

Article

Avoiding the Dark Side of Digital Transformation in Teaching. An Institutional Reference Framework for eLearning in Higher Education

Francisco José García-Peñalvo 

GRIAL Research Group, Computer Science Department, Research Institute for Educational Sciences, University of Salamanca, 37008 Salamanca, Spain; fgarcia@usal.es

Abstract: The purpose of this paper is to define a reference framework for introducing eLearning practices in mainly face-to-face higher education institutions. We suggest a suitable adoption and management of associated infrastructures and processes, in order to guarantee the ethical use of data in the related academic and learning analytics. A theoretical framework is proposed after years of practice and experience in the institutional government of IT processes related to learning technology. The digital transformation of teaching should imply the right technological decisions made by people and for people, in order to achieve a more inclusive, participative, and human university supported by technology. digital transformation is a social requirement of governments, companies, and institutions, and it should take into account the associated risks of the unethical use of technology, which leads to the dark side of transformation processes. eLearning approaches, especially with the influence of the COVID-19 outbreaks, are increasing the need for digital mechanisms in universities. Further, there is a need for strategic support and reference models if we are to avoid these undesired effects.



Citation: García-Peñalvo, F.J. Avoiding the Dark Side of Digital Transformation in Teaching. An Institutional Reference Framework for eLearning in Higher Education. *Sustainability* **2021**, *13*, 2023. <https://doi.org/10.3390/su13042023>

Academic Editor: Ralph Hansmann

Received: 18 January 2021

Accepted: 9 February 2021

Published: 13 February 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Keywords: digital transformation; learning technologies; eLearning; learning analytics; academic analytics; higher education; digital and ethical readiness; IT government; IT risks; eLearning reference model

1. Introduction

Digital transformation is a necessity in the current state of the society. Most companies are undertaking transformation actions [1–3] and claiming to be leaders of change. They claim to be highly competitive in their activity domains, with the conviction that changes in digital technologies could bring about new procedures in a company's business model. These new approaches would generate changed products, or changes in organizational structures, or a deeper automation of processes [4].

Digital transformation implies significant changes in organizations, as persons are concerned. Grajek and Reinitz [5] define digital transformation as a series of deep and coordinated culture, workforce, and technology shifts that enable new educational and operating models and transform an institution's operations, strategic directions, and value propositions. Gobble [6] establishes that digital transformation is the profound transformation of business activities and organisations, processes, competencies, and models for the maximum effectiveness of the changes and opportunities of a technology mix and its accelerated impact on society, in a strategic and prioritized way.

In the case of universities, analogously to the rest of the domains, it is necessary to face a crucial digital transformation of the institutional model [7–10]. If a university wants to persist in time as a vital participant in this transformation, and not to disappear from the stage, it must evolve integrally [11,12].

The university digitalisation has been addressed for more than a decade, understood as the digital university transition [13]. Nevertheless, universities' digital transformation

goes beyond mere digitalisation, which is also necessary as a basis for change. However, although digitalisation is oriented towards content, operations, and processes, a real digital transformation requires a complete change in the institutional model and in its interactions [14], framed within a strategic framework.

All the university's missions are under the digital transformation scope, but this paper is focused on the teaching mission. Nowadays, the difference between face-to-face universities and online ones is becoming less marked. Presential universities are betting on more online or blended programmes [15], and online universities are investing in more physical campuses. Moreover, the COVID-19 disease has accelerated the needs for online education in all universities worldwide [16,17], questioning, at the same time, the maturity of the digital transformation at the teaching stage [18].

Face-to-face universities should have a reference framework to drive the university managers' strategic decisions to the community and receive and accommodate the community's proposals. This approach combines both top-down and bottom-up flows to manage the knowledge and the digital transformation process [19–21].

Having a reference framework for online teaching is essential to make strategic decisions inside the institution about eLearning practices. Further, it is necessary to consider the adoption and management of associated infrastructure and processes. Fortunately, digital teaching introduces more data management capabilities [22], which might introduce more transparency and better decision-making processes for teaching, and for academic improvement. However, these data-based procedures require the definition of an ethical behaviour, in order to define trusted analytics actions that provide enough guarantees about security and privacy [23,24] for any involved person. Further, this will help avoid any dark side practices derived from the technological ecosystem [25] interfaces.

The trust in the information technology (IT) systems is crucial for their adoption [26]. If the academic community (including faculty, students, and service staff) has doubts about these technologies, if the community feels that they are a form of hidden surveillance, then IT will never be fully accepted, which implies the failure of the teaching digital transformation process and, further, a failure of the overall digital transformation of the university's missions.

This paper is devoted to defining an institutional reference framework for eLearning in higher education, which can be adapted to meet each university's specific requirements and idiosyncrasies, with particular attention to the ethical issues build-up a useful and trusted learning and academic analytics layer.

2. eLearning Models Review

Several eLearning models aim to integrate the principles that guide the use of technology in education.

The Technological Pedagogical Content Knowledge (TPCK) model [27,28] is one the best known references and it establishes that teachers need to develop three kinds of knowledge: technological, pedagogical, and of contents adequate for using information and communication technologies (ICT) in education (see Figure 1). Pedagogical knowledge refers to practices and methods used to promote learning; disciplinary or content knowledge is related to the subject to be taught, and technological knowledge refers to the use of tools included in the curriculum. The intersection between these knowledge domains means new knowledge areas: pedagogical–content knowledge (PCK) means the strategies used by the teacher to teach the subject; technological–content knowledge (TCK) is oriented to knowing not just the subject matter they teach but also how the application of technology can change the subject matter; on the other hand, technological–pedagogical knowledge (TPK) is related to the existence, components, and capabilities of various technologies as they are used in teaching and learning settings, and conversely, knowing how teaching might change as the result of using particular technologies. Finally, technological–pedagogical–content knowledge (TPCK) is to know how to apply these elements in a given context.

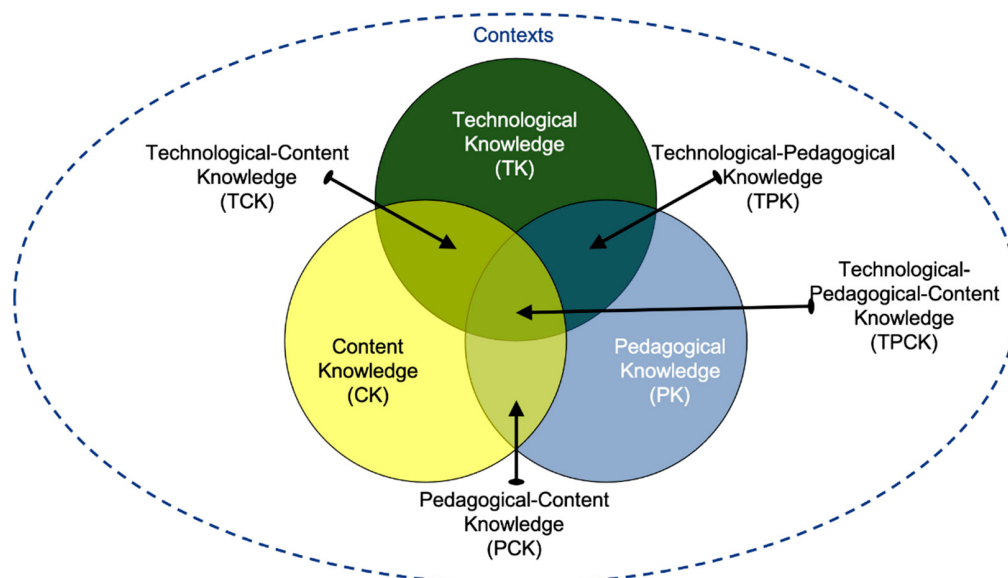


Figure 1. TPACK model. Source: based on [28].

