also predict overall performance. Multimedia, file management, and test elaboration were the functions 130 instructors found most helpful, according to Endozo et al. (2019); task simplification caused instant benefits, and the increased use attracted student engagement. In 2021, Chen et al. observed 35 teachers with and without prior experience using an LMS in particular. Most of the challenges were related to the expectations they had for specific functions by associating them to other platforms or tools, i.e., standard icon meaning, interface orientation. A compulsory period of adaptation was brought up when a required nimble adaptation to new environments was noticed, and better organization and content delivery were acknowledged. However, in the end, the tool was alienated from valuable strategies, and thus the researchers perceived a general lack of pedagogic approaches among them.

One of the highly conditioning aspects can be understood in terms of User Interface and User Experience. Digital literacies of content creation and platform optimization go hand in hand. In other words, the better an LMS is designed for profile accommodation, the better effect it will have on learning. Lindsay (2017) states such equation in her thorough report about teachers; two years before, Kruger et al. (2015) spotted the same pattern. Instructors opted for a scarce use because they thought it to be 1) constraining and 2) time-consuming when it came to task building. Thereby, less digitally competent instructors ended up ignoring these tools. Demir et al. (2022) conducted an extensive analysis on LMSs; the variety of results obtained – concerning better and worse options – confirmed Lindsay's (2017) and Kruger et al.'s (2015) hypotheses. After discussing UI and UX impact, they established a statistic relationship between quality plus satisfaction and frequency of use which, consequently, represented how students were able to take advantage of the functions available.

LMSs are undeniably well-established as file storage and material exchange channels (Del Prete et al., 2018), but they will not be valued nor seen as beneficial without also pedagogic blending (Steiner & Mendelovitch, 2017). In order to transfer knowledge and build skills meaningfully, faculty must become familiar with these instruments through appropriate training to first understand, and then apply precise affordances constructively (Lustek, 2019; Rhode et al., 2017).

1.1.2. LMS Student Perspective

Teacher attitude will generally affect that of students. If an LMS does not prove to be innovative and useful, does not add relevant information, or even hinders learning – due to technical or aesthetic issues – will eventually lead to abandonment. A modern approach should provide flexibility and autonomy which, in this case, must be enabled by the different functions a platform integrates. In such manner, more opportunities will be available for students to manage and improve their own learning according to an arrangement of teaching strategies (Godwin-Jones, 2011).

Dogoriti et al.'s (2014) assessment of LMS impact showed how a high percentage of students found it to be positive for their general learning; however, there was also an elevated number who revealed demotivation since tasks such as discussion forums lacked clear structure and purpose. Likewise, 31 students shared the same opinion in Mpugonse & Khoza (2020): teachers used LMSs solely as file storage. There was no possibility for ubiquitous or informal access, neither for authentic materials when sharing information.

Peer review, cross-platform device versatility, and progress tracking have proven to be reliable features to increase engagement and foster self-management. Pujasari & Ruslan (2021) assert in their conclusions that a technology designed to be comfortable eventually builds up student motivation; learners appreciated the guidelines provided for different activities and posed numerous questions which otherwise would not feel confident to enquire about in class; Soeung et al. (2021) explain three forces affecting student confidence in language learning: motivation, learning awareness, and a comfortable space where to work and exchange information. These also stood out in Santiana et al.'s (2021) study; the platform was conveniently and consistently designed, with students appreciating the learning-friendly layout and mobile access because it enhanced their learning experience – were it removed, it would not be as motivating to use. This factor, outside the instructor's line of duties, is a lifeline due to the current anywhere-anytime expansion and communication channels extension (Ahmad et al., 2018).

Additionally, Pratiwi (2021) focused on the strengths and weaknesses LMS use derived. 50 learners brought up technical issues as the most common drawback, while better organization, multifunction, flexibility, and feedback made the tool indispensable. Dahlstrom et al. (2014) found LMSs were regarded as one of the key facilitators to achieve

better outcomes because the materials could be contextualized, and therefore become valuable. It can be considered to be a pervasive tool in the students' routine from which a satisfaction pattern emerges: the more sophisticated features are the less satisfactory whereas the basic ones are mostly acceptable given their frequency of use. Hence, among learner suggestions mobile interface and communication channels are the least rated; additionally, their digital skills did not necessarily migrate to efficient use of institutional services. As such, student perspective plays a big role in determining the level of engagement in their learning; that is why teachers ought to invest time to become aware of the possibilities LMSs offer in order to benefit the learning ecosystem as much as possible (Amin & Sundari, 2020; Hodges et al., 2020).

In view of the perceptions described, it is then possible to recognize the positive and negative aspects of LMS use, together with the standard requirements they must meet, as illustrated by Bartolomé-Alonso (2014): [1] user-friendlies, [2] cross-platform / cross-device compatibility, [3] teaching-learning simplicity, [4] adaptability to different expertise profiles, [5] ubiquitous access, [6] collaborative work, and [7] assessment and tracking features. Indeed, the first conditioning factor will be digital literacy of both teachers and students; secondly, instructors would value this tool more if it were easily convenient and showed immediate results; lastly, UI and UIX are the stimuli for long-lasting engagement among students.

This classification might help to grasp the interdependence between one sphere and the other, as well as see how each perspective contributes to the outcomes. Present times are no longer a period of LMSs novelty, and the goal is to reach a stage beyond elementary impediments adapted to current expectations and needs. They should be an integral component of classroom curriculum because better teaching-learning practices can be supported (Bartolomé-Alonso, 2014); when thought as an accessory, they are eventually dropped since no substantial change occurs, neglecting how pedagogic shift must come first and subsequently lead the whole development (Del Prete et al., 2018).

1.2. Distance, Online, and Mobile Education

Education has long been at the center of coming and going trends. Some turn out to be short-lived, not proving feasible or failing to be established, perhaps to revitalized later; others, become either outdated or undergo a transformation to meet new standards. Trends

always imply change, and in this field a complex “orchestration of students, instructors, and institutions” (Boyatt & Sinclair, 2012) is required so that a meaningful implementation is achieved.

Currently, the dominating force is in line with technological sophistication, that being mobility. When mobile devices emerged, they set off a whole new wave of possibilities regarding access and use, getting more refined with time. For education, it meant a shift of learning environments and practices (Rudzewitz et al., 2020; Wang, 2017). Altogether, the Mobile Assisted Language Learning framework is a logical accommodation of two previously well-founded instructional approaches: distance and online education (Praseteya, 2021). Therefore, a brief review of each is needed to understand the contextual features of MALL in higher education.

Wang & Chen (2009) identified six dimensions within distance learning: [1] the existence of spatiotemporal barriers between teachers and students, in which [2] the latter must be highly committed to keep organized, [3] on the basis of institutional strategy. [4] The combination of multiple technologies and means is essential to [5] support synchronous and asynchronous models, and to [6] enable collaborative channels. Concerning online education, Mehdipour & Zerehkafi (2013) added digital ergonomics, meaningful material, and cost-efficiency as the underlying elements institutions should contemplate when choosing an online tool.

Furthermore, mobile applications – e.g., LMS apps – are also chief components of mobile dynamics. According to Steel (2012) university students place learning apps among the top three must-have software since they bring positive outcomes and make it possible to spend leisure hours productively. García-Botero et al. (2018) interviewed 118 learners regarding the process and results, revealing a need for clear instructions as a way to truly take advantage of a self-management approach; there was also emphasis on in-class and out-of-class interplay, since the second tends to be on the lacking side of the spectrum, thus leading to a decrease in interest. New situations imply new choices and preferences, as explained in Karasimos (2022) findings, with learners expecting the possibility to choose and distribute their learning, and inclining towards the asynchronous, autonomous, and online model.

1.2.1. MALL Definition and Design

Rooting from distance and online methodologies, MALL is also linked to Computer-Assisted Language Learning (CALL); while the former depends on smartphones, tablets and wearables, the latter on desktop computers and laptops. However, as Stockwell and Hubbard (2013) point out, MALL should not be considered a simple evolution, especially because “trends, perspectives, and outcomes” (Toto Giusi & Limone, 2020, p. 582) vary in application; Traxler (2005) foresaw how shifting practices and technical affordances would reinforce the similarities and differences, proving it to be a method on its own.

MALL is clearly associated to the dimensions of those learning theories. What then makes it distinguishable are features or affordances intrinsic to the mobile function allowing the uninterrupted blend of contexts (Kukulska-Hulme, 2017; Kukulska-Hulme & Viberg, 2018; Viberg, 2015). These environments may be inside or outside the classroom, related to other activities, and accessed via personal devices (Sharples et al., 2005); it targets adaptability, flexibility, spontaneity, and ubiquity (Kukulska-Hulme, 2017). Kukulska-Hulme’s 2012 work describes the MALL continuum covered by the classroom community, where teacher-driven and learner-driven activities alternate between formal and informal dimensions. The emergence of innovative means related to content, analytics and interactions are also added to the field (Demouy et al., 2016). We find an ecosystem acting as a bridge between several frameworks covering a wide range of approaches, principles, and instructional design factors in ways no longer possible through traditional means.

Central to this pedagogy is the Social Constructivist Theory (Viberg, 2015) in which the student is not merely an observer, but a mobile active agent and participant; learning becomes the process of perceiving, noticing, responding, reflecting, and acquiring language (Hoven & Palalas, 2016) on the basis on input, affordances, and collaboration. Additionally, Second Language Acquisition (SLA) principles such as the ones Kukulska-Hulme & Viberg (2018) mention: “comprehensive input, comprehensive output, negotiation of meaning, reflection on learning, and feedback” (p. 213) are included. Moreover, it contains task-based instruction as well as problem-solving approaches (Kukulska-Hulme & Viberg, 2018), alongside especially relevant styles like technology-driven and connected classroom with the use of personal mobile devices to support interactive learning in different settings (Crompton & Traxler, 2015).

Having distance and online education as the foundational approaches, Social Constructivism as the guiding theory, it is lastly backed by a Digital Competence Framework (Lustek, 2019), particularly to a subset proposed by Perifanou (2021), Digital Competences for Language Teachers; it covers six items educators should appraise to meet current instructive requirements: technology, pedagogy, assessment, content, professional development, and learner support. Transferring learning onto the digital sphere demands not only an emulation of physical classrooms, but also innovation. This is especially challenging for the language field, where skills development requires interactive elements. As far as MALL is concerned, teacher profiles and evaluation descriptors must be updated to fit new ways of accessing and engaging online.

Consequently, a careful examination is required when designing mobile environments. Instructors must constantly probe questions and reflect on results according to how inclusive, constructive, and advantageous practices may turn out to be. According to Çakmak's study (2019) of previous research he establishes three steps to consider in the implementation:

1. Process design involves learners in mobile strategies. It should be built on the basis of flexibility to accommodate different learning styles, include the purpose of multimodal activities, and provide adequate feedback.
2. Environmental design deals with content and context. Ubiquitous access, affordabilities and affordances are key for a successful development of practices.
3. Mobile interface design includes content exchange, multiformat availability, and effective task execution. Instructors must focus on reducing disturbances while setting up segmented multimedia materials.

The resources chosen have to adjust and exploit MALL inherent features to boost learning without being too challenging to use, as it might be counterproductive while encouraging to use personal devices for instructional purposes (Ushioda, 2013); Sarrab & Aldabbas (2012) emphasize hardware and software UI / UIX mechanisms as central to successfully convey the intended goals through suitable tools; nonetheless, they are scarcely explored and education guidelines are limited. The level of mobility will directly define the possibilities within a specific context; Pegrum (2016) explains the three levels of mobility and why are they important when shaping a mobile curriculum. Device, learner, and experience are the parameters linking together place and participants: on level 1, the device is mobile as in migrating the classroom to smaller screens; on level 2, device and learner are mobile,

prompting anytime-anywhere access; on level 3, device, learner, and experience are mobile providing a large-scale learning environment through the contextualization of items. Which level is appropriate within the bounds of affordabilities and affordances needs to be contemplated to understand users' perspectives (Kukulka-Hulme, 2012).

