Article

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The Application of Smart Learning Systems during Global Pandemics: Taking Spanish Teaching Course as an Example

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Abstract: The teaching and learning environment have changed significantly over the last decade with the integration of an increasing amount of information and communication technologies, especially in distance education due to global pandemics, total lockdowns, isolation, and quarantine periods. The number of numerous virtual and non-virtual tools involved in educational processes is growing day by day. In terms of technological innovations used in learning environments, many researchers and educators are trying their best to bring more creative ideas into the technology-based learning environments. Although higher educational institutions have greatly benefited from the growing number of hardware and software resources in the educational process, they have also faced some setbacks that have harmed the learning processes. These technologies have in turn complicated some of the processes in the learning atmosphere. Therefore, we take Spanish teaching course as an example to present the challenging smarter teaching and learning systems that higher educational institutions face today.

Keywords: smart learning systems; education; COVID-19; Spanish teaching

1. Introduction

The term 'smart' is commonly used to describe technological developments in all areas of modern society. By 'Smart Learning Systems' scholars generally mean all technological, virtual, and non-virtual tools that are widely used in the modern education system [1]. These tools are used to meet the requirements and improve the teaching and learning environment not only in the classroom but also virtually. Technological development, in turn, is enabling better and better ways of information sharing and connectivity, gathering the necessary data for the development of new teaching and learning tools to achieve the right pedagogical and academic goals. The term 'smart learning' itself best refers to the use of technological feedback used to enhance personalized learning in a smart virtual and non-virtual environment. Smart learning is an emerging field among other related fields such as smart technology, smart teaching, smart education, smart learning, smart classrooms, smart universities, smart society. The sophisticated use of smart learning environments along with new technologies and approaches such as ubiquitous learning and mobile learning could be called smart learning. Smart learning environments include "intelligent tutoring systems (ITS)", "adaptive learning systems", "technology-enhanced learning", "web-based learning", "mobile learning", "context-aware ubiquitous learning using sensor technologies" [2]. Basically, an intelligent learning system can be understood as a technology-enabled learning system that is capable of helping learners learn in the real world with access to the resources of the digital world.

In modern terms, a smart educational atmosphere is a smart learning environment with smart and virtual tools that greatly enhance all educational processes. Although this need for a smart

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academic environment existed long before the global pandemics, it was not given enough attention until the urgent need for smart facilities knocked on the doors of all educators and learners [3]. Thus, the goal of a smart educational environment is to make traditional learning and teaching methods in higher education smarter. The need for smart learning and teaching management systems is on the rise again due to the unexpected challenges that higher education is facing day by day.

To meet the demands of the changing learning environment, we needed to research and absorb useful information about new important virtual tools and try to offer other users to implement them in the current educational environment. The aim of this article is to realize the idea of introducing smart learning tools to capture the modern requirements of virtual and non-virtual learning for the benefit of educational goals through the use of existing and emerging smart technologies, one of the central problems in the system of higher education. The main goal of our research is to improve the use of Smart Learning Systems in higher education. With the support of smart facilities in education, the existing and emerging Smart Learning Systems have become an integral part of higher education and occupy a large space in the learning environment. The focus of our research was the interaction between teachers and students in the Spanish teaching courses, from which we could obtain all the data needed to answer the personal needs of each side in a learning environment.

2. Background

2.1. The Fall of Traditional Educational Systems and the Rise of Smart Teaching and Learning Environments

Many researchers have tried to shed light on traditional learning and how it can be improved, but few have tried to clarify how Smart Learning Systems can best be used in modern educational environments [4,5]. Therefore, there is an urgent need to investigate the ability of online learning innovations to improve teaching and learning systems. The need for smart learning systems existed long before the global pandemics, as the emergence of smart cities and smart technologies created the critical need for smarter innovative educational and learning environments. The unexpected events of 2020 called for further urgent investigation of innovative online teaching and learning methods and their backgrounds [3]. Within a year, the teaching and learning environment changed drastically. To meet all the critical needs of the tetrad (e.g., teachers, learners, learning environment, learning content) that the traditional education system was trying to meet, smarter education systems along with supporting virtual tools began to appear on the educational horizon. Consequently, Smart Learning Systems become an important scientific research subject. Models and tools for virtual education systems are developing rapidly and researchers need to investigate the advantages and disadvantages of this or that smart learning system because they need to improve the way they are used for learners worldwide.

Prior to the pandemic, learners and educators were accustomed to acquiring the necessary knowledge from such Massive Open Online Courses (MOOC) platforms as Coursera, Udemy, EdX, Future Learn, Shaw Academy, SWAYAM, Udacity, Kadenze, Canvas Network, Stanford Lagutina, Miriadax, EduOpen, Federica Web Learning, ThaiMOOC, NPTEL, Complexity Explorer, Campus-IL, XuetangX. Zhihuishu, CNMOOC, Edraak, European Multiple MOOC Aggregator (EMMA), OpenHPI, Open Education, Gacco, Fisdom, Open Learning, JMOOC, Open Education, K-MOOC, Prometheus, Khan Academy, PBS Teachers [6,7]. Common to all the above online MOOC providers is that most of them are based on video delivery and repository systems, although supplementary reading materials and other bibliographic references are also provided within the course.