The SAMR (substitution, augmentation, modification, and redefinition) model [29] provides a framework to improve the integration of emerging technologies in the classroom. This model is composed of four tasks, as shown in Figure 2, one for each letter of the model name, which are grouped under two different areas, “enhancement”, which groups substitution and augmentation tasks, and “transformation”, which involves modification and redefinition tasks. Enhancement means the leverage of technology to replace and/or improve existing tools in the learning process, while transformation implies new opportunities for learning that are not easily possible without the technology.

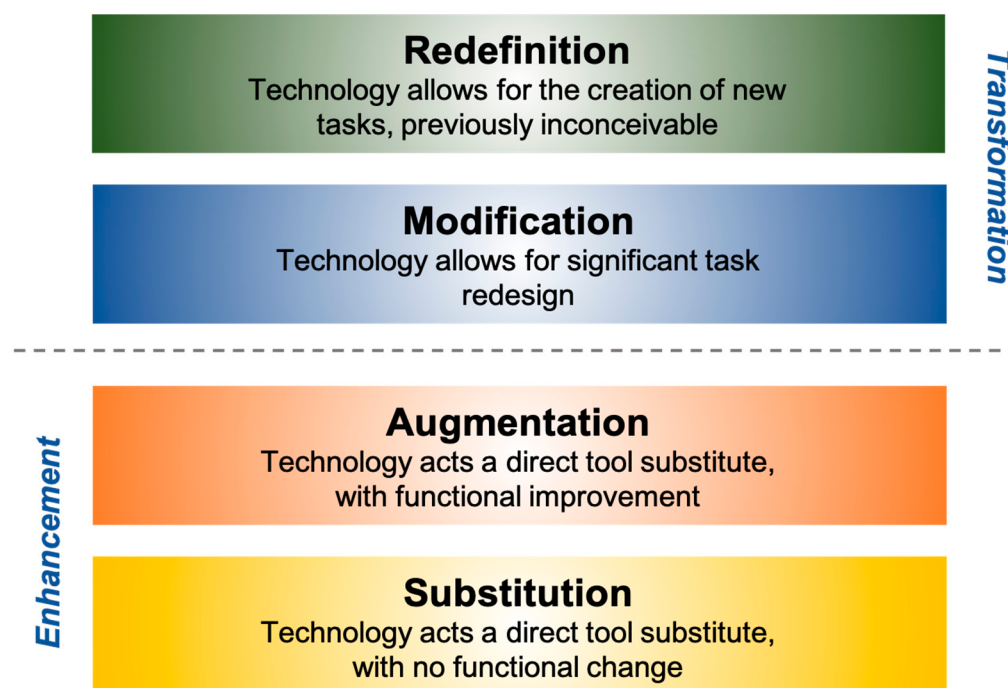


Figure 2. SAMR model architecture. Source: based on [30].

Portuguez-Castro [31] proposes an eLearning educational model to identify entrepreneurial skills organised in layers with social, pedagogical, technological, instructional design, and quality items (see Figure 3).

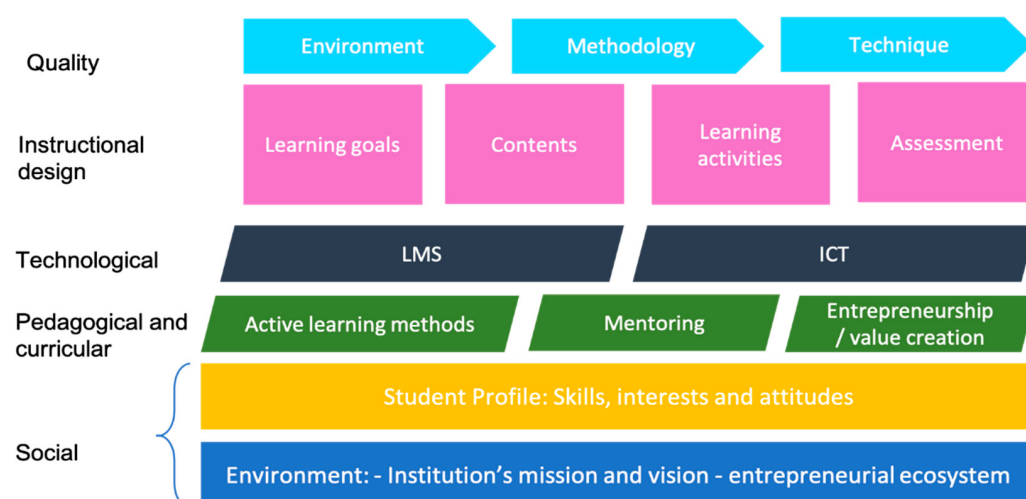


Figure 3. eLearning educational model for the identification of entrepreneurial skills. Source: based on [31].

The models mentioned above are oriented to faculty, but the challenge is to establish a model that could be leveraged as reference model from an institutional level to define a strategy for non-presential teaching that teachers could adopt.

3. Results: Institutional Reference Framework for eLearning Structure

A framework for eLearning, including blended learning [32], will only make sense if it is based on the educational institution's strategic view and is congruent with its mission and vision [33].

The ethical, service, technological infrastructure, and pedagogical model pillars will be used to provide the necessary elements for this reference framework. Contents must be given special consideration, since, together with pedagogical guidelines, they will be the key to instruction development (see Figure 4).

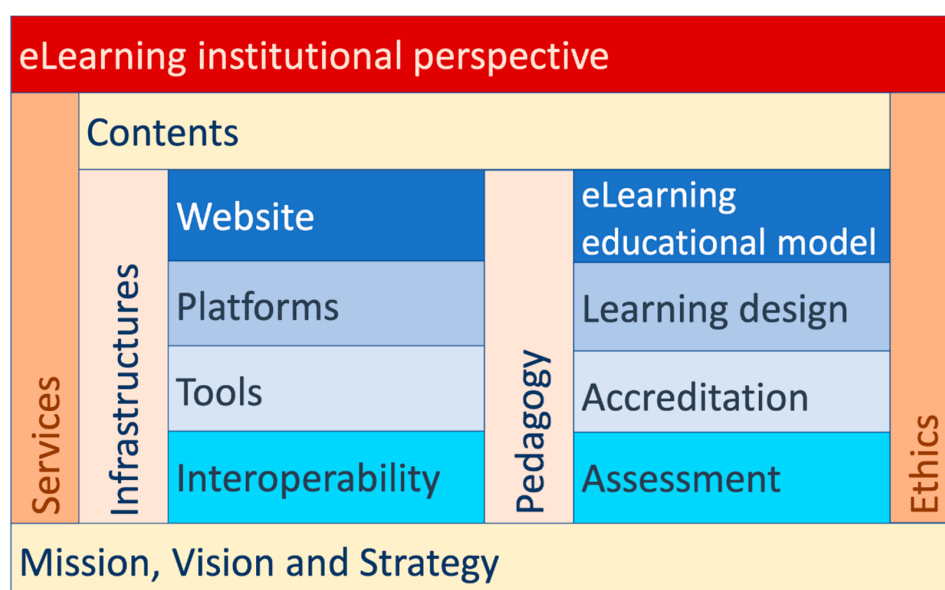


Figure 4. Pillars of the institutional reference framework for eLearning.

On this basis, a structural framework model is proposed based on the Layers pattern [34], which is represented in Figure 5. Seven layers compose the framework; the lower one is the infrastructure layer; the upper one is the policy and strategy layer. The

lower layers support the services and objectives of the upper layers, until, in a bottom-up approach, the institutional policy and strategy on distance learning are defined, which, in turn, influence decision-making in each of the other layers.