1.2.2. MALL Teacher and Student Perspective

Just like in LMS perspective consideration, the relevant users for MALL implementation are teachers and students. With less demand for traditional methods, the proliferation of digital spaces requires users to be aware of basic functions first so as to manage their learning, since affordances will be used and perceived differently depending on acceptance, familiarity, and expertise (Czerska-Andrzejewska, 2016; Reid, 2019) – illustrating how challenging design can be.

Learners noticed a much more varied and authentic learning, benefiting from anywhere-anytime accessibility for assignment completion, but platforms lacked collaborative elements (Demouy et al., 2016). Yurdağül & Öz (2018) perceived clues for teachers from the students' preferences toward flexibility and multiple source integration for a powerful information exchange and retrieval; mobility compensated for limited classroom sessions through valuable mechanisms as feedback (Xu et al., 2017). Lai & Zheng (2018) found different attitudes depending on frequency of use and technology expertise, in combination with access circumstances and task configuration; higher education students, being one of the most active digital users, involve teachers in assisting their instructional online browsing. Mahnaseh (2020) demonstrated a relevant statistical difference on the subject of final grades: mobile learning styles displayed better academic performance than those which only relied on in-class sessions. Nuraeni et al. (2020) elaborate on the same points while remarking how high expectations are for mobile environments: they must go beyond physical constraints to allow perpetual connection to the classroom. Grimshaw et al. (2017) also called attention to the infrequent use of mobile devices for didactic purposes, thus putting their digital skills to the test.

For teachers, as central as digital literacy, is readiness both in attitude and knowledge. A dichotomy between these was discovered to the point of sometimes preventing learning from using digital tools (Metruk, 2020). The shift from paper-based to mobile-based strategies shows a similar ratio of acceptance and hesitation, yet equally acknowledging its

significance and the need for faculty training to avoid misunderstandings between teacher purpose and student perception (Sato, 2013). Activities tend to be mainly focused on vocabulary, grammar, reading, and listening tasks to which mobility allows self-pacing and reflection time to attain better acquisition (Ozer & Kiliç, 2018). When content was delivered correctly, it showed a rise in engagement as it provided a richer learning setting; though greater opportunities for teaching can be minimized by institutional digital infrastructure, the fluctuation between willingness and resistance to mobile methods remains the main cause of unfulfilled practices (Tayan, 2017). In many situations, effectiveness does not depend on the type of affordances, but on pedagogical approach suitability (Basabrin, 2019).

There is a considerable number of teachers who are still holding onto old practices, unaware of the lost potential such standpoint implies. They hesitate to apply new techniques, deeming them as threats rather than opportunities (Palalas & Hoven, 2016), and doubts arise from thinking that mobile technologies will replace them. Perhaps, that is why the expectations have yet to become real to mitigate the clash between ICT affordances and SLA principles (Kukulska-Hulme, 2016; Pérez-Paredes & Zhang, 2022). However, what has been set forth is an extensive shift of instructional strategies, where instructors have new responsibilities in order to fulfil the needs of 21st century learners, whose attitudes need to be put into perspective to understand its supportive rather than replacing role (Walker et al., 2016). The core duty is to discern, assess, and integrate constructively the manifold affordances MALL brings into the classroom by being both facilitators and activators of technology-enhanced resources (Palalas & Hoven, 2016; Steiner & Mendelovitch, 2017).

1.3. MALL-based LMSs Implications

On this account, the MALL-based LMS vision of learning may be as follows:

- It is learning-centered within a Digital Competence Framework.
- It allows multiple devices and platforms.
- Time and space barriers are no longer a drawback.
- It deals with affordability (income) and affordances (hardware, software, and connectivity) to reach an optimized learning experience.
- Its ultimate goal is a cross-infrastructure interoperability.

Contemplating the upcoming multitude of instructional resources, the US National Research Council put forward a report of what an effective instruction must accomplish (Sharples et al., 2005), which is still relevant to this day: [1] focus on learners, knowledge, assessment, and community; [2] digitalization of contexts and communication channels to blend productively different settings. On these grounds, an LMS can effectively host MALL strategies and styles: it enables several ICTs for designing and delivering content, it accommodates materials and skills, it fosters an active student role, it promotes interactive collaborative work, it provides multiformat feedback, it allows interactive exchange, and it displays performance tracking and assessment while seeking to increase engagement and improve results (Praseteya, 2021; Rhode et al., 2017; Tafazoli et al., 2019; Turnbull et al., 2020). Such homogeneity can provide students with a powerful instrument where they can regulate their workload, contact faculty and peers, work with multiple sites and authentic materials, and keep track of their progress on different devices anytime (Khan et al., 2017).

The amount of changes the LMS field has experienced allows to identify valuable features with innovative potential. Nevertheless, institutional support is greatly missing; these tools require prolonged use in order to exploit their affordances. Walker et al. (2016) affirm that a true integration will only take place when the LMS is perceived “to be better than the status quo” (p. 42); only if evidence of obvious advantages is found by faculty, they will be willing to engage more (Fathema & Akanda., 2020; Wong et al., 2013). Azizah (2020) discusses the areas primarily adjusted: conditions, methods, and results which in conjunction to the types of innovation-driven decisions labelled by Walker et al. (2016) i.e., “optional, collective, and authoritative” (p. 42) reveal a systematic outline to tackle the complexity of the procedure regarding core components: course management, content, and communication.

Although current studies serve as a good starting point for better practices by providing guidance and support, there remain questions to be addressed and reviewed. Notions such as digital natives or the omnipotence of technology have done more harm than good by leading to the wrong conclusions – are strategies being carried out properly? 21st century skills include critical digital literacy, imperative to MALL-based LMSs. The role of every modern teacher depends on this; it implies preparing, guiding, and assisting while being as all-encompassing as possible so that students will be able to deal and evaluate information critically, thereby avoiding inadequate uses when faced with a gigantic data space, whether at basic or advanced levels, so, in the end, they may grasp what it means to work digitally

while managing their learning (Godwin-Jones, 2017; Reinders & Hubbard, 2013).

Analytic features are growing in popularity due to their sophistication through the years and the potential researchers see in the function; it is the sole source of data regarding students on LMSs (Godwin-Jones, 2017). The main goal is to monitor and track performance through data registry and mining (Atif et al., 2020; Duin & Tham, 2020; Godwin-Jones, 2017); by being directly linked to privacy issues, it is essential to adapt an appropriate pedagogic position. It is designed around a threefold aim: course progress information – general and individual –, early identification of errors and patterns, and awareness from the data provided (Atif et al, 2021; Liu et al, 2019; McLaren et al, 2018).

On the contrary, feedback stands out for its obsolete state and lack of digital transformation as it does not meet modern standards. To be timely, particularly at the individual level, it requires a significant time commitment which is usually counterproductive (Carpenter et al., 2020). To a certain extent, it aids analytics in identifying and correcting mistakes to allow regular class dynamics. Hodges et al. (2020) noted a better performance when feedback was used adequately; Laflen (2019) highlights how publish time is central to its efficacy. In fact, assessment and feedback are the elements which carry the most significance for students (Winstone et al., 2020), so their avoidance will carry negative consequences.

In addition, much debate has been built around the suitability and effectiveness of apps, especially relevant for MALL by proving to be a helpful source of learning for some contexts and students through methodology redefinition and adaptation (García-Botero et al., 2018; Steel, 2012). Technology becoming more sophisticated means a wider range of possibilities for teaching-learning, if applied correctly, enabling affordances such as camera, voice recognition, location services, and storage to be exploited (Godwin-Jones, 2011; Pegrum, 2016). Nevertheless, the more tools, the greater the challenge of establishing clear approaches and homogenous practices (Burston, 2014; Lotherington, 2018; Pegrum, 2016).

These matters are first and foremost subject to a Digital Competence Framework to be actually fulfilled. Usage measurement comprising all profiles will, to a certain extent, mirror LMS and approach adequacy (Chen et al., 2021). Here, the merger of environments is set in motion: personal skills vary among students which, after manifesting in the classroom

context, will exhibit contrasting self-management and autonomy aptitudes. It is strategic for instructors to show awareness of said issues as academic success will be affected (Godwin-Jones, 2012; Mpungose & Khoza, 2020). The utmost goal is that procedures can be parallel and consistent in the two settings to cultivate all the expected skills (Reinders & Hubbard, 2013).

Ultimately, the concept of mobility should no longer remain strange or unknown. Though challenges such as efficiency, affordance suitability, and support are part and parcel of the implementation process, mobile devices are essential for day-to-day tasks. They brought about unprecedented value through a cultural shift regarding communication and connectivity, offering anytime-anywhere access while still adapting to emerging changes continuously (Godwin-Jones, 2017), though expectations surrounding classroom application are yet to be seen on a wider scale (Kukulka-Hulme, 2016). The thought that permeates research is, perhaps the importance of collaboration between 1) software developer and designers as well as 2) linguists and teachers, and the lack thereof (Karasimos, 2022; Lotherington, 2018). Hence why the combination of LMSs along with MALL may offer a broader experience, aimed at an inclusive, ubiquitous, and interoperable curriculum where theories, instructional design, and learning outcomes should be in harmony (Hung et al., 2015).

In line with the theoretical framework described, we proceed to examine each LMS. Four elements will be contemplated concerning language learning pertinence: first, user interface and experience on web and app versions for mobility aspects; second, learning tools, both individual and collective; third, analytics value; lastly, assessment and feedback functions. Moving from an initially general vision to then specific EFL/ESL relevant features will allow us to attain a structured comparison between the two platforms in order to determine how effective they can be for the previously mentioned goals.

2. Canvas

Being one of the currently leading educational technologies demands a high-level of pedagogical aptness. Canvas affirms to simplify bureaucratic classroom practices related to access, communication, and geolocation while pioneering in aesthetically enhancing digital learning environments. That being the case, not only a sophisticated but also a beginner-friendly resource should be the end-product teachers and students work with.

2.1. Canvas Web & App Interface

Figure 2

Canvas Web Dashboard

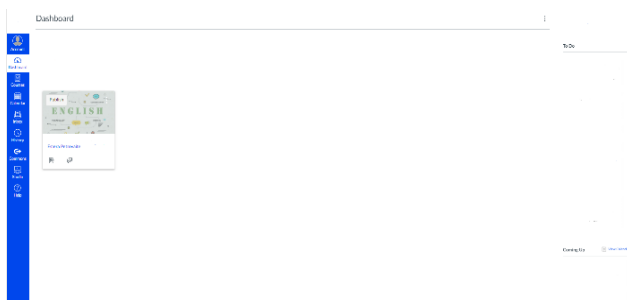


Figure 3

Canvas Course Homepage



In figures 2 and 3 above we get at once the main operational components: dashboard, global course navigation, and right-hand course sidebar. The dashboard includes standard course management items as account settings, calendar, email, cloud service, and helpdesk. Global course navigation integrates multiple courseflow links available for instructor customization i.e., they can be shown or hidden according to didactic needs. Shortcut buttons for importing cloud content, managing activity, monitoring analytics, or building a course from scratch are also located in the right-hand course sidebar.