The history of MOOC platforms dates back to the early 2010s [8]. In October 2011, professors at Stanford University launched three online courses that were open to anyone. Gradually, such courses evolved into mass events with more than 100000 registrations per course. The term ‘MOOC’ was coined by representatives of the mass media. Since then, more than 1000 universities worldwide have offered both free and paid online courses accessible to everyone. The biggest MOOC platforms are Coursera and EdX, but many governments and ministries of education have also tried to start their own online education platforms. Some websites usually provide the necessary information about the growing number of different online courses offered by different universities. Usually, all the courses

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are organized by subject. According to the website, more than 180 million users have registered for online courses by the end of 2020. Due to the global pandemic, the number of registered online learners on MOOC platforms is increasing daily and 2020 is often referred to as 'The Year of the MOOC'. The number of online learners will continue to grow with more than 35 MOOC platforms now offering a variety of educational opportunities [9]. The success of these platforms so far has shown that video materials with real lecturers from reputed universities are best received by students. Most of these platforms also support learners with online reading materials and other necessary bibliographic references. Most of the courses are also based on peer reviews of the material learnt as well as discussion forums on the knowledge acquired. What most of them lack is live online interaction between learners and instructors. These interactive and innovative features of online learning are setting new standards for global education systems.

2.2. Global Pandemics and New Requirements of Modern Educational Systems

In 2020, all universities had to adapt to modern online learning environments due to global pandemics and total closures. Zoom became the most used online platform and tool to deliver online learning worldwide [10]. One of the benefits and advantages of this new system on the Zoom platform was the online interaction between learners and instructors. Additional discussion forums and clubs were immediately created. A more creative approach to teaching by instructors helped ensure that not only unprepared first-year students, but also undergraduate students received the feedback they needed.

Currently, a smart academic environment is one of the first necessities for all higher educational institutions, but the methods, resources, and facilities used have not yet been studied. Although there are many virtual tools, most of them have not been properly studied scientifically. With the help of questionnaires and related data obtained from learners of different higher education institutions, we have tried to integrate the best Smart Learning Systems and tools into the virtual learning atmosphere of a higher education institution.

So far, our research has shown that purposefully designed lectures have facilitated the teaching-learning process with the advancement of technology-based teaching tools. Previous video-based lectures from MOOC platforms have also had a positive impact on the pedagogical aspects of new online learning and teaching systems. Lecturers around the world who had no experience with online teaching could freely explore the necessary aspects of the video-based teaching materials that have served as the key to the success of these online platforms for almost a decade. This could also help them improve their traditional teaching approaches, make the learning environment smarter, and explore its impact on the overall learning experience and increase student learning potential.

Empirical research on smart learning systems could help determine the pedagogical and instructional advantages and disadvantages of online learning [11]. As a result, in one year, many significant unexplored problems of online learning have remained unresolved due to the new challenges that higher education in particular faces on a daily basis. The demands are increasing as well as the setbacks that can harm the teaching and learning processes. Scholars still need to examine various sources to understand which tools best support modern educational needs. In addition to the Zoom platform, many universities have established their own online learning platforms where both learners and instructors can download the necessary material for peer reviews and group discussions. The question of how to synchronize all the existing approaches and take full advantage of different smart education sources is one of the main issues that currently needs more in-depth study. Over the year, MOOC platforms and other learning sources have tried to improve their methods to make the learning environment more interactive, the interaction between teachers and learners more effective, and the learning process more engaging.

Nowadays, millions of learners worldwide confirm that they have become accustomed to online learning systems despite the failures and setbacks that higher education has experienced. Moreover, most of them confirm that they enjoy learning online and have the privilege to learn about this or that subject on different platforms. By using such different devices as PCs, smartphones or tablets, they feel more connected to their educational goals. This amount of combined learning is the

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advantage of modern higher education. The number of potentially interested learners is growing day by day. Content-based education is becoming one of the most preferred aspects of online learning. This complex learning reality makes most of the lecturers to consider learner-centered approaches and try to improve the traditional teaching methods.

In the smart learning environment, not only the learner's behavior but also the instructor's behavior should be considered. So far, researchers have considered the behavior of the learner. This can be considered as the first step to improve the existing and emerging Smart Learning Systems. The second step should be to consider the teacher's behavior, which is no less important in achieving better outcomes in higher education. This can also help to improve the studies and try to manage and adapt the existing smart resources according to the requirements of the specific learning environment. In our opinion, comprehensive environmental awareness and adaptive teaching methods are the first steps to create and use smart educational systems and smart tools. The high priority of smart learning environment is undeniable, as it helps to improve the performance of pedagogical interaction between teachers and learners according to the requirements of smart learning in higher education.