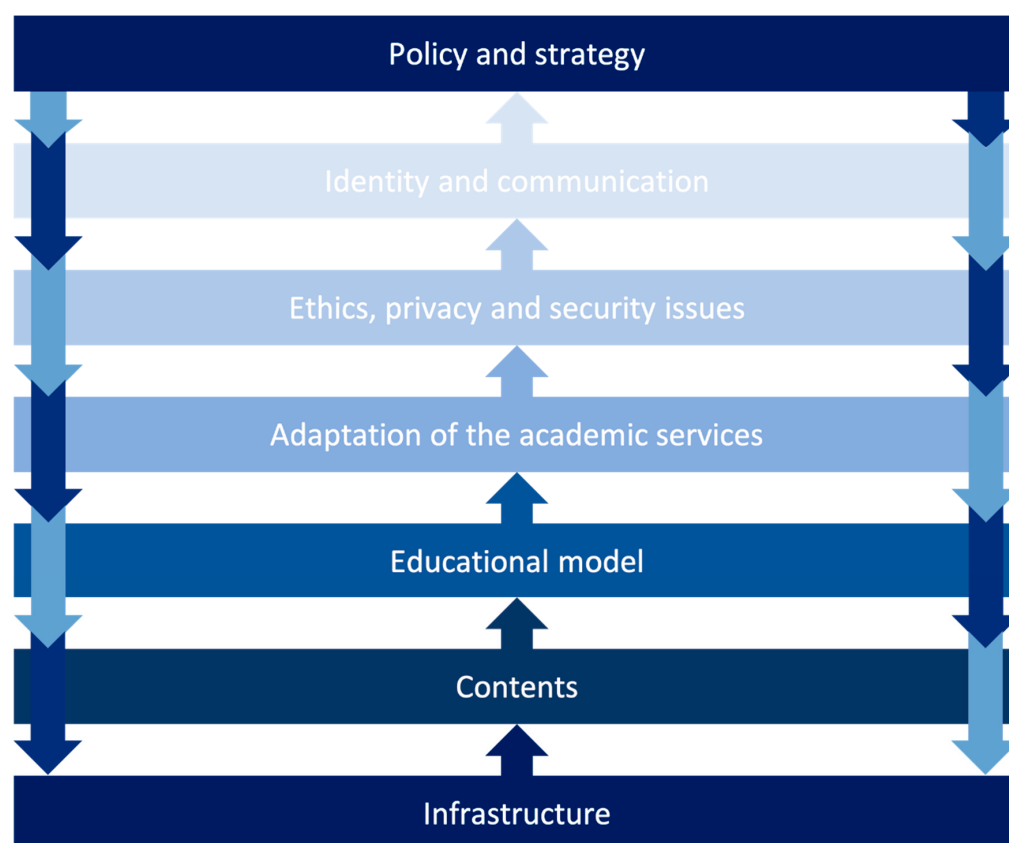


Figure 5. Institutional reference framework for eLearning.

3.1. Infrastructure Layer

The basis of an online education strategy is the technological infrastructure, which must include three sections: management and governance, physical infrastructure, and logical infrastructure [35].

In a scheme of technological transformation of a university, the government of technologies [36,37] is an essential facet, in which the initiatives corresponding to online education must be organised within the project portfolio [38] of the government team.

The physical infrastructure to support online teaching must cover the different connectivity needs, servers, storage space, audio-visual content production, etc., combining technological solutions acquired in property or hosted in external data centres.

Concerning the logical infrastructure, the definition of the technological ecosystem for online education [39] of the university [40] should be undertaken, to maximise both the interoperability and evolution of the software components of the ecosystem and the user experience of the persons who are also part of this ecosystem [41].

Figure 6 shows a diagram, which does not intend to be exhaustive, that shows the software components of the technological ecosystem for the support of online education organized in the processes of instructional design, content production, content publication, and delivery.

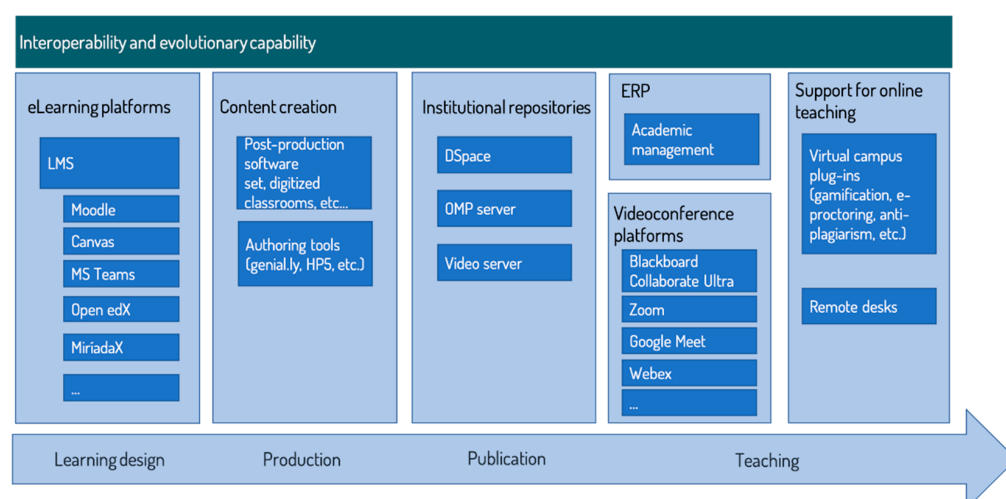


Figure 6. Software components of a technological ecosystem for online teaching.

In the section on instructional design, various eLearning or LMS (Learning Management Systems) platforms are shown, both for the definition of traditional online courses and in MOOC (massive open online courses) [42] or SPOC (small private online courses) formats [43,44]. Although these platforms will also be involved in the delivery of the courses, they are present in order to differentiate the design facet of the environment from the development of courses, so that these platforms will interact with other components of the institutional ERP (enterprise resource planning), such as academic management. They are also intended to link teachers and students to the virtual classrooms or to offer value-added services to these platforms.

In content management, we differentiate between the production or creation part, authoring tools [45], and the components necessary for the preservation and access to different types of repositories [46].

COVID-19 disease has popularized video conferencing tools for synchronous teaching sessions, meeting, or tutoring. Students feel highly satisfied with the videoconferences teaching quality [47]. However, different difficulties with this system might be underlined, such as class rhythm, problems for interacting with the teachers and peers, attention and procrastination issues, etc. [48]. Thus, video conferencing systems are an essential component of the online learning technological ecosystems [49], because not all of the activities must be synchronous. These tools include functionalities to save the sessions and provide them to the students for future visualization, whether they assisted or not (live, so to say) in those teaching sessions.

The LMS platform can be extended with different plug-ins. The policy to do so must be well-defined; otherwise, the evolution of the LMS might be compromised. Online assessment has been perhaps the most complicated problem during the COVID-19 emergence online transformation [50,51]. Thus, plug-ins for ensuring ethical behaviour during online examinations are very popular, especially those that include anti-plagiarism [52] and e-proctoring [53] functionalities.

3.2. Contents Layer

In an online education programme, the educational content alone does not guarantee the training process's quality, but it does have high relevance. Ensuring institutional content with a regular updating programme is a critical point for universities and a risk factor due to the obsolescence of content, but also due to poor management of the creation and updating flow.

Another of the significant institutional challenges related to educational content is incorporating flexibility so that teachers can contribute new content, activities, etc., without fighting a packaged and closed format.