Among these, the global course navigation is the key menu to manage workflow accurately. It comprises an intricate network of affordances out of which the following are meaningful for our study:

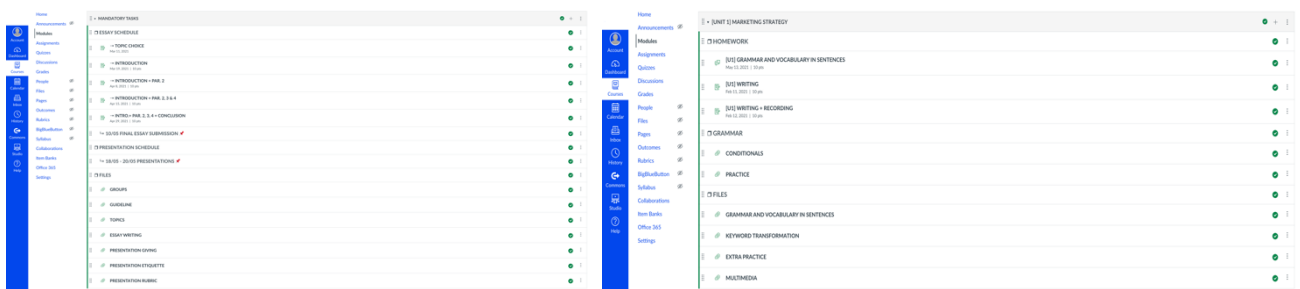
- Analytics: students profile report on access, engagement, and grades.
- Assignments
 - Submission type: (anonymous) individual or group.
 - Submission format: in-person, multimedia uploads, external tool attachment.
 - Assessment: teacher or peer; audiovisual, instant, formative, summative and personalized feedback.

- Collaborations: document sharing and editing on Google Docs or Office365.
- Chat: synchronous communication channel between course participants; scheduled office hours and study sessions.
- Discussions: focused or threaded boards.
- Learning Tools Interoperability (Third Party Tools): BigBlueButton, Office365, ZOOM shown by default. Canva, Kahoot, Elsevier, OER Commons, and Youtube, among others, can be added manually.
- Outcomes: performance tracking according to predefined goals through tasks.
- Quizzes: gap-filling, essay, matching, multiple choice.

They can be distributed and put together using the Modules tab, where a panoramic view of all content and materials is displayed:

Figures 4 & 5

Canvas Web Modules



Canvas has made available three native mobile apps – teacher, student, and parent both for iOS and Android devices. According to Instructure Team (2022) it aims at providing the same functionalities through a more flexible access and:

- Ubiquitous communication.
- Due dates and notification checking.
- Assignment submission for students.
- Task setting and grading for teachers.

After using the teacher and student apps on two iOS mobile devices, we can confirm the above elements to be feasible. Nonetheless, and in spite of a 4.65/5 average rating, mixed reviews point out slow loading speed and constant crashes as everyday issues. From our experience, we have been affected by the same occurrences which have not been resolved throughout the various updates. Such condition defeats the purpose of their assertions since mobile opportunities are disrupted and hence unlikely to succeed. As a consequence, web

access provides a much better experience because it minimizes interruptions while operating on the same graphics.

User Interface was assessed following Babich's (2016) summary of four key principles that make websites and apps constructive: [1] users can control their actions, [2] users find it easy to interact with the site, [3] users do not have to put too much effort to achieve their goal, and [4] users come across consistent interfaces. Accordingly, the evaluation of each dimension is shown below:

Canvas Web

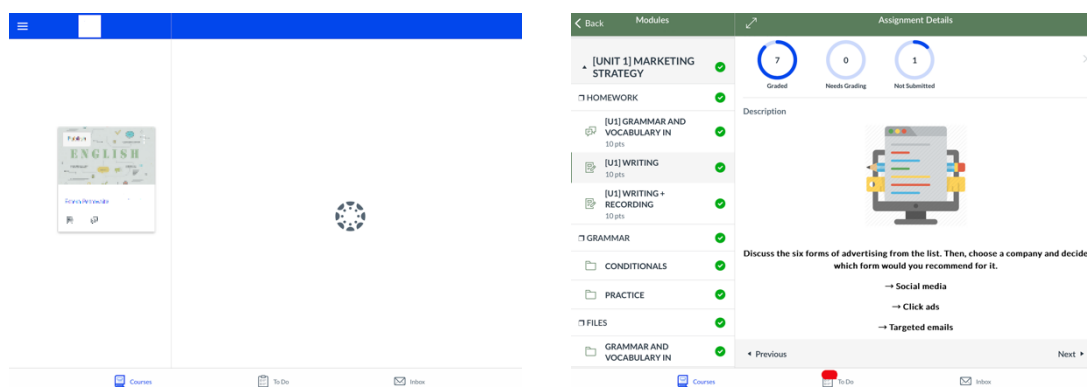
- [1] Sleek and intuitive design, visual cues and arrangement help identify item purpose. Suitable for novice and expert users. Objects are customizable for quicker navigation.
- [2] Global course navigation and homepage are in danger of becoming cluttering due to the number of options. If not customized properly, it can be overwhelming and hinder visual hierarchy which will eventually lead to users questioning utility.
- [3] Links lead to direct and expected actions. On the whole, a clear layout is found through issues from point 2 may affect negatively.
- [4] Functional consistency on course design can be achieved to facilitate access and navigation between subjects, pages, and devices.

Canvas App

- [1] Clean architecture with three main tabs: courses, to do, and inbox. User-friendly for basic tasks.
- [2] Optimized visualization of some but not all functions on different screen sizes.
- [3] Technical issues of loading speed and crash recovery hinder seamless work. Too many clicks are required to reach intended points.
- [4] Identical visual cues to web version avoid confusion and streamline actions.

Figures 6 & 7

Canvas Teacher App



For more specifications, an evaluation rubric was elaborated based on the proposals of Heil et al. (2016), Moreno-Fuentes & Risueño (2018), and Son (2016) to establish the criteria:

Table 2

Canvas Web & App Assessment Rubric

TECHNICAL FEATURES	CRITERIA			
Updates	1 Rare	2 Occasional	3 Frequent	4 Very frequent
Ergonomics	1 Poor (App)	2 Satisfactory	3 Good (Web)	4 Excellent
Device functionalities	1 None	2 Basic	3 Extensive	
Mobility	1 Level 1	2 Level 2	3 Level 3	
Multimedia		Yes	No	

All things considered we can conclude that the web model works better than the native app. It can potentially become a dynamic tool to integrate in the curriculum, seeing how classroom settings may be expanded. Yet, while technical issues persist, learning experiences will not benefit from its use. For MALL, it connotes a clear drawback because real implementation is obstructed – as Kukulska-Hulme (2016) states, even with ICT sophistication, MALL practices are yet to become more than a promise.

2.2. Canvas Learning Tools: Individual and Collective

This section includes the functions which have demonstrated being EFL/ESL instruments for approaches, styles, and strategies enrichment as well as student engagement boosters through adequate arrangements given the categories each integrates.

2.2.1. Assignments

Knowledge acquisition testing and skills development on a general level to obtain an understanding of student proficiency is what this feature targets. To make submissions easier and more accurate, it allows items such as:

- Description box with rich content editor for detailed and contextualized instructions.
- Assessment scale: grading criteria; reviewed by teacher or peer; rubrics.
- Submission format: multimedia file uploads, text entry, URLs, LTIs.
- Submission type: individual (can be anonymous), and group.

Submission format and submission type would be the most noteworthy ones. Opportunities are possible for different learner profiles on the former, since they can produce content in a variety of formats to complete a multiskill task. As long as teachers provide clear goals and guidelines, the same exercise can be approached from multiple perspectives. Students may show their mastery through diverse yet equally valid styles: writings, audiovisual recordings, presentations, e-books, etc. The latter, individual and group assignments, facilitates establishing contrasting learning environments. For instance, individually anonymous submission fosters what students call comfortable spaces in opposition to physical settings (Pujasari & Ruslan, 2021; Santiana et al., 2021; Sato, 2013) when sharing content, raising questions, and replying to feedback in opposition. Furthermore, group tasks open students' own working space (a mini version of the course page) where they can work and build projects by uploading, embedding, and designing materials or creating discussion forums. Likewise, the collaborations feature allows for synchronous collective work on numerous files where each participants' contribution is displayed. For these reasons, the assignment function proves to be necessary and constructive when it comes to enhancing skills building.

2.2.2. Quizzes

It promotes independent study and challenges individual performance by supporting several activity options. Traditional exercises of gap filling, matching, and multiple choice are especially suitable to review chunks of language; learners can carry self-testing strategies or prepare for class in advance. An interesting recourse is called *stimuli* which is rich content editor box meant to include contextualization cues. When building a quiz, teachers must consider grading, timing, and attempt elements while also ensuring frequency patterns to provide steady planning and meet student expectations; it is also important to recycle exercises and get more creative in the process of adapting to learner needs and preferences.

2.2.3. Discussions

Two types of discussions can be designed: focused or threaded. Focused boards target short and close-ended contributions with limited interactions e.g., introductions or individual opinions. Threaded ones demand a much more collaborative information exchange for opinion development by commenting on other participants' posts. This feature can be a means of putting theory in practice, continuing in-class discussions, or keeping students connected. All four skills can be tested since text-only as well as hypermedia posts are possible which makes contributions to be of higher quality than in-person because they are asynchronous and self-paced i.e., learners have time to reflect and prepare answers flexibly. Once again, more reserved students benefit greatly as they are able to voice their opinions more comfortably. Every contribution can be an opportunity to expand knowledge, build vocabulary, improve grammar accuracy, or practice pronunciation. Above all, it needs to be used purposefully; otherwise, it will gradually be perceived as useless. When approached constructively, it derives in active engagement and community building within a space of authentic exchanges covering diverse styles.

2.2.3. Canvas Analytics

Data mining on this feature consists of pattern detection, early error identification, and progress tracking groups. Two viewpoints containing quantitative information are at hand: quick individual insight includes degree of participation, submission rate, and grades [Figure 8]; and the more extensive New Analytics panel [Figure 9], allowing to track online activity, check grades on individual and average ranges, compare time frames to monitor progress, obtain a report on course performance and communication, and notify at-risk students. In the case of students, they get a graphic data of their task completion, grades, and possible scenarios for final scores; however, such a frame is probably too narrow for them to fully understand the areas in need of improvement and knowledge acquisition growth.

Figure 8

Canvas Quick Analytics

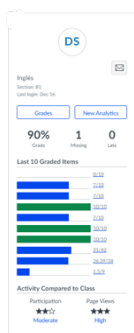
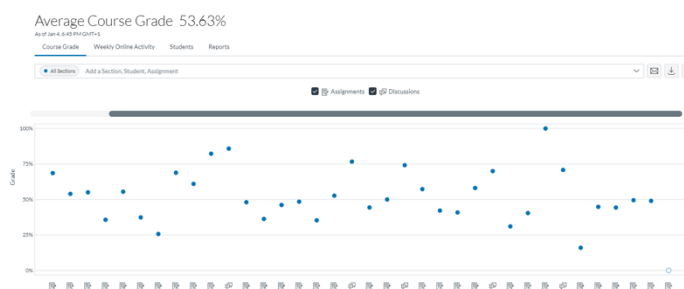


Figure 9

Canvas New Analytics



For instructors, these options may be helpful to monitor two facets: course success and student performance stemming from resource views, participation ratio, and achievement score; learners who do not meet subject requirements may be directly alerted. Quantitative data is the only source of learner progress and material effectiveness, which is why these analytics seem to fall short of providing more in-depth figures regarding specific skills, learner context, or device. In consequence, and despite the high expectations surrounding this functionality, reports may not be as complete as they could be since qualitative statistics are missing.

2.4. Canvas Assessment and Feedback

The present items are where student attention focuses the most. Carpenter et al., (2020) explain how feedback time and constancy highly condition its value because it aids learning speed. Being that the case, the learning tools we described in point 3.1.2 will now be examined separately to distinguish the formats provided in each to achieve helpful results for learners.

2.4.1. Assignments

SpeedGrader is the built-in tool for all types of submission evaluation. Teachers or peers can make direct annotations, add comments, fill in rubrics, and attach multimedia files as ways of giving personalized feedback in an effort to guide students individually. Moreover, peer assessment is an opportunity for authentic language learning practice serving a two-way purpose to foster learner engagement: input exposure and output production.

2.4.2. Quizzes

Self-paced preparation or revision instruments are normally setup to be graded

automatically according to the criteria determined by teachers. Likewise, feedback tends to be immediate and formative. Close-ended questions, e.g., gap-filling or multiple-choice reading comprehension, carry clarifications about right or wrong answers and particular mistakes while open-ended ones, as in the case of essay, should include individualized comments.