2.3. Defining Smart Learning from Scientific Perspective

In 2014, some journals were launched with the goal of helping higher education institutions make their learning environments smarter and find the best supporting solutions for this emerging and evolving field. Researchers of smart learning environments first address the definition of the smart learning platform from the perspective of its advantages over traditional educational approaches and methods. Spector et al. believe that the development of effective learning environments be derived from fields such as psychology of learning, instructional design, human-computer interaction, communication theory, cultural anthropology, media studies, performance technology, etc. [12]. Meanwhile, Hwang et al. introduced the model of "smart education framework", which identifies the core concepts for successful intelligent learning in the modern digital world [13]. Zhu et al. emphasize the importance of location awareness, context awareness, social awareness, adaptability, resourcefulness, and high engagement in the educational process of intelligent learning [14]. Furthermore, Koper et al. introduce the concept of human learning interface (HLI), a "set of interaction mechanisms that humans expose to the outside world and that can be used to guide, stimulate and facilitate their learning processes" [15]. Aforementioned studies on smart learning environments showed that there is a lack of background research in this area. This is also due to the fact that this field is relatively new and more practical approaches have been developed to improve smart learning management systems than theoretical approaches to support this field. We believe that regardless of the scientific considerations of smart teaching and learning management systems, one of the most important aspects is teacher-centered and learner-centered approaches based on flexible adaptability of the context as well as pedagogical insights modeled in the different learning activity models.

2.4. Most used learning management systems

Technological solutions for smart learning management systems primarily target educational institutions. Teaching and learning management systems are designed to help instructors manage their educational goals in the virtual space. Most of them provide a single platform through which course material can be accessed online. The course material may include not only the learning content but also assignments, syllabi, quizzes, tests, multimedia files and assessment systems. This allows both learners and instructors to have a more connected and accessible learning experience. Instructors can also create their own digital courses, distribute course materials, and even assess learners' progress online.

Our research would lack background information if we did not refer to https://www.g2.com/categories/learning-management-system-lms which regularly updates its list of the best technology solutions not only for educational purposes, but also for businesses. The website also updates the information about the best learning management systems. Users openly rate the

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smart learning management systems based on their own experiences, which makes the list more objective. According to users' ratings on the website, the top 10 learning management systems are: 1) Canvas, 2) D2L Brightspace, 3) Google Classroom, 4) Blackboard, 5) Docebo, 6) Schoology, 7) TalentLMS, 8) Cornerstone Learning, 9) Edmodo, 10) Moodle.

Canvas is generally used via open, cloud-based technologies that enable effortless integration of content, specific tools, and services that educators and learners need to achieve their educational goals [16]. 99% of users have confirmed in various surveys that Canvas, as a smart learning management system for users, is generally known for considering the needs of users and then standing out as the most suitable, flexible, customizable, and reliable smart learning platform. This is an important reason for its wider acceptance as a smart learning tool in universities. This is one of the reasons why Canvas is adopted and used more frequently than any other smart learning system. As a smart learning tool, it has simplified the teaching and learning system. Instructure, the company that developed this revolutionary technology for education, confirms that it is doing its best to improve the options to make the smart software more useful and people smarter. The Canvas learning management system is usually complemented by Canvas Commons, the Learning Object Repository (LOR), Canvas Catalog, Canvas Network offered by the same company Instructure. Canvas Network is an open educational resource that offers online courses worldwide. Long-time users of the Canvas smart learning system point out in various educational forums certain advantages of Canvas that other similar Smart Learning Systems lack. First of all, they highlight that Canvas is an incredibly consistent learning management system and is more cost effective. During the global pandemic, the transition to Canvas was smooth and without technical difficulties for most users. One of the best features is that instructors from different educational institutions can share their content with other instructors or learners. The Canvas learning management system also provides the ability to create videos within the system. Sharing videos in Canvas encourages collaborative exchanges between learners and instructors. Another beneficial feature of Canvas is the grading system for online assignments, which is better than the capacity of other learning management tools as it allows teachers to comment on learners' submitted assignments. This allows both teachers and learners to have a great mutual learning experience and an instructive process. Some users also mention that this is the best solution to engage a large number of students in the learning process. The in-app messaging system allows students and instructors to stay in constant contact with each other. Instructors can also add upcoming assignments before moving on to the online lecture. Canvas is easy to use in some ways because it is based on the background features and primary learning management systems of other educational platforms that most learners and instructors fundamentally understand, so all users can navigate the platform with ease. As simple as it is, it is robust because of its useful features. Canvas also allows users to integrate other smart learning platforms into the learning process across the college, making it one of the most beneficial educational tools. Learning completely virtually is one of the most undesirable yet expected realities of modern times. That is why Canvas has become one of the most helpful educational products with its 24/7 support and extensive content editor features. One of the positive aspects of Canvas is its calendar, which helps users keep track of publishing new learning content and grading assignments in these hectic times. It's a straightforward learning management system that's hard to replace with another. Learners and teachers can also create their own curriculum by topic and access resources such as "unboxed" learning standards and pacing requirements. This is also helpful in that the user can not only create a blueprint, but also find all courses, learning materials, and resources in one place and organize them the way they want. All grades, messages, emails, grades, assignments, tests, quizzes, and other supplemental materials are stored on one page, which can help users switch to other external resources to navigate their curriculum effortlessly. Communicating with both learners and their parents through the Canvas network helps teachers make useful connections to better organize the educational process. So, the overall impression of all Canvas users is that it is a very dynamic, flexible and useful learning management tool that can be easily synchronized with other educational tools. The layout of the modules is precise and clear and tracking tasks can be easily added to the to-do list. It is one of the best options for time management and planning for instructors

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working with a large number of students. It is a great tool to keep track of all the courses and automate them.