It is also essential to grow the institutional audio-visual collection, both in informal and formal pills, to complete a good collection of recordings of conferences, master classes, etc. In this sense, online education must incorporate the synchronous or asynchronous component, allowing that these sessions are of non-compulsory live attendance. Sessions can be recorded to be viewed by students as many times as they find necessary and independently of when they attended them for the first time.

Educational content must scrupulously respect the intellectual property of the elements that are integrated into it (texts, videos, images, etc.), but institutions also have an excellent opportunity to increase their visibility by adopting open licenses for their educational content [54]. This includes the creation of content in other languages, with particular attention to content in English, or the introduction of subtitles in different languages in the videos, which would also increase the accessibility of audio-visual educational content.

Figure 7 shows a conceptual model of an online module's contents or course carried out with the UML (unified modelling language) [55].

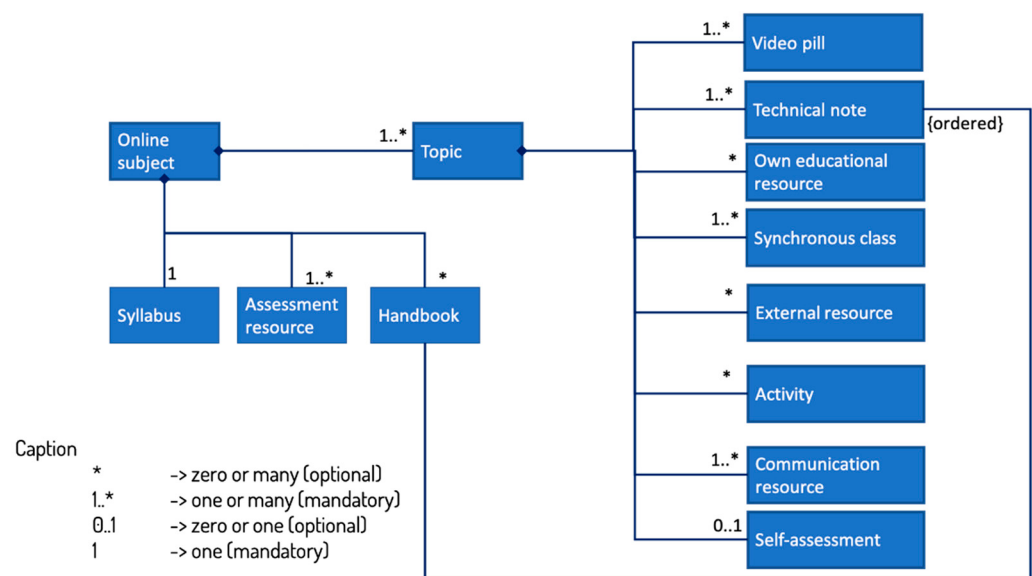


Figure 7. Software components of a technological ecosystem for online teaching.

The guide is the main organizational material of the course. It must be updated in each edition of the unit in order to adapt it to changes in the calendar, in activities, in resources, etc.

Assessment resources can be of the continuous or final evaluation type. They are different from the self-evaluation tests of the topics. It is considered mandatory that some assessment items exist at subject level.

It is recommended that, unless there is already an appropriate handbook for the subject being taught, it should be authored by the online unit's teaching staff. The recommendation would be that it should be licensed under an open licence and all its contents should preserve the copyright of third parties. This should be offered in different formats (pdf, epub, html, etc.) and consists of the different subjects' technical notes.

Video pills are more representative than textual content because of the influence of the content channels people interact with today. These pills should be of short duration, with an approximate time of between 3 and 7 min (not recommended to exceed 10 min, 15–18 min in the case of podcasts) [56–59], combining different types, in order to avoid all of them being in the talking-bust format. It is much to be preferred to have a combination of videos recorded by the institution, with video tutorials, recordings of the teachers, animations, interactive materials, etc.

The other types of content will be managed by the teaching team, including different types of activities, third party resources, self-assessment tests, etc., but paying particular

attention to the resources for interaction with the students, given that this is key for learning, collaboration, and active participation by all those involved in the training action [60,61].

3.3. Educational Model Layer

The educational model is where the instruction of the training actions is designed, together with the contents, services, and technology; it is the critical element to sustain an online offer's quality. There must be a close connection with the institutional strategy of online education. The objective is to mark the degree of freedom that faculty will have and the configuration of the groups of students. This will have a direct relationship with the number of teachers needed to preserve the quality of teaching, based on ensuring interaction between participants, as opposed to the effect of massification, which, on the other hand, may be desirable in other online course formats, such as MOOCs.

In a subject with an online component, i.e., not in a face-to-face one, concerning the pedagogical model based on quality, very clear and well-defined premises must be taken as a starting point.

Firstly, online education is not synonymous with traditional distance education. Technologies perfectly allow a deferred presence in time and space, very different from the traditional distance education concept. Furthermore, although educational models are defined in this way, online education is not merely the publication of content on learning platforms. It requires more significant interaction and collaboration between participants, seeking a balance between self-regulated learning and active and collaborative learning. This, in turn, requires the teaching team to be present and to make an effort to attend to students when a course or subject is ready to be accessed online, which can be more significant and more intense than in face-to-face education [62,63]. Therefore, if a commitment to quality non-face-to-face education in a university is to be made, any vestige or myth related to the consideration of this educational modality as a second-class product or whose teaching commitment requires less effort than that which would be employed in an equivalent situation in a face-to-face context must be eliminated.

Secondly, the competences acquired by a student studying a non-attendance qualification must be the same as if they were studying the same qualification in a face-to-face way, including transversal competencies or soft skills, which must be guaranteed in the design of non-attendance programmes [64,65].

The third premise is that in the instructional design of online subjects or courses, a balance must be reached between self-regulated learning processes and the need to interact and collaborate with other peers. The latter aspect is fundamental to achieving the learning objectives and the aforementioned transversal competences. This is an aspect that is always controversial, since it involves questioning some of the aspects that have been defended since the origins of online education, flexibility and self-regulation [66], as opposed to the commitments of having to fulfil a set programme and achieve learning objectives in a collaborative and interactive context. Therefore, it is a question of balancing opposing interests such as flexibility vs. planning or personalisation vs. collaboration to ensure that, within the freedom to act within a given time frame, the planned objectives are met and that the training action does not end in chaos. Furthermore, one must be aware that not all subjects require the same approaches and that not all types of non-attendance training actions share the same context, formality, and educational objectives. This is why it is essential to carry out the instructional design adapted to each specific action [67].

Considering these premises, the educational model for sustenance, from the perspective of quality, of non-face-to-face education with an online component must take into account the following aspects.

- (1) Each non-presential initiative must have an institutional virtual space that meets the identity, technical, and content requirements defined in the respective layers of the reference model.
- (2) In the case of non-attendance degrees, these must have the same coordination and commission structure, both academic and quality, like the rest of the university's

degrees, thus transmitting that what is important is the degree offered and not so much the methodology used to teach it.