2.4.3. Discussions

They can be graded using varied measurements i.e., degree of participation, contribution accuracy, or engagement with other participants. Posts will be displayed on SpeedGrader for final grading, so two methods of feedback are viable: synchronous to the discussion board via replies, edits, or likes for real-time feedback, and personalized comments regarding all contributions in light of linguistic and metalinguistic aspects for the final score of which the analytics participation tab can be taken advantage.

All in all, assignments is best suited for summative assessment by supporting complex multiformat tasks where feedback should be elaborated for each learner. Conversely, given their nature, quizzes and discussions are more fitting for formative assessment; built for preparation and revision while trying to accomplish course objectives, feedback in this case aims as guiding students to understand language blocks gradually. Additionally, on this subject, the outcomes feature can also be of service. Outcomes represents course goals regarding a skill in particular; once a number of tasks are linked to a set of outcomes, the scores students obtain indicate proficiency level.

3. Moodle

Moodle's longevity in the market carries a series of expectations from research. Though pedagogy remains unmistakably central to the platform, aspects related to innovation cannot be bypassed: is the service up to current instructional methodologies or does it still rely on outdated techniques by relying on a repository prototype? From what they claim (Moodle Team, 2020), a straightforward modern space should be the resource we come across. In consideration of the upcoming comparative study with Canvas, the order and type of features to be discussed are going to be the same.

3.1. Moodle Web & App Interface

Figure 10

Moodle Web Home Tab

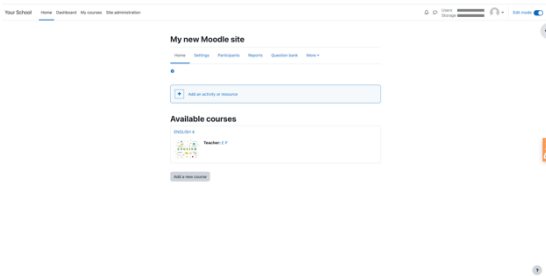


Figure 11

Moodle Web Dashboard

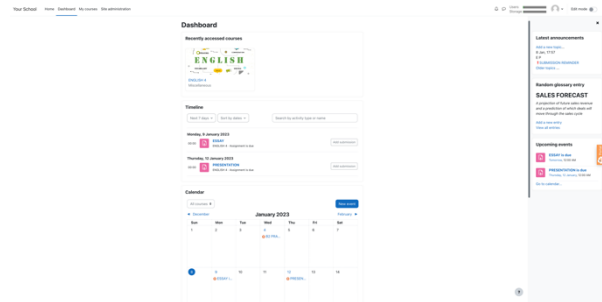
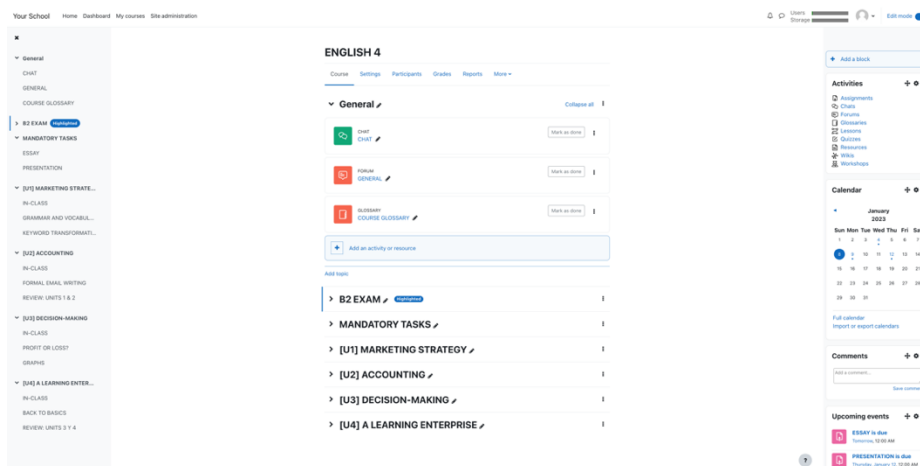


Figure 10 above depicts homepage distribution: static top navigation bar, courses, and bottom left corner assistance icon. Standard LMS features are included in the upper bar, dashboard being the tab where a course's content is displayed according to block customization and site administration, which manages the kernel function of Moodle plugins. In short, plugins are customizable objects which regulate course workflow conditions like activity, tasks, formats, and admin tools; their setup is often carried out by the administration staff. Once inside a course [Figure 11], the left-hand index shows its content and the top panel the usual management functions that run in accord with plugin configuration. Each affordance shows on the corresponding index section, and includes an extensive settings panel for submission, grading, evaluation, and feedback [Figure 12]. The activities and resources we selected for their EFL/ESL significance are:

- Assignment
- BigBlueButton (Web Conferences)
- Chat
- Forum
- Glossary
- Lesson (Multiple Learning Pathways)
- Quiz
- Wiki
- Workshop (Peer Assessment Tool)

Figure 12

Moodle Web Course Homepage



Moodle’s native app for iOS and Android devices affirms to migrate all features while accomplishing (Moodle Team, 2022):

- Ubiquity
- Easy access and navigation.
- On-the-go submissions / task completion.
- Effortless notification, inbox, and progress checking.

Reviews show a 4.4/5 average rating, yet comments emphasize a hard to browse, even outdated, interface with frequent crashing and multimedia loading failure. From our use on two iOS mobile devices, we vouch for the app’s unremitting technical issues. However, what is more surprising is the fact that the interface itself completely dismisses the claims above. No consistency exists between Web and App versions: in essence, architecture does not adapt to different screen sizes and visual cues correspond to different actions in each

dimension. Under those circumstances, classroom setting cannot be expanded through mobile tools. For a more detailed evaluation of the two, we will again make use of Babich's (2016) golden rules¹ and the assessment rubric:

Moodle Web

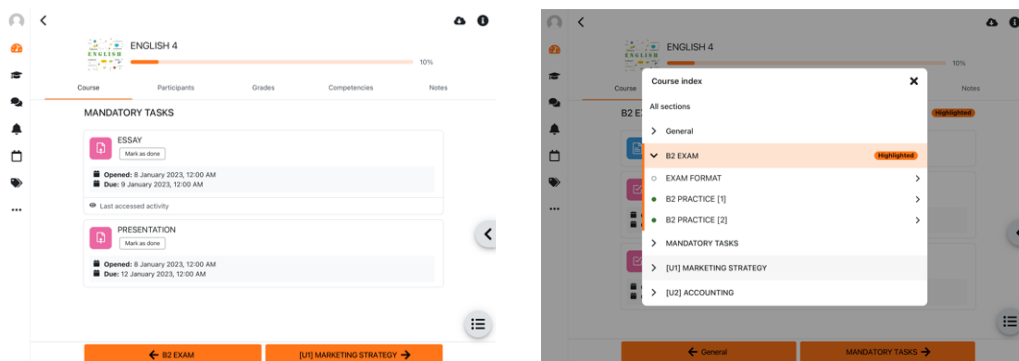
- [1] Clean design. Visual hierarchy established by textual cues. Best suited for intermediate and above computing skills users as it requires a large amount of customization for an optimal experience.
- [2] Too many options available which may increase reluctant attitudes.
- [3] In light of point 2, activity/resource setup may be considered unnecessary complex.
- [4] Cross-course/task standard configuration is feasible.

Moodle App

- [1] Smart layout allocated in different menus: sidebar,
- [2] Not fully optimized screen size adaptation.
- [3] Reloading issues disrupt experience. Unclear visual cues with too many clicks required to reach intended goal.
- [4] Not functionally consistent to web version which may lead to confusion.

Figures 13 & 14

Moodle App



¹ [1] users can control their actions, [2] users find it easy to interact with the site, [3] users do not have to put too much effort to achieve their goal, and [4] users come across consistent interfaces.

Table 3*Moodle Web & App Assessment Rubric*

TECHNICAL FEATURES	CRITERIA			
Updates	1 Rare	2 Occasional	3 Frequent	4 Very frequent
Ergonomics	1 Poor (App)	2 Satisfactory	3 Good (Web)	4 Excellent
Device functionalities	1 None	2 Basic	3 Extensive	
Mobility	1 Level 1	2 Level 2	3 Level 3	
Multimedia	Yes		No	

On the whole, Moodle’s web version may be the only possibility to integrate in language learning settings given how the app does not integrate well standard features and formats. Device functionality neglect leaves MALL practices at disadvantage again, not only due to technical issues but also to software shortcomings when it comes to fulfilling modern educational requirements.

3.2. Moodle Learning Tools: Individual and Collaborative

Seven learning tools useful have been observed to be especially meaningful for EFL/ESL. Besides reviewing those running similar to Canvas’ item range, we will also address Moodle’s broader assortment of tasks afterwards.

3.2.1. Assignments

It is the standard function to evaluate student work requiring a more formal and extensive pattern. The configuration panel primarily consists of:

- Description with Alto Editor integrated for hypermedia content.
- Submission type: individual and group (one or all members required to submit input).
- Submission format: online, upload or file attachment.

These provide opportunities for multiskill exercises where output can come in varying shapes such as reports, presentations, mind-maps, games, or interviews allowing students to show their mastery through a range of styles and strategies within set guidelines.

3.2.2. Forums

A versatile medium for information delivery and exchange through learner-generated content interaction via posts, edits, and shares. For our purposes, the tool is imperative in

order to keep students engaged while acknowledging all contributions made on different times. Setting student-to-student communication is easier as the format allows asynchronous replies supporting language intake for skills development through multimedia objects beyond text-only input and output.

3.2.3. Quizzes

Traditional drill and recall exercises can be used for test practice, content revision, and class preparation; this self-assessment method helps learners to track their progress in specific language units or skills. It includes gamified questions of drag and drop or flashcards, as well as less dynamic ones like multiple-choice reading or essay writing. Interval distribution needs to be taken into account to achieve a constructive and rewarding usage.

So far, standard LMS features identical to Canvas have been discussed. Notwithstanding, though undeniably convenient, we believe the most outstanding ones where Moodle excels in terms of EFL/ESL suitability are Glossary, Wiki, Lesson, and Workshop. Inherently, they do not convey state-of-the-art methods, but digitalization has made them to be much more engaging resources with which contemporary students may not be quite familiar. They ensue higher motivation and increased efforts to succeed in the target language through interactive means.

3.2.4. Glossary

Vocabulary expansion and collaborative working – either individually or in groups – are strengthened on the basis of information recall and long-term retention through constant memory reactivation. Words or structures suggested must be approved by a teacher or peer to be not only collected but also auto-linked to the places where they appear throughout the course for contextualization purposes.

3.2.5. Wiki

A built-in affordance seeking to foster collaborative learning. It operates on a threefold basis: input reception, output production, and continuous work revision; by recording team creation it exemplifies how co-constructive language learning can be put into action. Organized in topics, units, or concepts students self-manage and distribute tasks while using

the target language via a less static approach to knowledge expansion. Samples tasks may be: collective writing, grammar exercises, project creation or feedback giving. All content is learner-generated thus encouraging knowledge construction and linguistic awareness in order to achieve coherent communication with peers.

3.2.6. Lesson

Personalized learning experiences dependent on student choices and level is what this feature targets. Instructors design pathways for the possibilities or responses available on each exercise or page e.g., some students may need to reinforce content while others work on improving weaker skills. The principle is a gamified design encompassing mixed learner profiles to assess multiple or single units e.g., roleplaying, problem/case solving, translating, etc.

3.2.7. Workshop

Especially designed for submissions which will undergo a process of peer assessment conforming to teacher-set parameters. It prompts students to actively participate in a graded exercise requiring target language reception, production, and careful revision so that the feedback provided is coherent in content and on par with the established criteria. Artificial Intelligence-mediated scores are assigned to learners based on the quality of both submission and feedback quality.