D2L (Desire to Learn) Brightspace is another advantageous learning management system that combines powerful educational tools, services and support to deliver an outstanding teaching and learning experience [17]. The package includes a time-saving experience on any device, adaptable to any screen size, coupled with any mobile app to streamline common educational tasks. One of the standout features is award-winning accessibility that makes it easy for students to navigate with assistive technology. An innate interface and built-in templates make it easier for instructors to design courses, create engaging content, and grade assignments. Instructors are encouraged to enrich course content directly with online audio, video, and other media sources or external websites. In this way, D2L Brightspace as a learning management system increases learner engagement with integrated video capabilities that allow for the use of a video-based grading system, web conferencing, and anchored positive feedback. Learners, in turn, can document and share their learning expedition, motivated by personalized learning experiences, and even seek to recognize individual achievements with awards and certificates. D2L Brightspace provides an easy way to share content through its integration with Google Drive and the ability to share content from YouTube or other social networks. In addition, D2L Brightspace can be used to implement various course methods and competency-based online instruction to meet the needs of each learner. It is an easy-to-use, powerful teaching and learning management tool that provides feedback across courses and from anywhere with its inline comments on documents, audio or video materials. Instructors can easily access and analyze each learner's performance using Class Progress Dashboard. Students, in turn, can generate reports and have access to detailed grade statistics. This smart learning tool provides the best optimization opportunity for all resources and helps focus on personalized delivery and training experience based on the learner's personal needs. D2L Brightspace is an interactive, powerful tool, smart learning space and virtual community open to all users to explore questions and find solutions, share ideas with peers and other experts in the field. It is an easy and quick to use application for all with supporting leverage resources and tools to help the system run smoothly. What users like most about D2L Brightspace is the ease of use and even access to other college assignments. The lecturer and the learner can easily communicate with each other when the learner has a question to answer. It also transparently shows the instructor who has submitted assignments and who has ignored them. The second feature that most users highlight is the fact that it is a highly customizable learning management system for higher education and corporate training. Users can easily create virtually any type of content and adhere to the required standards. Another pleasing feature is that D2L Brightspace has a perfect customer service and the team members are always ready to help with any technical issues. Users also point out that this is a perfect learning system for instructor-student interaction. Instructors have access to a customizable interface to design their course, and the many tools allow them to personalize each student's learning experience by providing a customizable learning experience. Another aspect highlighted by users is the D2L Brightspace community, where users from different educational institutions can constantly share ideas, doubts, problems and solutions related to educational processes and other organizational procedures. There is also the Product Idea Exchange, which allows users to share improvement and development of ideas for future updates to the platform. The best thing that this product offers is the integration of presence and virtuality. This feature has proven its usefulness during the pandemic. There is also an encouraging moment for fans of smart learning management, D2L Brightspace is constantly updating and expanding to meet the rapidly changing requirements in education. Recently D2L Brightspace has started using a chat feature for tech support, which is very helpful. This allows users to constantly update to the new system or revert to the oldest version.

Google Classroom is a smart learning management tool in Google Apps for Education that helps teachers create and organize a quick assignment system, provide efficient feedback, and facilitate in-class communication [18]. Users of Google Classroom highlight that it is the best smart teaching and learning management system for teachers to manage all classroom activities. It allows both teachers and learners to manage all classroom activities: for learners to submit assignments and for teachers

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to give assignments via Google Classroom. The backup feature also helps in not avoiding any possible challenges. This is the best app available for managing multiple online classroom activities, including setting deadlines for learners to ensure their timely submission. It is easy to navigate and it is easy to share the material through the website. Google Classroom also allows users to collaborate in the modern digitized world, and even if people are physically far away, Google Classroom makes the virtual meeting like a physical one in a sense and facilitates the exchange of ideas. Some users still admit that Google Classroom was the best smart learning and teaching solution in the virtual education reality of the global pandemic. But most admit that it works best with various learning systems like Canvas, Moodle, and Blackboard. Its simple layout is easy for any student to navigate without being overwhelmed by the difficulty of using the software. And even if someone is quarantined after a Covid-19 infection, they can still access all materials and the teaching process. Google Classroom is a smooth transition to virtual learning.

Blackboard Learn is a scalable, unfailingly smart learning management tool and a world- class learning experience [17]. It is a flexible learning platform that enables users to enhance online learning opportunities, increase and promote learner engagement, and optimize learning outcomes. With its engaging learning environment and insightful features added daily, users can effortlessly manage content, personalize lessons, connect with learners, and foster collaboration between teachers and learners. When we look at user reviews, in addition to the benefits, they also note that it is sometimes difficult to navigate through the application. In any case, learners and teachers can create folders of learning materials, assignments, tests, and quizzes on the site by week or other criteria. Blackboard allows learners to complete online coursework and access all grades so they can keep track of the learning process. It allows instructors to teach a variety of courses in person and online, with the ability to share course materials with learners.

Docebo is another impactful smart learning technology that enables users to create, deploy, and understand the benefits of smart learning [17]. Docebo is a multi-product learning tool that addresses any learning challenge and creates a true smart learning culture within the modern education system. It covers the entire learning cycle, from content creation to learning organization to materials delivery - all from a single vendor. Docebo currently stands out as a market leader, offering excellent live customer support, a learner-centric application with a user-friendly interface, the potential of a mobile app, 24/7 access with password protection, and requires no programming skills or advanced knowledge of internet technology. Docebo is also a great solution for corporate learning goals. It is a great digital platform for training all employees, customers and clients, making the training process exciting and friendly. It is best customized from both laptop and mobile. It is therefore essential to define the requirements of the learning objectives before attempting to implement them.