- (3) The students' group size should be defined. Except in the case of self-study courses or MOOCs, group size will be essential to keep it at a number that allows interaction and collaboration, both of minimum and maximum students, while making it sustainable from the perspective of teaching policy. In any case, the maximum number of students in an online group in which interaction between participants is desired should not exceed 30–40 people per group, and it is advisable to stay in the lower part of the interval.
- (4) Interaction through asynchronous components is compelling in providing the flexibility of access and follow-up for students. However, the teaching staff must establish maximum response times so that students receive any necessary feedback without this preventing them from following the development of their learning objectives.
- (5) The sequencing of the subjects or courses of an educational programme must be determined. There are multiple options, and all have their advantages and disadvantages, but in the online format, the sequencing of subjects or the minimum overlap of some of them makes it easier for non-classroom learners to follow them. Regardless of the sequence chosen, it should be borne in mind that the total weekly load for students should be consistent with the referenced credit unit, such as ECTS (European Credit Transfer and Accumulation System) in Europe, and the reality of online students.
- (6) Ethical aspects must be taken into account in the educational context in general and in particular in the case of non-attendance degrees. Respect for the authorship of the work carried out, the correct use of the materials' licenses, and the ethics of not falling into plagiarism must be present and guaranteed in all subjects, using automatic tools for detecting plagiarism.
- (7) Assessment systems have to consider the diversity of students. Assessment examinations must be consistent with the competences to be assessed and the degree of attendance they require (it should be taken into account that an online degree can use face-to-face assessment exams, either with a physical presence or online, without losing its non-attendance status). As a general principle, assessment systems will ensure that there is adequate control over the authorship of assessment exams (identification of students) and that the student has taken the examinations without unauthorised external assistance (control of the environment). This may be justified by the evaluation system's presence or by an appropriate combination of technology and human resources [53].
- (8) Teachers who teach on an official university online degree must have adequate preparation to deploy their skills as online teachers, and this must be guaranteed by the university and supported by a continuous training plan for teachers which addresses, among other topics, aspects related to technologies for online teaching, the pedagogical model, and teaching innovations. Lack of this specific knowledge in university teachers is one of the most critical barriers to the deployment of quality online training in higher education [68,69]. However, other authors believe that this lack of specific skills rather than being a barrier is a symptom of something that is failing at the strategic level of universities [70–72].

Consistent with the above, the following teaching functions are differentiated in online education:

1. The creation of content to be used in the course.
2. The instructional design and planning of the virtual environment (sequencing the contents and activities to be carried out with the tools and resources available on the institutional virtual campus, as well as in other online environments and tools).
3. Synchronous teaching via videoconference.
4. Asynchronous tutoring and monitoring of activities and interaction.
5. Evaluation of students.

6. Mentoring or personalised follow-up of the student to prevent him/her from dropping out (the mentor's figure must be assigned at the beginning of the degree and should remain until the end of it).

In order to carry out these tasks, universities will define the structure of their teaching staff, following the categories and figures established in the legislation, collective agreements, contracts, and agreements, but ensuring that this teaching staff possesses the skills as mentioned earlier to carry out their online teaching work.

3.4. *Adaptation of the Academic Services*

Having online degrees implies integrating this reality into the digital transformation with the rest of the academic services affected, because it makes no sense to duplicate the services affected, nor would it be appropriate to do so if it were feasible to give institutional normality to non-presential degrees.

Thus, among other things, regulations and workflows must be modified for degree verification, registration, quality assessment, online classroom booking, online practices, examination regulations, regulations for the defence of theses, student information, privacy regulations, etc.

3.5. *Ethics, Privacy, and Security Issues*

This layer must be the institutional guarantee to fight against the dark side practice related to the abusive and unethical use and exploitation of data within the learning process.

Teaching digital transformation must be oriented to persons for achieving a more inclusive, participative and human university supported by technology. Data are a powerful and strategic asset, but also have associated risks that define this concept of the dark side of the transformation and analytical processes.

For this reason, online education requires the establishment of a set of services that do not exist or go unnoticed in face-to-face teaching.

Confidentiality and respect for the privacy of individuals must prevail over any other criteria in online education. In this field, institutional regulation should be based on the existing legal framework, such as the General Data Protection Regulation (GDPR) [73].

Academic and learning analytics are crucial for decision-making processes at both institutional [74] and faculty levels [75,76]. Powerful dashboards [77] should be included in the technological ecosystems of the institution [78]. However, access to personal data must always be under the institutional regulations' ethical umbrella [79].

3.6. *Identity and Communication*

This layer aims to define a brand that identifies the online offer within a more powerful brand that is the name of the on-site university. It is a question of taking benefit of the competitive advantage of having a face-to-face university, whose name will already be positioned in the higher education sector, but which must be given specific weight in the online education sector.

This identity must be built both internally and externally through three key elements. Firstly, an image design that, being congruent with the existing corporate image, gives it that differentiating and attractive feature to attract attention and make a space in the virtual space. However, the central component is a multi-device web portal, with a simple and dynamic design that reflects the attraction of the graphic design carried out, and that serves, in addition to serving as a catalogue of the entire online educational offer of the university, as an information portal on online education. To become a focus of attention for the community interested in online education, for its offer and contents, it is necessary to connect the portal with the third element, the social media. The presence in the different social networks should be very active and independent of the university's general social media managers, although there should be coordination to achieve a more significant

overall impact. This is strategic for building a digital brand from an activity model's experience and development that comes from a mostly offline context [80].

Within this communication strategy, attention to users is important, in order to give the best response in the shortest possible time (either directly or by referring it to the person who best knows how to respond). A large part of the questions and queries that will be made is not strictly related to the subjects' academic aspects, but rather to doubts about the platforms, user management, and administrative questions.

3.7. Policy and Strategy

The adoption of an online education model requires a commitment from the university as a whole, starting with its leading team [81]. Therefore, the definition of a strategy on non-face-to-face education (both online and semi-face-to-face) in a public university should be an institutional project and should not be considered as an isolated or personalistic project and should be reflected explicitly and in a way that is not merely testimonial in the institutional strategic plan [82]. This strategy must be aligned with the overall policy on the institution's digital transformation, because, as discussed in the academic services layer, several administrative procedures will be affected by the implementation of online degrees. Consequently, the institutional strategy must be consistent with any other existing strategy in this field in the administration with competences in education and with any existing higher-order regulations.

Some institutions opt to outsource the online education part. Since this is a decision that belongs to the governing bodies of the universities, this is considered a risky option and denotes an undecided commitment to this type of training. As teaching is one of the core areas of any university, it would mean losing control of something that is inherently part of the institution, which does not mean that there cannot be a collaboration with all kinds of actors for the development of specific actions according to the interests and needs that may arise.

From an internal perspective, the strategy to be defined concerning online education must be of the win-win type, where all the actors involved (teachers, students, service personnel) win and the university also wins. On this level, the recognition of online teaching work must be fully covered and encouraged if the initial resistance to accepting a new paradigm is to be broken for a vital part of the teaching staff.

Online education has many areas of action (formal, non-formal, and informal), and not all of them have the same impact within the institution, but the online education strategy must cover all the options in which the university wants to have a presence with its institutional brand.

The offer, mainly formal, of online degrees at a university, can come from the identification of new degrees to be incorporated into the official catalogue and from the transformation of existing face-to-face degrees into online or blended degrees or may not coexist with fully face-to-face itineraries.

This strategy must be based on a set of technological incentives and facilitators (technological ecosystem designed to maximise the user experience, useful and easily accessible tools and services for all participants, etc.), methodological factors (strengthening of SPOC, MOOC, use of the inverted classroom, etc.), and university policy (recognition in the staffing model, reinforcement of staff, both teachers and technicians, indirect incentives in the form of internationalisation, innovation projects, teaching publications, etc.).

As a final recommendation, the university leadership has the responsibility to ensure that this strategy reaches all university community members, allowing and involving all the ecosystem of university services for online education.

4. Discussion about the Challenges to Online Education in Higher Education

For a face-to-face university, leaping into the online paradigm, although not exhaustively, means a substantial change in the organisation. Changes always generate rejection and reticence that must be overcome, and this implies challenges to be faced, not only by

the institution, but also by the main actors in this training process, the teaching staff and students.