3.3. Moodle Analytics

Moodle Team (2021) define the tool to be mostly descriptive and predictive in nature. It reports on common actions i.e., logs and scores derived from online presence and page visits to depict how students are partaking in the course at individual and collective levels; these allow to predict outcomes and differentiate between at-risk and high-performing students. In turn, a very limited data mining process, to which students do not have access, can be carried out. Moreover, course-specific analytics can only be activated by administrators through plugin installation since there is not a fully developed standard version for interoperability across subjects and institutions.

3.4. Moodle Assessment and Feedback

Summative and formative assessment as well as multiple feedback options are available

on the platform: teacher or peer revision, annotations, rubrics, file attachments; formative, summative, or personalized feedback. Conventionally, Assignments, Wiki, and Workshop are bound to extensive tasks covering multiple language units, whereas Forum, Glossary, Lesson, and Quiz tend to channel micro self-learning. Feedback can then be provided in the most suitable format and appropriate time so that students may identify productive feedback patterns. For skills development, the Competencies feature operates on the same basis as Canvas' Outcomes. Once a student completes the tasks aligned to this function, it generates a report based on the scores informing learners about their proficiency level and their progress in the set learning plan.

4. Canvas and Moodle Comparative Analysis

After exploring each LMS in view of four main constituents, we can then compare and contrast how they perform apropos of language learning. We will address inherent assets and shortcomings to attain a thorough side by side awareness of the real implementation these tools enable in contemplation of the claims brought forward by their developers: what works best, which item disappoints, where true potential resides, and whether a dichotomy between novelty and longevity emerges.

4.1. User Interface

Experimenting with Web and Mobile versions lead us to conclude that both for Canvas and Moodle the former proved to be much more reliable. Function quantity is ample in the two: camera, microphone, and storage are the device built-in features permitted positioning them at level 2 of mobility since geolocation is not included. Canvas offers a modern design with some minor factors risking negative attitudes proliferation; the app integrates similar layout and functionalities but fails to meet expectations due to high frequency crashes which constrain simple navigation. Moodle Web's architecture is intuitive and neatly arranged; however, alongside constant technical issues of multimedia loading and excessive steps to reach goals, this does not migrate successfully to the mobile application, and thus requires users to get accustomed to new cues and actions, prompting possible disengagement for being time-consuming. Moodle's core functionality of plugins may be out of instructors' hands for two reasons: by belonging to the administrative line of duties or requiring advanced digital skills from teachers will impede a course-specific accurate configuration.

Ultimately, either technical or aesthetic issues set back stable mobile app access. Even though alternatives might be available, solid evidence of technological change is greatly missing in a field where perspectives and success are measured by such details. Native apps do not match the affirmations presented, and a subsequent workaround of browser access that is not built ergonomically defeats the purpose altogether.

4.2. Learning Tools

From the outset, we notice a possible contrast between the number of features at hand: three on Canvas versus a total of seven on Moodle. The two include standard LMS Assignments, Discussion / Forum, and Quizzes, and Moodle carries a broader catalogue

applicable to language learning – Glossary, Lesson, Wiki, and Workshop, which can also be expanded through plugin installation. Nonetheless, Canvas integrates a Personal Learning Environment feature for group assignments that can be designed to operate in a similar fashion; moreover, External Applications also amplify submission range.

Multiple learner profiles and skill consideration make these resources powerful enough to digitally-enhance classroom settings. The key lies in designing them properly so as to encourage participation and community building, increase confidence in the target language, and expand learning opportunities through a variety of tasks accommodating different styles and strategies. The content editing tools are also essential for multimedia materials and authentic communication exchanges, which make these LMSs adequate to host effective EFL/ESL environments.

4.3. Analytics

If we only focus on the type of data analysis, we can agree they deliver what they claim. Mainly descriptive, and to a certain extent predictive, are the categories we noticed in both platforms; quantitative data is collected from logs, communication, contributions, grades, and page views to outline student progress as well as course activity with an intention of assisting decision-making.

However, if we consider what is truly possible to achieve in accordance with research expectations, then the scope is limited. A lot of emphasis has been placed on the fact that the tool holds the potential to become a powerful source for data mining, and yet a stage where new and valuable information is added has not been reached. Users are given numbers and figures illustrating gradual performance and learning levels, but there are no qualitative insights showing the reasons and the actions to take.

Though it is convenient to detect and alert students regarding their particular situation or adapt course resources, the function does not generate a full picture including, for instance, level, context, or device, which is usually valued by language teachers.

4.4. Assessment and feedback

Canvas and Moodle exhibit similar techniques on this subject. Teachers and peers can

grade submissions abiding by a set of rules and give multifaceted feedback via the content editors: annotations, audiovisual files, or comments. Peer review is especially relevant in the EFL / ESL context because it creates opportunities for authentic input reception and output production. In terms of feedback, traditional methods of summative, formative, and personalized reports have become more significant by incorporating multimedia and scheduling options for diverse task groups.

Additionally, Outcomes (Canvas) and Competencies (Moodle) are two features devised to measure student proficiency in a specific skill or unit. Learning tools can be aligned to assessment scales linked to a series of goals and requirements; once scores are collected, the system reports on the position of each student which can also be reflect on the gradebook in contemplation of final grades.

Manifold sources of feedback increase the impact of this primary mechanism by displaying more comprehensive reports. Students need to actively engage in the process to grow in the target language since the tools also facilitate practice opportunities.

5. Discussion

This prior comparative evaluation has displayed how similar yet distinctive these two LMS are. Some features run in parallel (Assignments), others can be set up analogously (Discussions / Forums; Outcomes / Competencies), whereas still others are exclusive (Collaborations or External Apps; Glossary or Lesson). We will discuss our findings [Table 4] in light of the advantages and disadvantages research attributes to LMS and MALL.

Table 4

Canvas and Moodle Comparative Summary

FUNCTION	CANVAS	MOODLE
User Interface	<p>Intuitive beginner-friendly layout. Customization available for optimized design to avoid cluttering elements. Multimedia and device built-in features available. On the app version, frequent technical issues interfere with smooth navigation. Mobile access is preferable via the browser version.</p>	<p>Clean architecture. Intermediate and above digital skills are recommended given customization and plugins feature. Multimedia and device built-in features available. App version is not functionally consistent to web, and experiences constant technical issues. Mobile access is preferable via the browser version.</p>
Learning Tools	<p>Assignments:</p> <ul style="list-style-type: none"> • LTIs • PLEs <p>Discussions Quizzes</p>	<p>Assignments Forum Glossary Lesson Quiz Wiki Workshop</p>
Analytics	<p>Descriptive and predictive for individual, group, and course reports from quantitative data on:</p> <ul style="list-style-type: none"> • Access • Communication • Grades • Participation 	<p>Descriptive and predictive for individual, group, and course reports from quantitative data on:</p> <ul style="list-style-type: none"> • Activity • Grades • Logs
Feedback & Assessment	<p>Multiple sources and formats:</p> <ul style="list-style-type: none"> • Teacher or peer • Immediate, formative, summative • Multimedia <p>Outcomes for skill levels</p>	<p>Multiple sources and formats:</p> <ul style="list-style-type: none"> • Teacher or peer • Immediate, formative, summative • Multimedia <p>Competencies for skill levels</p>

To begin with LMS, Canvas and Moodle indeed offer wide-range choice of functions, especially in setup menus which enable multiple formats for engagement. A course's success rate will highly depend on accurate configuration through the category panel on each LMS in order to create engaging and constructive learning experiences. Chat, email, forum boards, and third-party apps like BigBlueButton, Office365, or ZOOM keep users continually connected to the platform through several channels. Consequently, data-driven decisions derived from quantitative online presence may be conducted to monitor student progress and adapt course content strategically e.g., notify low-performing students, check resource usability for immediate or future improvement. Lastly, in the matter of ubiquity, we can say such access is feasible but owing to technical issues and User Interface design problems mobile apps do not perform the way they are intended to.

As a result, these LMSs are not robust enough for MALL. Even though their affordances promote flexibility and multimodality, mobile learning is not supported on a general level. A poor app user experience due to bad architecture alongside a web access not designed for such purposes manifest a negligence of crucial aspects for conducting this approach, from which additional shortcomings will end up stemming. For this reason, user digital literacy, often labelled as the prime cause for failure, must not be the sole measure of achievement. A single tool expected to be used by multiple profiles needs to ensure standard operations run smoothly. If application behavior does not meet standards, the responsibility for a successful implementation cannot possibly be on the users' end; by assuming flawless performance without further examination, digital skills become the wrong focal point. A Digital Competence Framework is undoubtedly key to manage modern pedagogies, but a well-shaped tool is imperative for real implementation to be possible.

A first-hand experience of the two LMSs allowed us to grasp the academic and technological factors involved and how they perform for language learning. Decades-long concerns are still very much relevant today, and some are thus far underdeveloped i.e., analytics and mobile fields. While constant updates are made, hardly any pedagogic considerations are taken. Notwithstanding, multifaceted collaborative and interactive functions both for learning as well as teaching practices make them helpful didactic sources: authentic materials, meaningful feedback, four-skills and knowledge appraisal offer an engaging learning context which greatly benefits EFL/ESL.

All things considered, we have learned that Canvas' novelty is not a distinctly innovative panacea and Moodle's longevity does not imply a better performance. Hence, an all-encompassing LMS was not found. A double takeaway ensues regarding User Interface and Digital Literacy. Instructors must use computerized pedagogical approaches constructively to promote language acquisition; in such a manner, they will get closer to a holistic model containing the strategies required by modern instructional methods. Yet, it will only be possible if resource architecture allows it.

Teachers then face a complex task given the fact that LMS quality will be evaluated by students since nowadays "technology quality, online tools and face-to-face support are predictors of learners satisfaction" (Kintu et al., 2017, p.17). They need to find the balance on this dimension from which extreme, but not absolute importance is demanded (Duin & Tham, 2020; Gabarrón-Pérez et al., 2020; Strang, 2016).

Conclusion

The present study focused on three objectives in the context of EFL/ESL in higher education through the lens of analytic, comparative, and descriptive methods: identify the functions of each platform, examine their integrated affordances, and compare the findings to obtain a comprehensive perception of how they operate on the basis of LMS and MALL research. After an initial panoramic view of each space, we proceeded to explore four categories: User Interface, Learning Tools, Analytics, and Assessment and Feedback, which then led to our side-by-side analysis.

LMSs have proven to be versatile for individual and collaborative environments in the process of building online dimensions that redefine traditional models. Skills development through meaningful tasks where authentic language use is available will stimulate the learners' active engagement and motivation. Our findings can help educators recognize and understand relevant features in view of realistic expectations to prevent general misuse. Such a pragmatic vision will improve learning opportunities when it comes to material creation, adaptation, and reuse, transcending the standard storage function by taking advantage of interactive possibilities fit for specific classroom needs.

Even though the target affordances were discussed in detail, one particular challenge was mobile application interface in both systems. Technical and aesthetic issues limited our research for a MALL-based LMS. From this, we were able to infer an evident lack of collaboration between software developers and language experts/teachers which is required if classroom innovation is to agree with digital change; in other words, LMS service promise must be accurate to fulfil didactic needs. Moreover, faculty training plays a significant role in bringing new insights while monitoring steady application. Future research may want to examine if improvements to boost mobile experiences are made in regard to pedagogic principles and assess approach feasibility.

We can conclude these affordances to be imperative for higher education language learning-teaching, where the quality of a tool will prompt contrasting attitudes. Nonetheless, we can also affirm that in this context many of the digital promises are challenged in real classroom implementation, such as seamless mobile access or cross-platform use. While new expectations and responsibilities keep emerging within the EFL/ESL fields, these LMSs are not pedagogically sophisticated enough to effortlessly integrate modern methodologies.