Schoology has supported all intelligent learning and instructional management systems for online courses and blended learning environments for over a decade [17]. It is part of the PowerSchool Unified Classroom™ solution, which ensures that all users should have access to all high-quality teaching and learning opportunities. Schoology enables the deployment of the most comprehensive integrated classroom solution that provides teachers with personalized learning opportunities to enhance their academic background. Schoology provides the best communication tools that connect learners and teachers to collaborate on a high-quality learning mode that stimulates the learning experience and improves overall impartiality and access on a daily basis. Teachers can easily organize their courses in files and folders, duplicate them and publish the lessons and content by controlling the learning process in the Schoology app.

TalentLMS is largely customized to meet the training objectives of the organization [17]. With the help of the fully customizable TalentLMS learning management system, companies grow as team members embrace training in this mode and enjoy guidance and support before taking an important step. TalentLMS team members emphasize that their mission is to democratize training by bringing together all possible training tools and materials into one suitable platform. It can be easily combined with other apps and services so that learners can have complete control over their training and have the best learning experience ever. Although it helps teachers create training courses easily by adding all the necessary learning materials, tests, quizzes, and live sessions, it also offers ready-made courses

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from TalentLibrary. By adding all the necessary details, a homepage and a language localization option for everyone. Users of the TalentLMS platform emphasize what they like most about it: it allows them to automate the learner experience, freeing up the instructor's time for other tasks and saving money on video management services.

Cornerstone Learning is another exceptional smart learning management system that aims to create a culture of lifelong learning. Cornerstone Learning leverages machine learning to create a personalized learning systems hub for users. Each user can customize the portal options to their own needs. The mobile training app is also an easily accessible option that allows for skillful learning. Cornerstone Learning is also used for corporate training that helps learners develop, grow, and reach their full potential within their organization. Through a personalized learning system, engaging content and modern training methods, employee performance is enhanced. More than 75 million users worldwide from over 180 countries have already benefited from Cornerstone Learning. What users highlight most in their reviews is that this product is the best for all learning management needs. Its endless possibilities offer constant updates that take into account the user's contribution to improve the dynamics of the learning or training process. The application also allows holding virtual conferences to achieve their educational goals.

Edmodo is another top-rated learning management system that connects potential participants and learners with the people and resources they need to reach their full potential [19]. Users say it is the best learning system they have ever experienced. This is indeed because of its ease, convenience and hassle-free delivery. It is mainly used for communication between learners and teachers at any time of the day. In the virtual classroom, learners can generate and share ideas with each other, with the teacher individually or in a group.

Moodle is the best and most trusted world-class online learning system. The Moodle ecosystem is a secure and customizable open-source platform used daily by over 250 million users worldwide [20]. Although it is an open-source teaching and learning management system, it also has an innate security and privacy system. Moodle enables all educators to create flexible, accessible and engaging learning environments. Moodle proved its effectiveness during the 2020 lockdown when all the world-famous universities had to completely switch to a virtual education system, and Moodle was the best solution for most of them as it is compatible with other learning platforms. Most users particularly emphasize in their reviews that it can be used as a central source repository for all course materials. Students do not have to speculate outside the university platform to access all their course material. The Moodle platform combines all mart learning management tools and materials into one platform. For most universities, Moodle even served as a remote administration and management system during the pandemic. With its many useful features, it makes all set up projects accessible.

3. Smarter Ways of Spanish Teaching Course

3.1. The Smart Board - Interactive Whiteboard as Spanish Teaching and Learning Tool in Universities

The field of education has been significantly impacted, changed and improved by technological advancements in the last decade. A decade ago, teachers could only pass on their knowledge to their students using chalk on blackboards. Certainly, we cannot deny that this method was also effective in many ways and played a crucial role in the learning environment of universities. At the same time, we have to accept that this method led to endless, boring monologues where only the lecturer could speak and focus on the material being taught, resulting in a lack of interactive, collaborative learning. Lecturers mostly focused on the blackboards and writing with chalk rather than interacting with students. Later, white boards were introduced in the education sector. These boards were different from the old blackboards where lecturers could write with a marker. But this tool also had shortcomings that led to limitations in the learning process. Later, the advancement of smart technology systems led to the development and introduction of interactive whiteboards, which soon replaced the traditional white boards and blackboards in many universities. These whiteboards led to a more flexible interactive and conversational way of teaching and learning. This also resulted in more diverse teaching methods, including sharing content from various online and offline resources;

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more engaging lessons and discussions between lecturers and students; an easier way to share files and provide learning feedback; faster access to online resources.

The website https://mytechclassroom.com/best-smartboards-for-schools/#google_vignette which provides daily updates on the best solutions for integrating modern smart technologies in education, has recently updated its list of the best Smart Boards for educational purposes: 1) Vibe collaboration Smart Whiteboard, 2) 50 "Touch force 4K UHD touch screen digital display, 3) Smart Technologies Interactive Whiteboard with Projector, 4) Quartet porcelain whiteboard, 5) Ipevo IW2 Wireless Interactive Whiteboard System, 6) Google Jamboard, 7) NIERBO HC40 Interactive Projector, 8) Epson BrightLink Interactive Projector, 9) GoTouch Basic 3.0, 10) eBeam Smartmarker Complete.