From the institutional perspective, the challenge is based on a global need to face its integral digital transformation. Online education is essential, although not the only, part of the transformation of teaching to better adapt to a digital society's needs and characteristics. To do so, it is necessary to lay the strategic foundations, that is, to know where one wants to go with the incorporation of online education in its multiple variants. As proposed in this paper, having a reference model is a crucial necessity to reinforce the institutional strategy and policy. The services ecosystem for online education should be redefined and integrated into the current university organisational and administrative structure that must be aligned with the institutional strategy. In order to support online education, an institutional technological ecosystem should be implemented, including both the physical and the logical infrastructure. The logical infrastructure must reflect the same integration, and interoperability sought with the ecosystem of services. Nevertheless, services and technology are not enough for defining the institutional strategy on online education. Human resources, both from a teaching and technician perspectives, are crucial to coping with the workload resulting from an online training offer. Human resources must comply with the ethical behaviour defined in the ethical layer of the reference model.

Institutionally, it is not enough to have a strategy and the whole support structure. Both at the level of human resources and of technology, it is necessary to communicate this university policy to the rest of the community, placing a particular emphasis on attracting and convincing teaching staff who, at least initially, are often reluctant to change the teaching paradigm.

The institution must put all the safeguards in place in the systems and procedures to preserve the confidentiality and privacy of the data of all persons who end up taking part in online training, to avoid the dark side of the digital transformation of teaching.

From the perspective of quality assurance, the institution must take great care to ensure that all processes, at the various levels, are adapted to guarantee quality assurance and ethics, as well as those aspects that deal with the updating of online content and with the privacy of participants. All this within the appropriate framework of sustainability and return on investment.

Teachers are faced with the challenge of adapting to a new paradigm in which, if they decide to become involved, they will have to make a considerable effort to implement the subjects and subsequently focus on the learning platform. It is substantially important for teachers to see their teaching commitment properly recognised. Unfortunately, this commitment has so far suffered from a lack of definition that has hindered its recognition.

From the perspective of the instructional design of the subjects of a given online programme, coordination with the rest of the teaching staff takes on as much or more importance as in face-to-face teaching. In the digital context, coordination errors and content overlaps are more evident. Furthermore, the organisation and sequencing of the contents and activities require assuming the type of instruction's characteristics to be developed. The activities' synchronous or asynchronous nature influences the students' and teachers' effort estimation as well as the integration of transversal competences.

When teaching action begins and therefore, interaction with students starts, it is a significant challenge to manage time correctly in order to provide an adequate response time that does not block students and allows the flow of instruction.

Online students are faced with the first challenge of assuming that the flexibility of following a degree online has limits and consequences. The greater the degree of flexibility and autonomy, the greater the risk of abandonment due to the weight of loneliness. Time management appears as a fundamental challenge also associated with the flexibility of the online context.

The digital ethics component is critical, seen from all perspectives, including students' patterns of behaviour in interactions with faculty and peers, the preservation of their

privacy and that of other participants, and their attitude and respect for others' intellectual property.

Finally, online students need to feel part of universities, even though they may not be physically there for their training programme duration. This is a challenge that must be shared with the rest of the actors, i.e., the teaching staff and ultimately the institution represented by all the administration staff and the processes and services offered that must reach them under the same conditions of equality as if they were face-to-face students.

5. Conclusions

On a global level, the university, especially the face-to-face university, is in an unstoppable digital transformation process. This transformation includes the adoption of online education if it is not to be left out of a process of change that is already universal and growing. Therefore, the non-face-to-face education model is now part of a strategic transformation of the university.

Faced with this situation of change, traditional universities find themselves facing scenarios that are new and which, therefore, produce an essential vertigo: risks vs. opportunities. Those who best adjust their mission, redefine their vision, and adapt their processes will have more significant opportunities in the immediate future.

Above all, any university that wants to assume this responsibility must be prominent and convey to its community that online education is not a second-rate product when the means are put in place to guarantee the quality of the process, and the teaching effort involved is recognised. Investments must be made into the infrastructure, the technical means, and the teaching staff required.

In this context, emphasized by the effects of the COVID-19 pandemic, we have defined a framework for introducing eLearning models in mainly face-to-face higher education institutions. The proposed model has been theoretically subtended on years of practice and experience in the institutional government of IT processes related to learning technology. The model pretends to be a reference for helping non-virtual universities to face the digital transformation in teaching.

Online education does not mean that face-to-face universities must abandon their commitment to what is to them a natural teaching model. Instead, universities can see it as a strategic opportunity. In that case, an option appears for completing the catalogue of educational offerings with online and/or blended learning degrees. This allows universities to become visible actors in a market share that is increasingly in demand and that is expected to grow exponentially in the short and medium term. Entering into these dynamics is not compulsory, but if a university does, it must compete with a quality offer, as good as is it is expected of the institutional brands that are represented, in order to differentiate itself in a market of multiple offers of a very diverse type and condition.

6. Limitations

The proposed model is limited by the experience in a face-to-face public university and should evolve with the acceptance and penetration of the higher-education institutions' government IT processes.

Funding: This work has been partially funded by the Spanish Government Ministry of Economy and Competitiveness throughout the DEFINES project (Ref. TIN2016-80172-R).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The author declares no conflict of interest.