References

- Ahmad, F., Beyene, W., & Giannoumis, G. A. (2018). Comparative Evaluation of Accessibility and Learnability of Learning Management Systems: Case of Fronter and Canvas. In C. Stephanidis (Ed.), *HCI International 2018 – Posters 'Extended Abstracts* (pp. 3-9). Springer. https://doi.org/10.1007/978-3-319-92279-9_1
- Aldiab, A., Chowdhury, H., Kootsookos, A., Alam, F., & Allhibi, H. (2019). Utilization of Learning Management Systems (LMSs) in higher education system: A case review for Saudi Arabia. *Energy Procedia*, 160, 731-737.
<https://doi.org/10.1016/j.egypro.2019.02.186>
- Al Harbi, M. (2016). Faculty Attitudes Toward and Motivation for Virtual Learning Environments (VLE) for Language Studies: A Cross-National Study in Saudi Arabian Universities. *Journal of Psychology and Behavioral Science*, 4(2), 2374-2399.
<https://doi.org/10.15640/jpbs.v4n2a9>
- Al Khoeri, A.F, Nuraini, W., Ramdani, R., & Agum, S. (2021). The Implementation of Canvas to Enhance English Teaching and Learning. In D. Priyatno, M. Rois, J. Helmie, N. Kurniawati, E. H. Maolida, V. A. Salsabila, A. Sofarini A. (Eds.), *iConnects 2021 Proceedings* (pp. 315-320). GARUDA. <https://iconnects.unsur.ac.id/past-conference/1st-iconnects-conference>
- Al Yafaei, Y., & Attamimi, R. (2019). Understanding Teachers' Integration of Moodle in EFL Classrooms A Case Study. *English Language Teaching*, 12(4), 1-6.
<https://doi.org/10.5539/elt.v12n4p1>
- Amin, F. M., & Sundari, H. (2020). EFL students 'preferences on digital platforms during emergency remote teaching: Video Conference, LMS, or Messenger Application? *Studies in English Language and Education*, 7(2), 362-378.
<https://doi.org/10.24815/siele.v7i2.16929>

- Atif, A. Jha, M., Richards, D., & Bilgin, A. A. (2021). In S. Caballé, S. Demetriadis, E. Gómez-Sánchez, P. Papadopoulos, A. Weinberger (Eds.), *Artificial Intelligence (AI)-enabled remote learning and teaching using Pedagogical Conversational Agents and Learning Analytics* (pp. 3-29). Academic Press. <https://doi.org/10.1016/b978-0-12-823410-5.00013-9>
- Azizah, E. N. (2020). Using Learning Management System, Edmodo, for Sociolinguistic Learning: A Case Study at English Education. *Academica: Journal of Multidisciplinary Studies*, 2(1), 61-70. <http://ejournal.iainsurakarta.ac.id/index.php/academica/article/view/2239>
- Babich, N. (2016). *Golden Rules of User Interface Design*. UX Planet. <https://uxplanet.org/golden-rules-of-user-interface-design-19282aeb06b>
- Bailey, D. R., Lee, A. R., Che Vorst, T., & Crosthwaite, P. (2017). An investigation of differences and changes in L2 writing anxiety between blended and conventional English language learning contexts. *CALL-EJ*, 18(1), 22-39. <https://www.researchgate.net/publication/312494929>
- Barnes, C. (2014). *Education and Training - What's the difference?* eLearning Industry. <https://elearningindustry.com/education-and-training-what-is-the-difference>
- Bartolomé-Alonso, P. (2014). Las herramientas de autor en el aula de ELE. *La Enseñanza Del Español Como LE/L2 En El Siglo XXI*, 141-150. <https://dialnet.unirioja.es/servlet/articulo?codigo=5423123>
- Basabrin, A. (2019). Exploring EFL Instructors and Students Perceptions of Written Corrective Feedback on Blackboard Platform: A Case Study. *Arab World English Journal*, 1(1), 178-191. <https://doi.org/10.24093/awej/elt1.13>
- Bell, B. S., & Federman, J. E. (2013). E-learning in Postsecondary Education. *The Future of Children*, 23(1), 165-185. <https://doi.org/10.1353/foc.2013.0007>

- Berber, K. (2020). EFL Teachers' Perceptions and Experiences with the Moodle Platform during COVID-19 Epidemic A Case Study at the University of Tizi-Ouzou. *Journal of Studies in Language, Culture, and Society (JSLCS)*, 3(3), 11-23. <https://www.researchgate.net/profile/Katia-Berber/publication/359659160>
- Boyatt, R., & Sinclair, J. (2012). Navigating the Educational Cloud. *Advances in Intelligent Systems and Computing*, 179-191. https://doi.org/10.1007/978-3-642-30859-8_17
- Burston, J. (2014). The Reality of MALL: Still on the Fringes. *CALICO Journal*, 31(1), 103-125. <https://doi.org/10.11139/cj.31.1.103-125>
- Çakmak, F. (2019). Mobile Learning and Mobile Assisted Language Learning in Focus. *Language and Technology*, 1(1), 30-48. <https://dergipark.org.tr/tr/download/article-file/665969>
- Cassany, D. (2018). 12 Expresión Escrita (Writing). In J. Muñoz-Basols (Ed.), *The Routledge Handbook of Spanish Language Teaching* (pp. 168-182). Routledge. <http://ebookcentral.proquest.com/lib/unedbiblioteca-ebooks/detail.action?docID=5569553>
- Carpenter, T. S., Beall, L. C., & Hodges, L. C. (2020). Using the LMS for Exam Wrapper Feedback to Prompt Metacognitive Awareness in Large Courses. *Journal of Teaching and Learning with Technology*, 9(1), 79-91. <https://doi.org/10.14434/jotlt.v9i1.29156>
- Cavus, N., Uzunboylu, H., & Ibrahim, D. (2007). Assessing the Success Rate of Students Using a Learning Management System Together with a Collaborative Tool in Web-Based Teaching of Programming Languages. *Journal of Educational Computing Research*, 36(3), 301-321. <https://doi.org/10.2190/t728-g676-4n18-6871>
- Chen, C-C., Huang, C., Gribins, M, & Swan, K. (2018). Gamify Online Courses with Tools Built into Your Learning Management System (LMS) to Enhance Self-Determined and Active Learning. *Online Learning*, 22(3), 41-54. <https://doi.org/10.24059/olj.v22i3.1466>

- Chen, W., Sanderson, N. C., Nichshyk, A., Bong, W. K., & Kessel, S. (2021). Usability of Learning Management Systems for Instructors – The Case of Canvas. In P. Zaphiris & A. Ioannou (Eds.), *Learning and Collaboration Technologies: New Challenges and Learning Experiences* (pp. 210-223). Springer Publishing. https://doi.org/10.1007/978-3-319-92279-9_1
- Coates, H., James, R., & Baldwin, G. (2005). A critical examination of the effects of learning management systems on university teaching and learning. *Tertiary Education and Management*, 11(1), 19-36. <https://doi.org/10.1080/13583883.2005.9967137>
- Crompton, H., & Traxler, J. (2015). Mobile learning. In Y. Zheng (Ed.), *Encyclopedia of Mobile Phone Behavior* (pp. 506-518). IGI Global. https://digitalcommons.odu.edu/teachinglearning_fac_pubs/116/
- Czerska-Andrzejewska, D. (2016). Mobile assisted language learning. *Zeszyty Glotodydaktyczne*, 6, 43-52. <https://www.ejournals.eu/ZG/2016/Zeszyt-6/art/8608/>
- Dahlstrom, E., Brooks, D. C., & Bichsel, J. (2014). *The Current Ecosystem of Learning Management Systems in Higher Education: Student, Faculty, and IT Perspectives*. EDUCAUSE. <https://doi.org/10.13140/RG.2.1.3751.6005>
- Del Prete, A., Cabrero-Almenara, J., & Halal-Orfalí, C. (2018). Motivos inhibidores del uso del Moodle en docentes de educación superior. *Campus Virtuales*, 7(2), 69-80. <https://idus.us.es/bitstream/handle/11441/81058/>
- Demir, F., Bruce-Kotey, C., & Alenezi, F. (2022). User Experience Matters: Does One size Fit all? Evaluation of Learning Management Systems. *Technology, Knowledge and Learning*, 27, 49-67. <https://doi.org/10.1007/s10758-021-09518-1>
- Demouy, V., Jones, A., Kan, Q., Kukulska-Hulme, A., & Eardley, A. (2016). Why and how do distance learners use mobile devices for language learning? *The EuroCALL Review*, 24(1), 10-24. <https://doi.org/10.4995/eurocall.2016.5663>

- Dogoriti, E., Pange, J., & S. Anderson, G. (2014). The use of social networking and learning management systems in English language teaching in higher education. *Campus-Wide Information Systems*, 31(4), 254-263. <https://doi.org/10.1108/cwis-11-2013-0062>
- Duin, A. H., & Tham, J. (2020). The Current State of Analytics: Implications for Learning Management System (LMS) Use in Writing Pedagogy. *Computers and Composition*, 55. <https://doi.org/10.1016/j.compcom.2020.102544>
- Endozo, A. N., Oluyinka, S., & Daenos, R. G. (2019). Teachers' Experiences towards Usage of Learning Management System. In *Proceedings of the 2019 11th International Conference on Education Technology and Computers* (pp. 91-95). ACM Digital Library. <https://doi.org/10.1145/3369255.3369257>
- Fakhrudinova, A., & Nurkhamitov, M. (2016). Technologies of interactive learning in higher education. *International Journal of Humanities and Culture Studies*, 383-389. <https://www.ijhcs.com/index.php/ijhcs/article/view/2136>
- Fathema, N., & Akanda, M. H. (2020). Effects of instructors' academic disciplines and prior experience with learning management systems: A study about the use of Canvas. *Australasian Journal of Educational Technology*, 36(4), 113-125. <https://doi.org/10.14742/ajet.5660>
- Fauzi, M. F., Murdiono, M., Anindiati, I., Nada, A. L. I., Khakim, R. R., Mauludiyah, L., & Thoifah, I. (2020). Developing Arabic Language Instructional Content in Canvas LMS for the Era and Post Covid-19 Pandemic. *Izdihar: Journal of Arabic Language Teaching, Linguistics, and Literature*, 3(3), 161-180. <https://doi.org/10.22219/jiz.v3i3.15017>
- Gabarrón Pérez, N., Pino Rodríguez, A.M., Salvadores Merino, C., & Trujillo Sáez, F. (2020). Tecnología para la Enseñanza y el Aprendizaje de Lenguas Extranjeras. *Pragmalingüística*, 28, 238-254, <https://doi.org/10.25267/pragmalinguistica.2020.i28.12>
- García-Botero, G., Questier, F., & Zhu, C. (2018). Self-directed language learning in a mobile-assisted, out-of-class context: do students walk the talk? *Computer Assisted Language Learning*, 32(1-2), 71-97. <https://doi.org/10.1080/09588221.2018.1485707>

- Ghosh, A., Nafalski, A., Nedic, Z., & Wibawa, A. P. (2019). Learning management systems with emphasis on the Moodle at UniSA. *Bulletin of Social Informatics Theory and Application*, 3(1), 13-21. <https://doi.org/10.31763/businta.v3i1.160>
- Godwin-Jones, R. (2011). Autonomous language learning. *Language Learning & Technology*, 15(3), 4-11. https://scholarspace.manoa.hawaii.edu/bitstream/10125/44255/15_03_emerging.pdf
- Godwin-Jones, R. (2012). Challenging Hegemonies in Online Learning. *Language Learning & Technology*, 16(2), 4-13. https://scholarspace.manoa.hawaii.edu/bitstream/10125/44279/16_02_emerging.pdf
- Godwin-Jones, R. (2017). Scaling up and Zooming In: Big Data and Personalization in Language Learning. *Language Learning & Technology*, 21(1), 4-15. https://scholarspace.manoa.hawaii.edu/bitstream/10125/44592/21_01_emerging.pdf
- Grimshaw, J., Cardoso, W., & Collins, L. (2017). Teacher perspectives on the integration of mobile-assisted language learning. In K. Borthwick, L. Bradley, & S. Thouésny (Eds.), *CALL in a climate of change: adapting to turbulent global conditions – short papers from EUROCALL* (pp. 135-140). Research Publishing. <https://files.eric.ed.gov/fulltext/ED578177.pdf>
- Grossi, M. G. R., Elias, M. C. A. D. S., Chamon, C. M., & Leal, D. C. (2018). The Educational Potentialities of the Virtual Learning Environments Moodle and Canvas: A Comparative Study. *International Journal of Information and Education Technology*, 8(7), 514-519. <https://doi.org/10.18178/ijiet.2018.8.7.1091>
- Heil, C. R., Wu, J. S., Lee, J. J., & Schmidt, T. (2016). A Review of Mobile Language Learning Applications: Trends, Challenges, and Opportunities. *The EUROCALL Review*, 24(2), 32-50. <https://doi.org/10.4995/eurocall.2016.6402>
- Hill, P. (2021). *State of Higher Ed LMS Market for US and Canada: Year-End 2020 Edition*. PhilOnEdTech. <https://philonedtech.com/state-of-higher-edlms-market-for-us-and-canada-year-end-2020-edition/>