Research on the use of smart technology in language teaching shows that the use of Smart Board Interactive Whiteboards has produced the best results in foreign language teaching [21]. The Interactive Whiteboards have not only facilitated the teaching process but also revealed the hidden learning potential of the learners. No foreign language learner or teacher has ever denied the value of this tool for foreign language learning. The Interactive Smart board is an Interactive Whiteboard connected to a computer and a projector. The task of the projector is to display the image on the computer screen, while the computer in turn is projected onto the Interactive Whiteboard Smart Board. The whole process is controlled by touching the surface of the whiteboard with a finger. Students can open files and websites along with the teacher or try to manage other software applications. One of the most valuable features of whiteboards is that users can take notes on the Interactive Whiteboard. Also, the notes can be saved or printed just like any other regular document. Another feature of Interactive Whiteboards is classroom interaction, which helps the teacher to better organize the learning process. Learners are also encouraged to make presentations on the learning material and use Smart Board Interactive for this purpose. The active interaction and dialogue between learners and teachers help both sides to focus more on teaching and the process of important language skill acquisition than on using the software. The widespread use of touch boards in secondary schools, colleges and higher educational institutions has led them to play a crucial role in foreign language teaching and learning process. Users of the Interactive Whiteboard not only emphasize the importance of conversation and interaction during lessons, but also the option of highlighting, paraphrasing, and underlining the Interactive Whiteboard, which best emphasizes the importance of certain elements that should always be revised and paid attention to. This helps learners and teachers to better focus on the material that still needs to be mastered. Learners' presentation skills also change drastically as they get used to using Whiteboard Interactive in the classroom. They all acquire presentation skills by following the teacher's ability to present the material on the Whiteboard Interactive, and they also acquire the skills to present the material in the most entertaining way possible. This is also very important in teaching and learning foreign languages, not only to present cultural elements of the target language, but also to master them skillfully. Opinions and ideas exchanged on the presentation material during the lesson support oral interaction between the foreign language teacher and learners. As mentioned earlier, the Interactive Whiteboards support the foreign language learning process in different ways. The research shows that users also emphasize the importance of focusing on the projected material, which in turn enhances the cognitive process of learning. The underlined and circled objects serve as a center of attention and concentration, thus promoting language learning. The fun of writing and correcting their own mistakes on the interactive whiteboard has helped learners feel excited and motivated to acquire new knowledge. This is not only a personal enthusiasm but also a group enthusiasm that flows into the classroom of foreign language learners. Positive classroom attitudes have been proven hundreds of times to be critical to learning. The powerful support of Interactive Whiteboards in the language learning process has become one of the most innovative and valuable achievements in foreign language teaching.

The valuable approaches of researchers on the valuable use of Smart Board Interactive Whiteboards provide guidance to foreign language teachers not only to continue using interactive whiteboards but also to improve their implementation skills [22]. In this stage of our research, we tried to use the method of anonymous questionnaire to interview learners and teachers from Spanish

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and other European higher education institutions and later analyze the results of the questionnaire. Participants of the online interviews were asked not only to provide their personal data, but also to answer five questions in the questionnaire:

- Have you ever used Smart Board Interactive Whiteboard in a foreign language classroom?
- How often have you used this smart technology tool?
- In what ways has this tool improved your studies?
- Have you encountered any challenges in using this tool in your classroom?
- Can you name the advantages and disadvantages of the Smart Board Interactive Whiteboard?

During the survey, a total of 100 completed questionnaires were received. Of the 100 respondents, 50 (10 lecturers, 40 students) were from Russian universities and 50 (10 lecturers, 40 students) were from EU universities. Initially, the understanding of smart technologies on both sides did not differ and both sides agreed that the integration of Smart Board Interactive Whiteboard is one of the best options of the last decade. This has improved the learning process in the classroom and the conversational nature of reading aloud has led to more fruitful outcomes in the learning process. Lecturers indicated that the challenges they faced at the beginning of the implementation of this tool and the benefits their students derived from the foreign language learning process exceeded their expectations. We specifically surveyed lecturers to find out whether they were satisfied with the introduction of Smart Board interactive whiteboards in their university's educational processes.

Our study at this stage of the research was aimed at gaining detailed insight into the respondents' understanding of Smart Board interactive whiteboard for learning a foreign language. We present the results in analyzed form according to the answers given and according to the most frequently given answers.

1) Have you ever used Smart Board Interactive Whiteboard in a foreign language classroom?

We asked respondents this question to find out how often Smart Board Interactive Whiteboards are used in foreign language learning. The affirmative response of 90% of the respondents confirms that this is one of the most frequently used tools in the foreign language learning environment. We should also point out that the 10% indicating that the respondents are not aware of this kind of smart technology. This means that the educators themselves do not use this tool in their lectures.

2) How often have you used this smart technology tool?

Most of them (65%) used it every day, followed by several times a week, which represents the frequency of use of Smart Board interactive whiteboards. The following answer represents the less frequent use of the smart learning technology under study. It is worth highlighting that 10% of the respondents, most of them university students, admitted that they do not use technology as a means of smart teaching and learning.

3) In what ways has this tool improved your studies?