References

1. Kutnjak, A.; Pihiri, I.; Furjan, M.T. Digital Transformation Case Studies Across Industries—Literature Review. In Proceedings of the 2019 42nd International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO), Opatija, Croatia, 20–24 May 2019; IEEE: New York, NY, USA, 2019; pp. 1293–1298. [CrossRef]
2. Brown, N.; Brown, I. From Digital Business Strategy to Digital Transformation—How: A Systematic Literature Review. In Proceedings of the South African Institute of Computer Scientists and Information Technologists 2019, Skukuza, South Africa, 17–18 September 2019; ACM: New York, NY, USA, 2019. [CrossRef]
3. Negreiro, M.; Madiaga, T. *Digital Transformation*; European Parliament: Brussels, Belgium, 2019.
4. Hess, T.; Matt, C.; Benlian, A.; Wiesböck, F. Options for formulating a digital transformation strategy. *MIS Q. Exec.* **2016**, *15*, 103–119.
5. Grajek, S.; Reinitz, B. Getting Ready for Digital Transformation: Change Your Culture, Workforce, and Technology. *Educase Review*, 8 July 2019.
6. Gobble, M.M. Digital Strategy and Digital Transformation. *Res. Technol. Manag.* **2018**, *61*, 66–71. [CrossRef]
7. Grupo de Trabajo de Directores TI Crue—TIC. *TIC 360°—Transformación Digital en la Universidad*; Crue Universidades Españolas: Madrid, Spain, 2017.
8. Llorens-Largo, F. ¿Qué es la transformación digital de las universidades? In *Universidad*; Studia XXI: Madrid, Spain, 2018; Volume 2018.
9. Arango Serna, M.D.; Branch, J.W.; Castro Benavides, L.M.; Burgos, D. Un modelo conceptual de transformación digital. *Openenergy y el caso de la Universidad Nacional de Colombia. Educ. Knowl. Soc.* **2018**, *19*, 95–107. [CrossRef]
10. Broadbent, J.; Poon, W.L. Self-regulated learning strategies & academic achievement in online higher education learning environments: A systematic review. *Internet High. Educ.* **2015**, *27*, 1–13. [CrossRef]
11. Castro Benavides, L.M.; Tamayo Arias, J.A.; Arango Serna, M.D.; Branch Bedoya, J.W.; Burgos, D. Digital Transformation in Higher Education Institutions: A Systematic Literature Review. *Sensors* **2020**, *20*, 3291. [CrossRef]
12. Kebritchi, M.; Lipschuetz, A.; Santiago, L. Issues and Challenges for Teaching Successful Online Courses in Higher Education: A Literature Review. *J. Educ. Technol. Syst.* **2017**, *46*, 4–29. [CrossRef]
13. *Libro Blanco de la Universidad Digital 2010*; Laviña Orueta, J.; Mengual Pavón, L. (Eds.) Ariel: Barcelona, Spain, 2008.
14. Llorens-Largo, F. Transformación digital versus digitalización. In *Universidad*; Studia XXI: Madrid, Spain, 2020; Volume 2020.
15. Crisol-Moya, E.; Herrera-Nieves, L.; Montes-Soldado, R. Educación virtual para todos: Una revisión sistemática. *Educ. Knowl. Soc.* **2020**, *21*. [CrossRef]
16. Daniel, S.J. Education and the COVID-19 pandemic. *PROSPECTS* **2020**. [CrossRef]
17. Murphy, M.P.A. COVID-19 and emergency eLearning: Consequences of the securitization of higher education for post-pandemic pedagogy. *Contemp. Secur. Policy* **2020**, *41*, 492–505. [CrossRef]
18. García-Peñalvo, F.J.; Corell, A. La COVID-19: ¿enzima de la transformación digital de la docencia o reflejo de una crisis metodológica y competencial en la educación superior? *Campus Virtuales* **2020**, *9*, 83–98.
19. Fidalgo-Blanco, Á.; Sein-Echaluce, M.L.; García-Peñalvo, F.J. Knowledge spirals in higher education teaching innovation. *Int. J. Knowl. Manag.* **2014**, *10*, 16–37. [CrossRef]
20. Fidalgo-Blanco, Á.; Sein-Echaluce, M.L.; García-Peñalvo, F.J. Epistemological and ontological spirals: From individual experience in educational innovation to the organisational knowledge in the university sector. *Program Electron. Libr. Inf. Syst.* **2015**, *49*, 266–288. [CrossRef]
21. Rubio-Royo, E.; Cranfield McKay, S.; Nelson-Santana, J.C.; Delgado Rodríguez, R.N.; Occon-Carreras, A.A. Web Knowledge Turbine as a Proposal for Personal and Professional Self-organisation in Complex Times. *J. Inf. Technol. Res.* **2018**, *11*, 70–90. [CrossRef]
22. García-Peñalvo, F.J. Learning Analytics as a Breakthrough in Educational Improvement. In *Radical Solutions and Learning Analytics: Personalised Learning and Teaching through Big Data*; Burgos, D., Ed.; Springer: Singapore, 2020; pp. 1–15. [CrossRef]
23. Amo, D.; Alier, M.; García-Peñalvo, F.J.; Fonseca, D.; Casañ, M.J. Protected Users: A Moodle Plugin To Improve Confidentiality and Privacy Support through User Aliases. *Sustainability* **2020**, *12*, 2548. [CrossRef]
24. Amo-Filvã, D.; Alier, M.; García-Peñalvo, F.J.; Fonseca, D.; Casañ, M.J. Privacidad, seguridad y legalidad en soluciones educativas basadas en Blockchain: Una Revisión Sistemática de la Literatura. *Ried. Rev. Iberoam. Educ. Distancia* **2020**, *23*. [CrossRef]
25. García-Holgado, A.; García-Peñalvo, F.J. Validation of the learning ecosystem metamodel using transformation rules. *Future Gener. Comput. Syst.* **2019**, *91*, 300–310. [CrossRef]
26. Holland, P.; Bardoel, A. The impact of technology on work in the twenty-first century: Exploring the smart and dark side. *Int. J. Hum. Resour. Manag.* **2016**, *27*, 2579–2581. [CrossRef]
27. Koehler, M.J.; Mishra, P. What is technological pedagogical content knowledge? *Contemp. Issues Technol. Teach. Educ.* **2009**, *9*, 60–70. [CrossRef]
28. Mishra, P.; Koehler, M.J. Technological Pedagogical Content Knowledge: A framework for teacher knowledge. *Teach. Coll. Rec.* **2006**, *108*, 1017–1054. [CrossRef]
29. Puertedura, R. SAMR: A Contextualized Introduction. Available online: <https://bit.ly/3ad83VX> (accessed on 12 February 2021).
30. Hilton, J.T. A Case Study of the Application of SAMR and TPACK for Reflection on Technology Integration into Two Social Studies Classrooms. *Soc. Stud.* **2016**, *107*, 68–73. [CrossRef]