- Hill, P. (2022). *State of Higher Ed LMS Market for US and Canada: Year-End 2021 Edition*. PhilOnEdTech. <https://philonedtech.com/state-of-higher-ed-lms-market-for-us-and-canada-year-end-2021-edition/>
- Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). *The Difference Between Emergency Remote Teaching and Online Learning*. EDUCAUSE. <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>
- Hoven, D., & Palalas, A. (2016). Ecological Constructivism as a New Learning Theory for MALL: An Open System of Beliefs, Observations, and Informed Explanations. In A. Palalas & M. Ally (Eds.), *The International Handbook of Mobile-Assisted Language Learning* (pp. 113-137). Central Radio & TV University Press. <https://www.academia.edu/27892480/>
- Hsu, L. (2013). English as a foreign language learners' perception of mobile assisted language learning: a cross-national study. *Computer Assisted Language Learning*, 26(3), 197-213. <https://doi.org/10.1080/09588221.2011.649485>
- Hung, P., Lam, J., Wong, C. & Chan, T. (2015). A Study on Using Learning Management System with Mobile App. In F. L Wang, T. L Wong, O. Au, Q. Liu, & D. Wu (Eds.), *Proceedings of the 2015 International Symposium on Educational Technology* (pp. 168-172). IEEE. <https://doi.org/10.1109/ISET.2015.41>
- Instructure Team. (2022). *Three Reasons the Canvas Mobile App is an Essential Download*. Instructure. <https://www.instructure.com/canvas/resources/higher-education/three-reasons-the-canvas-mobile-app-is-an-essential-download>
- Ishikawa, Y., Akahane-Yamada, R., Kitamura, M., Smith, C., Tsubota, Y., & Dantsuji, M. (2014). Sustaining Outside-of-Class CALL Activities by Means of a Student Self-Evaluation System in a University Blended Learning EFL Course. *Lecture Notes in Computer Science*, 146-154. https://doi.org/10.1007/978-3-319-07485-6_15

- Kadoic, N., & Oreski, D. (2018). Analysis of student behavior and success based on logs in Moodle. In K. Skala, M. Koricic, T. G. Grbac, M. Cicin-Sain, V. Sruk, S. Ribaric, S. Gros...M. Janjic (Eds.), *Proceedings of the 2018 41st International Convention on Information and Communication Technology, Electronics and Microelectronics* (pp. 654-659). IEEE. <https://doi.org/10.23919/mipro.2018.8400123>
- Kannan, J., & Munday, P. (2018). New Trends in Second Language Learning and Teaching through the lens of ICT, Networked Learning, and Artificial Intelligence. *Círculo de Lingüística Aplicada a La Comunicación*, 76, 13-30. <https://doi.org/10.5209/clac.62495>
- Kapsargina, S., Shmeleva, Z., & Olentsova, J. (2020). Innovative Methods of Working with the Text in the Process of Teaching a Foreign Language in a Non-Linguistic University. *Advances in Economics, Business and Management Research*, 128, 545-550. <https://www.researchgate.net/publication/340302343>
- Karasimos, A. (2022). The battle of language learning apps: a cross-platform overview. *Research Papers in Language Teaching and Learning*, 12(1), 150-166. <https://researchgate.net/publication/355203434>
- Khairudin, N., Khairudin, R., Hamid, M. N. A., Hancock, P., McGill, T., & Zamani, Z. A. (2016). The Importance of Human Capital Perspective in the Learning Management System (LMS) Decision-Making Process at Universities. *Jurnal Psikologi Malaysia*, 30(2), 102-113. <https://spaj.ukm.my/ppppm/jpm/article/view/245>
- Khan, A., Egbue, O., Brooke, P., Madden, J. Active Learning: Engaging Students to Maximize Learning in an Online Course. (2017). *Electronic Journal of E-Learning*, 15(2), 107-115. <https://files.eric.ed.gov/fulltext/EJ1141876.pdf>
- Khatser, G., & Khatser, M. (2022). Online Learning Through LMSs: Comparative Assessment of Canvas and Moodle. *International Journal of Emerging Technologies in Learning (iJET)*, 17(12), 184-200. <https://doi.org/10.3991/ijet.v17i12.30999>

- Kintu, M. J., Zhu, C., & Kagambe, E. (2017). Blended learning effectiveness: the relationship between student characteristics, design features and outcomes. *International Journal of Educational Technology in Higher Education*, 14(1). <https://doi.org/10.1186/s41239-017-0043-4>
- Kruger, D., Inman, S., Ding, Z., Kang, Y., Kuna, P., Liu, Y., Lu, X., Oro, S., & Wang, Y. (2015). Improving Teacher Effectiveness: Designing Better Assessment Tools in Learning Management Systems. *Future Internet*, 7(4), 484-499. <https://doi.org/10.3390/fi7040484>
- Kukulska-Hulme, A. (2012). Language learning defined by time and place: A framework for next generation designs. In J. E. Díaz-Vera (Ed.), *Left to my own devices: Learner autonomy and mobile assisted language learning (Innovation and leadership in English language teaching)* (pp. 1-13). Emerald Group Publishing. [https://doi.org/10.1108/S2041-272X\(2012\)0000006004](https://doi.org/10.1108/S2041-272X(2012)0000006004)
- Kukulska-Hulme, A. (2016). Mobile Assistance in Language Learning: A critical appraisal. In A. Palalas & M. Ally (Eds.), *The International Handbook of Mobile-Assisted Language Learning* (pp. 138-160). Central Radio & TV University Press. <https://www.researchgate.net/publication/308917838>
- Kukulska-Hulme, A., Lee, H., & Norris, L. (2017). Mobile Learning Revolution: Implications for Language Pedagogy. In C. A. Chapelle & S. Sauro (Eds.), *The Handbook of Technology and Second Language Teaching and Learning* (pp. 217-233). Wiley. <https://doi.org/10.1002/9781118914069>
- Kukulska-Hulme, A., & Viberg, O. (2018). Mobile collaborative language learning: State of the art. *British Journal of Educational Technology*, 49(2), 207-218. <https://doi.org/10.1111/bjet.12580>

- Kurilovas, E., Kurilova, J., & Melesko, J. (2016). Personalised Learning System Based on Students' Learning Styles and Application of Intelligent Technologies. In L. Gómez Chova, A. López Martínez, & I. Candel Torres (Eds.), *Proceedings of the 9th International Conference of Education, Research and Innovation* (pp. 6976-6986). Atlantis Press. <https://www.researchgate.net/profile/Eugenijus-Kurilovas/publication/31136>
- Laflen, A. (2019). What LMS Site Statistics Tell Us About Timing Instructor Feedback on Student Writing. *Journal of Response to Writing*, 5(2), 46-71. <https://scholarsarchive.byu.edu/journalrw/vol5/iss2/3/>
- Lai, C. & Zheng, D. (2017). Self-directed use of mobile devices for language learning beyond the classroom. *ReCALL*, 30(3), 299-318. <https://doi.org/10.1017/s0958344017000258>
- Lamichhane, P., Mahatra, A., Parajuli, A., & Shrestha, S. (2019). Comparative analysis between Moodle and self-made Learning Management System. In *KEC Conference 2019 Proceedings* (pp. 249-254). http://kec.edu.np/wp-content/uploads/2020/01/Paper_45.pdf
- Levy, M. (2009). Technologies in Use for Second Language Learning. *The Modern Language Journal*, 93, 769-782. <https://doi.org/10.1111/j.1540-4781.2009.00972.x>
- Lindsay, W. K. (2017). Canvas Basics. *International Journal of Digital Literacy and Digital Competence*, 8(3), 28-38. <https://doi.org/10.4018/ijdlcd.2017070102>
- Lotherington, H. (2018). How Mobile Are Top-Rates Mobile Language Learning Apps? In I. Sánchez & P. Isaías (Eds.), *Proceedings of the 14th International Conference Mobile Learning* (pp. 121-128). IADIS Press. <https://files.eric.ed.gov/fulltext/ED590366.pdf>
- Liu, D. Y. T., Atif, A., Froissard, J. C., & Richards, D. (2019). An enhanced learning analytics plugin for Moodle: Student engagement and personalised intervention. In *ASCILITE 2015 Conference Proceedings* (pp. 180-189) <http://www.2015conference.ascilite.org/wp-content/uploads/2015/11/ascilite-2015-proceedings.pdf>

- Lustek, A., Jedrinovic, S., & Rugelj, J. (2019). Supporting Teachers in Higher Education for Didactic Use of the Learning Environment Moodle. In J. Rugelj & M. Lapina (Eds.), *Proceedings of SELT-2019: International Scientific Conference Innovative Approaches to the Application of Digital Technologies in Education and Research* (pp. 1-16). CEUR Workshops. https://ceur-ws.org/Vol-2494/paper_20.pdf
- Mahnaseh, O. M. K. (2020). The Effect of Teaching by Mobile Learning in University Students' Achievement. In I. Sánchez, P. Isaías, & B. Bontchev (Eds.), *Proceedings of the 16th International Conference Mobile Learning 2020* (pp. 121-125). IADIS Press. <https://www.researchgate.net/profile/Omar-Mahasneh-2/publication//341890023>
- McLaren, J., Donaldson, J., & Smith, S. (2018). Learning Analytics Suggest a Positive Experience. In K. Ntalianis, C. Sgouropoulou, & A. Andreatos (Eds.), *Proceedings of the 17th European Conference on E-learning* (pp. 670-678). Academic Conferences and Publishing. <https://www.storre.stir.ac.uk/bitstream/1893/28381/1/Learning%20Analytics%20Suggest%20a%20Positive%20Experience.pdf>
- Mehdipour, Y., & Zerehkafi, H. (2013). Mobile Learning for Education: Benefits and Challenges. *IJCER*, 3(6), 93-101. <https://d1wqtxts1xzle7.cloudfront.net/55396587/>
- Melton, M. L. (2019). *ALEXA Skill Voice Interface for the Moodle Learning Management System*. [Master's Thesis, Appalachian State University]. ACM Digital Library. http://libres.uncg.edu/ir/asu/f/Melton_Michelle_2019_Thesis.pdf
- Metruk, R. (2020). Confronting the Challenges of MALL: Distraction, Cheating, and Teacher Readiness. *International Journal of Emerging Technologies in Learning (IJET)*, 15(2), 4-13. <https://doi.org/10.3991/ijet.v15i02.11325>
- Moodle Team. (2020). *About Moodle*. MOODLE. https://docs.moodle.org/401/en/About_Moodle
- Moodle Team. (2021). *Analytics*. MOODLE. <https://docs.moodle.org/401/en/Analytics>