We analyzed answer according to the frequency of core notions:

- Flexible use of the tool - 28%
- Active participation in the learning process - 22%
- Easy learning process of a foreign language -14%
- More interaction with the lecturer -12%
- More dialogues with classmates -10%
- More class discussions - 8 %
- More presentations on cultural topics of the target language - 3 %
- Establishing the important points of the subject matter -2 %
- Fun and entertainment during the activities -1 %

4) Have you encountered any challenges in using this tool in your classroom

Respondents were asked this question to highlight the difficulties they have in using Smart Board Interactive Whiteboards to learn a foreign language. 43% admitted that at first, they had some difficulties in using the software and the novelty of the application caused some kind of discomfort in using the tool, but soon they were able to find ways to deal with the application without discomfort. 67% of respondents indicated that this type of smart technology motivated them to use it from the beginning without a sense of awkwardness. In addition, a new approach to learning and

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teaching a foreign language served as a hopeful message for the collective determination to achieve their educational goals.

5) Can you name the advantages and disadvantages of the Smart Board Interactive Whiteboard? We have received the following answers to this question:

- Advantages: more flexibility in content delivery - 40%, more diverse teaching and learning approaches - 24%, more face-to-face interaction during class - 20%, easy access to online and offline resources-10%, staying connected to our educational goals - 6%.
- Disadvantages: None-95%, imbalance and inconsistency with personal expectations - 5%.

The results obtained clearly show that Smart Board Interactive Whiteboards are extensively used in foreign language classrooms. The integration of Smart Board Interactive Whiteboards along with other smart technologies has changed and modernized the teaching and learning methods and approaches for foreign languages and other educational purposes in general. From the results of the questionnaire and the interview, we can conclude that modern foreign language teachers and learners are actively involved in the learning process and the facilitated process only motivates both sides to continue and achieve new educational goals. The dedicated courses combined with the use of the Smart Board Interactive Whiteboards make the teaching and learning process more flexible and comprehensive. The conversational and interactive aspect of using this technology is one of the key benefits, which is miles away from the boring methods of traditional chalk and blackboard teaching.

In the next phase of our research, we also conducted another online interview with various representatives of other institutions from other countries to find out what other purposes Smart Board Interactive Whiteboards can be used for besides language teaching and learning environment. The results of our research showed that a number of renowned universities have used Interactive Whiteboards for other educational purposes as well. The benefits of using Interactive Smart Whiteboards are accumulating every day. Some universities have installed an Interactive Whiteboard controlled by a central computer. These boards record and project all sessions so that students never miss a lecture, and makes it easier for instructors to record and display data and take additional notes during the lecture. Some medical schools are also using whiteboard technology for various academic and training purposes [23]. Users highlight that whiteboards have made the educational environment more digital, the educational process clearer, and students more willing to engage. They also mention that over time they need little assistance from specialists and can take full advantage of the technology used. For their part, students enjoy the interactive collaborative learning process achieved through the use of Smart Board Interactive Whiteboards. They believe that this is the best solution that their universities have been looking for their students. The students also mention that they can easily save files with necessary materials for future use and share them with each other for various educational purposes. The lecturers and students of the School of Medicine, University of St Andrews, highlight that the Interactive Whiteboards have complemented the teaching environment and made the learning process much easier. This solution was anticipated long ago for future hospital employees, as there are a variety of scenarios that the use of Interactive Whiteboards can serve in the hospital. These are just a few examples of how Interactive Whiteboards have been used by various higher educational institutions around the world and how they have improved the learning process in the modern education system. We feel that Interactive Whiteboards are a very innovative and irreplaceable support not only for language acquisition but also for other diverse educational goals. This is one of the greatest revolutionary technological achievements in the modern education system.

3.2. Smart Classroom Integration for Language Learning Purposes

The global pandemic of 2020 was one of the most unexpected challenges for all people worldwide. One of the most vulnerable sectors that was not prepared for such an unexpected event was education. All secondary schools and higher educational institutions had to switch to distance learning within a very short period of time. The real-time interactive virtual classroom was the first big step for all learners and educators worldwide. Most inexperienced educators were not ready to adopt such a revolutionary approach in their academic careers, but time was of the essence. The

semester had just begun, and students were ready for their next educational goals. However, immaturity and unpreparedness for the current demands led to countless failures in the distance education system. Existing learning systems were not up to the challenge, but it was high time and new approaches had to be found to facilitate the integration of the new e-learning systems. They needed to be service-oriented and easy to implement. They also needed to provide flexible interfaces to support teachers and learners. The first phase of this global challenge was experimental for most educational institutions, but over time the integration process became easier for all. A new approach to a promising distance learning system had to be developed for foreign language teachers and learners. Before long, a new generation of e-learning systems was developed. Unlike the previous generation of traditional face-to-face learning, they had to adapt to the new reality of the new education system. The advantages and disadvantages of both systems could only be established over time [24]. As the global pandemic was universal in terms of teaching culture, the approaches of e-learning also became universal with the same technological online learning systems like Zoom, Moodle, Smart Classrooms etc. One of the privileges of the newly introduced e-learning system was that instructors were easily able to publish both online and offline learning content, and students could access the learning material statically over the Internet at any time and listen to the instructor's online teaching. This also led to more flexible learning schedules for all, which increased the learning effectiveness of virtual classrooms. Over time, research over a year of distance learning has shown that these experiments were successful for distance learners and the platforms provided a type of interactive platform that met the needs of universal modern education systems. This also led to emerging modes of learning that all institutions sought to adopt at the local level for their faculty and learners [25]. The service-oriented platforms received positive reviews and feedback worldwide, becoming a virtual education workplace that developed new trends in the global education system. The number of education-specific services is increasing day by day, and their development will definitely help modern people not to face total lock-downs again. At the same time, different local learning systems cooperate for common goals, making the mechanisms of these platforms more interactive and integrated. The Open Smart Classrooms system is another gigantic step in the development of modern educational technologies. This tool allows different university students and teachers to connect online on a daily basis and share the learning material with different students from different universities, avoiding cultural misunderstandings as lectures are usually accompanied by online subtitles. The absence of intercultural misunderstandings is especially beneficial for foreign language learners as they can bring together native speakers and foreign language learners who can easily make their online communication in the open network. As a result, filling the gaps of intercultural conflicts makes the foreign language learning process more flexible and intercultural collaboration a privilege.

The next phase of our research was to conduct another interview with the same Spanish and other EU students to find out whether they had managed to adapt to the new reality of distance education and whether service-oriented educational platforms had improved their Spanish learning. In order to obtain objective results, the interviewees were asked to answer the following questions:

1) How well did the Zoom platform and other learning platforms meet your educational goals?

2) How quickly did you adapt to distance learning system?

3) Do the online presentation options facilitate the learning process?

4) How do you rate the systems for downloading online and offline materials? Is this option helpful for a continuous access to the learning materials?

The details of our study results are presented below:

1) How well did the Zoom platform and other learning platforms meet your educational goals?

- It exceeded my expectations as it is very motivating and interesting - 55%.
- Although it was an awkward experience at first, it did not take long to get used to, so the learning process became more engaging - 30%.
- I see absolutely no difficulty in switching to e-learning because of the flexibility of the platforms used - 7%.
- I am still disappointed with this experience. The platforms lead to a less conversational mode of learning - 5%.

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- It still needs improvement to meet my educational goals - 3%.

2) How quickly did you adapt to distance learning system?

- Less than a week - 70%
- A month - 22%
- λ More than a year - 8%

3) Do the online presentation options facilitate the learning process?

- Yes -83%
- Sometimes - 12%
- No - 5%

4) How do you rate the systems for downloading online and offline materials? Is this option helpful for a continuous access to the learning materials?

- Certainly, it is one of the most useful options - 68%
- To some extent it is helpful - 19%
- No, there are other ways of accessing learning materials -13%

From the respondents' answers, it is clear that they have only positive attitudes and pleasant impressions of the virtual learning process. The respondents' answers confirm that the widely used Smart Learning Systems, together with the internal platforms, could easily replace the usual teaching and learning mode in the lecture hall. Respondents also have a positive attitude towards online presentations and downloaded materials that support learners' continuous access to all materials.

Educators could easily achieve their educational goals by cleverly exploiting all the available options of the educational platforms in use. Flexible learning time is also one of the privileges of virtual learning platforms. In any case, it would be reasonable to mention that learners mention that they understand the taught material better in the auditorium than in a remote classroom. Nevertheless, the responses of most students sound positive as they do not complain about misunderstanding the subject matter online. The discussion forums that not only the teachers but also the learners tried to organize during the total closure also proved to be very useful. This option also brings benefits to the educational platforms used. The smart spaces and smart learning environments of the distance education system illustrate the fruitful results in achieving the educational goals. Several technology companies are trying to improve educational platforms based on the setbacks that users and researchers are trying to spot recently.

4. Future directions

This article highlights the key features of the existing Smart Learning Systems, the challenges of which the modern education system is facing and trying to adapt to due to the global pandemic and lockdowns. New insights into the existing optimized smart educational systems, interactive whiteboards, smart learning environments, and other smart learning and teaching tools to find solutions for better outcomes are a step towards improving modern virtual and non-virtual learning methods. The critical importance of these smart tools is unquestionable given the current global situation. For their part, researchers are facing a new set of scientific challenges to investigate and find possible solutions to help learners and teachers achieve their academic goals. The focus should be on how to improve student engagement in the learning process, facilitate the teacher's tasks in classroom management, and enrich the conversational mode of learning in virtual environments. This kind of collaboration is important to make the lessons more interactive and avoid monotonous monologs on the part of the instructor. Finding solutions using smart teaching and learning management tools for face-to-face teaching is another issue that requires more scientific knowledge for future research. Improving digitized teaching methods and identifying the best solutions for the development of educational processes is an important task that lies ahead of researchers and educators. This is one of the reasons why this topic and this relatively new area of linguistics requires more scientific research.

5. Conclusion

Our research on Smart learning and teaching management systems revealed that the improvement of existing and emerging smart teaching and learning management systems is more than required, as they will help to develop smarter learning environments, tools and devices, virtual contexts, and future educational models focused on the teaching-learning environment. In this way, the teaching-learning process will become more open, purposeful, creative and universal. Obviously, such changes will not happen immediately, but scientific research in this area can also help to promote progress in smart education management systems. The development of better tools and techniques will lead to meeting all the requirements of modern higher education and improving the performance and behavior of the interaction between teachers and learners.

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