- Moodle Team. (2022). *Moodle App Feature*. MOODLE. https://docs.moodle.org/401/en/Moodle_app_features
- Moreno-Fuentes, E., & Risueño Martínez, J. J. (2018). Design of a Checklist for Evaluating Language Learning Websites. *Porta Linguarum*, 30, 23-41. <https://dialnet.unirioja.es/descarga/articulo/6691572.pdf>
- Mpungose, C.B., Khoza, S.B (2022). Postgraduate Students' Experiences on the Use of Moodle and Canvas Learning Management System. *Tech Know Learn*, 27, 1-16 <https://doi.org/10.1007/s10758-020-09475-1>
- Nuraeni, C., Carolina, I., Supriyatna, A., Widiati, W., & Bahri, S. (2020). Mobile-Assisted Language Learning (MALL): Students' Perception and Problems towards Mobile Learning in English Language. *Journal of Physics: Conference Series*, 1641(1). <https://doi.org/10.1088/1742-6596/1641/1/012027>
- Ozer, O., & Kılıç, F. (2018). The Effect of Mobile-Assisted Language Learning Environment on EFL Students' Academic Achievement, Cognitive Load and Acceptance of Mobile Learning Tools. *EURASIA Journal of Mathematics, Science and Technology Education*, 14(7), 2915-2928. <https://doi.org/10.29333/ejmste/90992>
- Palalas, A., & Hoven, D. (2016). Emerging Pedagogies for MALL. In A. Palalas & M. Ally (Eds.), *The International Handbook of Mobile-Assisted Language Learning* (pp. 44-85). Central Radio & TV University Press. <https://www.academia.edu/27892480/>
- Panagiotidis, P. (2018). Technologies and language learning: Towards next generation digital learning environments. In L. Gómez Chova, A. López Martínez, & I. Candel Torres (Eds.), *Proceedings of the 11th International Conference of Education, Research and Innovation* (pp. 1609-1617). IATED. <https://doi.org/10.21125/iceri.2018.1364>
- Pegrum, M. (2016). Three Agendas for MALL. In A. Palalas & M. Ally (Eds.), *The International Handbook of Mobile-Assisted Language Learning* (pp. 86-112). Central Radio & TV University Press. <https://www.academia.edu/27892480/>

- Pérez-Paredes, P., & Zhang, D. (2022). Mobile Assisted Language Learning: *Porta Linguarum Revista Interuniversitaria De Didáctica De Las Lenguas Extranjeras*, (4), 11-25. <https://doi.org/10.30827/portalin.vi.21424>
- Perifanou M. (2021): *Digital Competence Assessment Framework and Tool for Language Teachers*. DC4LT Consortium. <https://www.dc4lt.eu/>
- Piña, A. A. (2013). Learning Management Systems. In Y. Kats (Ed.), *Learning Management Systems and Instructional Design: Best Practices in Online Education* (pp. 1-19). IGI Global. <https://doi.org/10.4018/978-1-4666-3930-0.ch001>
- Prasetya, R. E. (2021). Effectiveness of Teaching English for Specific Purposes in LMS Moodle: Lecturers' Perspective. *Journal of English Language Teaching and Linguistics*, 6(1), 93-109. <https://doi.org/10.21462/jeltl.v6i1.498>
- Pratiwi, A. (2021). *Student's perceptions on the use of Canvas in ESP classes at University of Muhammadiyah Malang*. [Master's Thesis, Universitas Muhammadiyah Malang]. UMM Institutional. <https://eprints.umm.ac.id/82003/2/PENDAHULUAN.pdf>
- Pujasari, R. S., & Ruslan, R. (2021). Utilizing Canvas in Technology Enhanced Language Learning. *Learning of English as a Foreign Language*, 8(1), 42-54. <https://doi.org/10.36706/jele.v8i1.14240>
- Reid, D. L. (2019). Learning Management Systems: The Game Changer for Traditional Teaching and Learning at Adult and Higher Education Institutions. *Global Journal of Human-Social Science: G Linguistics & Education*, 19(6) 1-14. <https://doi.org/10.34257/gjhssgvoll9is6pg1>
- Reinders, H., & Hubbard, P. (2013). CALL and Learner Autonomy: Affordances and Constraints. In M. Thomas, H. Reinders, & M. Warschauer (Eds.), *Contemporary Computer-Assisted Language Learning* (pp. 359-375). Continuum. <https://www.researchgate.net/publication/323185552>

- Rhode, J., Richter, S., Gowen, P., Miller, T., & Wills, C. (2017). Understanding Faculty Use of the Learning Management System. *Online Learning*, 21(3), 68-86. <https://doi.org/10.24059/olj.v%vi%i.1217>
- Rudzewitz, B., Ziai, R., Nuxoll, F., De Kuthy, K., & Meurers, D. (2020). Enhancing a Web-based Language Tutoring System with Learning Analytics. *EDM (Workshops)*, 1-7. <http://ceur-ws.org/Vol-2592/paper1.pdf>
- Sato, M. (2013). Beliefs about peer interaction and peer corrective feedback: Efficacy of classroom intervention. *The Modern Language Journal*, 97(3), 611-633. <https://doi.org/10.1111/j.1540-4781.2013.12035.x>
- Santiana, S., Silvani, D., & Ruslan, R. (2021). Optimizing LMS CANVAS for Interactive Online Learning Perceived by the Students. *Journal of English Education and Teaching*, 5(4), 529-543. <https://doi.org/10.33369/jeet.5.4.529-543>
- Saputro, B., & Susilowati, A.T. (2019). Effectiveness of Learning Management System (LMS) On In-Network Learning System (SPADA) Based on Scientific. *Journal for the Education of Gifted Young Scientists*, 7(3), 533-546. <https://doi.org/10.17478/jegys.606029>
- Sarrab, M., & Aldabbas, L. E. H. (2012). Mobile Learning (M-Learning) and Educational Environments. *International Journal of Distributed and Parallel Systems*, 3(4), 31-38. <https://doi.org/10.5121/ijdps.2012.3404>
- Sharples, M., Taylor, J., & Vavoula, G. (2005). Towards a Theory of Mobile Learning. In H. Van Der Merwe & T. Brown (Eds.), *Mobile Technology: The Future of Learning in Your Hands* (pp. 1-9). Paarl Printing. https://www.researchgate.net/publication/228346088_Towards_a_theory_of_mobile_learning
- Soeung, C., Nakanitanon, P., & Chaichompoo, C. (2020). The Effects of Peer Feedback Activity Through Canvas Learning Management System on Enhancing of Pannasastra University Students 'English Writing Ability. *Journal of Graduate Research*, 11(2), 55-66. <https://so02.tcithaijo.org/index.php/banditvijai/article/download/241952/166486>

- Son, J.B. (2016). Selecting and evaluating mobile apps for language learning. In A. Palalas & M. Ally (Eds.), *The International Handbook of Mobile-Assisted Language Learning* (pp. 86-112). Central Radio & TV University Press. <https://www.academia.edu/27892480/>
- Steel, C. H. (2012). Fitting Learning into life: language students perspectives on the benefits of using mobile apps. In M. Brown, M. Hartnett, & T. Stewart (Eds.), *Future challenges, sustainable future: Proceedings of ASCILITE 2012 Conference* (pp. 875-880). <https://researchgate.net/publication/233978244>
- Steiner, D., & Mendelovitch, M. (2017). “I’m The Same Teacher”: The Attitudes of Science and Computer Literacy Teachers Regarding Integrating ICT in Instruction to Advance Meaningful Learning. *EURASIA Journal of Mathematics, Science and Technology Education*, 13(5), 1259-1282. <https://doi.org/10.12973/eurasia.2017.00670a>
- Stockwell, G., & Hubbard, P. (2013). Some Emerging Principles for Mobile-assisted Language Learning. *TIRF*, 1-15. https://www.tirfonline.org/wp-content/uploads/2013/11/TIRF_MALL_Papers_StockwellHubbard.pdf
- Strang, K. D. (2016). Do the Critical Success Factors from Learning Analytics Predict Student Outcomes? *Journal of Educational Technology Systems*, 44(3), 273-299. <https://doi.org/10.1177/0047239515615850>
- Tafazoli, D., Huertas-Abril, C. A., & Gómez-Parra, M. E. (2019). Technology-Based Review on Computer-Assisted Language Learning: A Chronological Perspective. *Pixel-Bit Revista De Medios Y Educación*, 54, 29-44. <https://doi.org/10.12795/pixelbit.2019.i54.02>
- Tayan, B. M. (2017). Students and Teachers’ Perceptions into the Viability of Mobile Technology Implementation to Support Language Learning for First Year Business Students in a Middle Eastern University. *International Journal of Education and Literacy Studies*, 5(2), 74-83. <https://doi.org/10.7575/aiac.ijels.v.5n.2p.74>
- Toto Giusi. A, & Limone, P. (2020). E-Learning, MALL and LMOOC or a New Didactic Tendency in Foreign Language Learning: A Meta-Analysis from 2014 to 2018. *Psychology*, 11(04), 581-593. <https://doi.org/10.4236/psych.2020.114039>

- Traxler, J. (2005). Defining mobile learning. In P. Isaías, C. Borg, P. Kommers, & P. Bonano (Eds.), *Proceedings of the IADIS International Conference Mobile Learning 2005* (pp. 261-266). IADIS Press. https://www.researchgate.net/publication/228637407_Defining_mobile_learning
- Turnbull, D., Ritesh C., Luck, J. (2020). Learning Management Systems: An Overview. In A. Tatnall (Ed.), *Encyclopedia of Education and Information Technologies* (pp. 1052-1058). Springer. https://doi.org/10.1007/978-3-030-10576-1_248
- Ushioda, E. (2013). Motivation matters in mobile language learning: A brief commentary. *Language Learning & Technology*, 17(3), 1-5. <http://llt.msu.edu/issues/october2013/commentary.pdf>
- Veluvali, P., & Suriseti, J. (2021). Learning Management System for Greater Learner Engagement in Higher Education – A Review. *Higher Education for the Future*, 1-15. <https://doi.org/10.1177/23476311211049855>
- Viberg, O., & Grönlund, A. (2012). Mobile Assisted Language Learning: A Literature Review. In M. Specht, M. Sharples, & J. Multisilta (Eds.), *Proceedings of mLearn 2012: The 11th World Conference on Mobile and Contextual Learning* (pp. 9-16). CEUR Workshops. <https://www.diva-portal.org/smash/record.jsf?pid=diva2:549644>
- Walker, D. S., Lindner, J. R., Murphrey, T. P., & Dooley, K. (2016). Learning management system usage. *Review of Distance Education*, 17(2), 41-50. <https://www.researchgate.net/profile/Darrell-Walker/publication/308338607>
- Williams, R. T. (2022). An Academic Review of Virtual Learning Environments. *ICRRD*, 3(2), 143-145. <https://doi.org/10.53272/icrrd>
- Wang, Y., & Chen, N. S. (2009). Criteria for evaluating synchronous learning management systems: arguments from the distance language classroom. *Computer Assisted Language Learning*, 22(1), 1-18. <https://doi.org/10.1080/09588220802613773>

- Wang, B. T. (2017). Designing Mobile Apps for English Vocabulary Learning. *International Journal of Information and Education Technology*, 7(4), 279-283.
<https://doi.org/10.18178/ijiet.2017.7.4.881>
- Winstone, N., Bourne, J., Medland, E., Niculescu, I., & Rees, R. (2020). “Check the grade, log out”: students’ engagement with feedback in learning management systems. *Assessment & Evaluation in Higher Education*, 46(4), 631-643.
<https://doi.org/10.1080/02602938.2020.1787331>
- Wong, K. T., Teo, T., & Russo, S. (2013). Interactive Whiteboard Acceptance: Applicability of the UTAUT Model to Student Teachers. *The Asia-Pacific Education Researcher*, 22(1), 1-10. <https://doi.org/10.1007/s40299-012-0001-9>
- Xu, Q., Dong, X., & Jian, L. (2017). EFL Learners’ Perceptions of Mobile-Assisted Feedback on Oral Production. *TESOL Quarterly*, 51(2), 408-417. <http://www.jstor.org/stable/44984761>
- Yurdagül, C., & Öz, S. (2018). Attitude towards Mobile Learning in English Language Education. *Education Sciences*, 8(3), 142-155. <https://doi.org/10.3390/educsci8030142>