31. Portuguese-Castro, M.I. *Propuesta de un Modelo Educativo E-Learning que Permita Identificar Habilidades de Emprendimiento en Estudiantes Universitarios Dentro de un Ecosistema Emprendedor*; Tecnológico de Monterrey: Monterrey, Mexico, 2020.
32. González-Rogado, A.B.; Rodríguez-Conde, M.J.; Olmos-Migueláñez, S.; Borham, M.; García-Peñalvo, F.J. Experimental evaluation of the impact of b-learning methodologies on engineering students in Spain. *Comput. Hum. Behav.* **2013**, *29*, 370–377. [\[CrossRef\]](#)
33. García-Peñalvo, F.J. Modelo de referencia para la enseñanza no presencial en universidades presenciales. *Campus Virtuales* **2020**, *9*, 41–56.
34. Buschmann, F.; Meunier, R.; Rohnert, H.; Sommerlad, P.; Stal, M. *Pattern-Oriented Software Architecture. A System of Patterns*; John Wiley & Sons: Chichester, UK, 1996; Volume 1.
35. Piattini Velthuis, M.; Mengual Pavón, L. Universidad Digital 2010. In *Libro Blanco de la Universidad Digital 2010*; Laviña Orueta, J., Mengual Pavón, L., Eds.; Ariel: Barcelona, Spain, 2008; pp. 5–27.
36. Fernández Martínez, A.; Llorens Largo, F. (Eds.) *Gobierno de las Tecnologías de la Información Para Universidades*; Conferencia de Rectores de las Universidades Españolas (CRUE): Madrid, Spain, 2012.
37. Fernández Sánchez, C.M.; Piattini Velthuis, M.G. El gobierno y la gestión de las tecnologías y sistemas de información. In *Modelo para el Gobierno de las TIC Basado en las Normas ISO*; Fernández Sánchez, C.M., Piattini Velthuis, M.G., Eds.; AENOR: Madrid, Spain, 2012; pp. 19–28.
38. Fernández Martínez, A. Impulsando el Gobierno de las TI Mediante una Cartera de Proyectos de las TI. Available online: <https://goo.gl/PNpcgQ> (accessed on 12 February 2021).
39. García-Holgado, A.; García-Peñalvo, F.J. A metamodel proposal for developing learning ecosystems. In *Learning and Collaboration Technologies. Novel Learning Ecosystems. 4th International Conference, LCT 2017. Held as Part of HCI International 2017, Vancouver, BC, Canada, 9–14 July 2017. Proceedings, Part I*; Zaphiris, P., Ioannou, A., Eds.; Springer International Publishing: Cham, Switzerland, 2017; pp. 100–109. [\[CrossRef\]](#)
40. García-Peñalvo, F.J.; Hernández-García, Á.; Conde, M.Á.; Fidalgo-Blanco, Á.; Sein-Echaluce, M.L.; Alíer-Forment, M.; Llorens-Largo, F.; Iglesias-Pradas, S. Enhancing Education for the Knowledge Society Era with Learning Ecosystems. In *Open Source Solutions for Knowledge Management and Technological Ecosystems*; García-Peñalvo, F.J., García-Holgado, A., Eds.; IGI Global: Hershey PA, USA, 2017; pp. 1–24. [\[CrossRef\]](#)
41. García-Holgado, A.; García-Peñalvo, F.J. Human interaction in learning ecosystems based on open source solutions. In *Learning and Collaboration Technologies. Design, Development and Technological Innovation. 5th International Conference, LCT 2018, Held as Part of HCI International 2018, Las Vegas, NV, USA, 15–20 July 2018, Proceedings, Part I*; Zaphiris, P., Ioannou, A., Eds.; Springer: Cham, Switzerland, 2018; pp. 218–232. [\[CrossRef\]](#)
42. García-Peñalvo, F.J.; Fidalgo-Blanco, Á.; Sein-Echaluce, M.L. An adaptive hybrid MOOC model: Disrupting the MOOC concept in higher education. *Telemat. Inform.* **2018**, *35*, 1018–1030. [\[CrossRef\]](#)
43. Fox, A. From MOOCs to SPOCs. *Commun. ACM* **2013**, *56*, 38–40. [\[CrossRef\]](#)
44. Shuying, C.; Lei, C. Exploration and Practice of SPOC Mixed Teaching Mode in Data Structure Course. In *Proceedings of the 4th International Conference on Modern Management, Education Technology and Social Science (MMETSS 2019)*, Dalian, China, 20–22 September 2019; Atlantis Press: Amsterdam, The Netherlands, 2019; pp. 397–400. [\[CrossRef\]](#)
45. García-Peñalvo, F.J.; García Carrasco, J. Educational hypermedia resources facilitator. *Comput. Educ.* **2005**, *44*, 301–325. [\[CrossRef\]](#)
46. Ferreras-Fernández, T. Los repositorios institucionales: Evolución y situación actual en Spain. In *Ecosistemas del Conocimiento Abierto*; Merlo Vega, J.A., Ed.; Ediciones Universidad de Salamanca: Salamanca, Spain, 2018; pp. 39–84.
47. Fatani, T.H. Student satisfaction with videoconferencing teaching quality during the COVID-19 pandemic. *BMC Med. Educ.* **2020**, *20*. [\[CrossRef\]](#)
48. Dietrich, N.; Kentheswaran, K.; Ahmadi, A.; Teychené, J.; Bessière, Y.; Alfenore, S.; Laborie, S.; Bastoul, D.; Loubière, K.; Guigui, C.; et al. Attempts, Successes, and Failures of Distance Learning in the Time of COVID-19. *J. Chem. Educ.* **2020**, *97*, 2448–2457. [\[CrossRef\]](#)
49. Al-Samarraie, H. A Scoping Review of Videoconferencing Systems in Higher Education: Learning Paradigms, Opportunities, and Challenges. *Int. Rev. Res. Open Distrib. Learn.* **2019**, *20*, 121–140. [\[CrossRef\]](#)
50. García-Peñalvo, F.J.; Corell, A.; Abella-García, V.; Grande-de-Prado, M. Recommendations for Mandatory Online Assessment in Higher Education During the COVID-19 Pandemic. In *Radical Solutions for Education in a Crisis Context. COVID-19 as an Opportunity for Global Learning*; Burgos, D., Tlili, A., Tabacco, A., Eds.; Springer Nature: Singapore, 2021; pp. 85–98. [\[CrossRef\]](#)
51. García-Peñalvo, F.J.; Corell, A.; Abella-García, V.; Grande-de-Prado, M. Online Assessment in Higher Education in the Time of COVID-19. *Educ. Knowl. Soc.* **2020**, *21*. [\[CrossRef\]](#)
52. Fluck, A.E. An International review of eExam technologies and impact. *Comput. Educ.* **2019**, *132*, 1–15. [\[CrossRef\]](#)
53. González-González, C.S.; Infante-Moro, A.; Infante-Moro, J.C. Implementation of E-proctoring in Online Teaching: A Study About Motivational Factors. *Sustainability* **2020**, *12*, 3488. [\[CrossRef\]](#)
54. García-Peñalvo, F.J.; García de Figuerola, C.; Merlo-Vega, J.A. Open knowledge: Challenges and facts. *Online Inf. Rev.* **2010**, *34*, 520–539. [\[CrossRef\]](#)
55. Object Management Group. *Unified Modeling Language Specification Version 2.5.1*; formal/17-12-05; Object Management Group: Needham, MA, USA, 2017.

56. Mutiawani, V.; Juwita. Developing e-learning application specifically designed for learning introductory programming. In Proceedings of the 2014 International Conference on Information Technology Systems and Innovation (ICITSI 2014), Bandung, Indonesia, 24–27 November 2014; IEEE: New York, NY, USA, 2014; pp. 126–129. [\[CrossRef\]](#)
57. Pew Research Center's Project for Excellence in Journalism. *YouTube & News: A New Kind of Visual Journalism*; Pew Research Center's Project for Excellence in Journalism: Washington, DC, USA, 2012.
58. isEazy. *Capacidad de Atención en los Cursos E-Learning, ¿Cuánto Debería Durar un Curso Online?* 2018. Available online: <https://bit.ly/3aKtH> (accessed on 12 February 2021).
59. Peñalba, A. Microlearning: Qué es, cómo aplicarlo y casos de éxito. 2019. Available online: <https://bit.ly/315hWP4> (accessed on 12 February 2021).
60. Seoane-Pardo, A.M.; García-Peñalvo, F.J. Pedagogical Patterns and Online Teaching. In *Online Tutor 2.0: Methodologies and Case Studies for Successful Learning*; García-Peñalvo, F.J., Seoane Pardo, A.M., Eds.; IGI Global: Hershey, PA, USA, 2014; pp. 298–316. [\[CrossRef\]](#)
61. Tinoco-Giraldo, H.; Torrecilla Sánchez, E.M.; García-Peñalvo, F.J. E-Mentoring in Higher Education: A Structured Literature Review and Implications for Future Research. *Sustainability* **2020**, *12*, 4344. [\[CrossRef\]](#)
62. García-Peñalvo, F.J.; Seoane-Pardo, A.M. (Eds.) *Online Tutor 2.0: Methodologies and Case Studies for Successful Learning*; IGI Global: Hershey, PA, USA, 2014. [\[CrossRef\]](#)
63. Seoane-Pardo, A.M. *Formalización de un Modelo de Formación Online Basado en el Factor Humano y la Presencia Docente Mediante un Lenguaje de Patrón*; Universidad de Salamanca: Salamanca, Spain, 2014.
64. Tadimeti, V. E-soft skills training: Challenges and opportunities. *IUP J. Soft Ski.* **2014**, *8*, 34–44.
65. Hirsch, B.J. Wanted: Soft skills for today's jobs. *Phi Delta Kappan* **2017**, *98*, 12–17. [\[CrossRef\]](#)
66. Houlden, S.; Veletsianos, G. A posthumanist critique of flexible online learning and its “anytime anyplace” claims. *Br. J. Educ. Technol.* **2019**, *50*, 1005–1018. [\[CrossRef\]](#)
67. Beltrán Hernández de Galindo, M.J.; Ramírez-Montoya, M.S. Innovation in the Instructional Design of Open Mass Courses (MOOCs) to Develop Entrepreneurship Competencies in Energy Sustainability. *Educ. Knowl. Soc.* **2019**, *20*. [\[CrossRef\]](#)
68. Roberts, J. Future and changing roles of staff in distance education: A study to identify training and professional development needs. *Distance Educ.* **2018**, *39*, 37–53. [\[CrossRef\]](#)
69. Mathes, J. *Global Quality in Online, Open, Flexible and Technology Enhanced Education: An Analysis of Strengths, Weaknesses, Opportunities and Threats*; International Council for Open and Distance Education: Oslo, Norway, 2019.
70. Jones, D. Is Training the Barrier to Quality Online Learning in Higher Ed? *Creative Dissatisfaction. Success Is on the Far Side of Failure*. 2019. Available online: <https://bit.ly/3aMO66e> (accessed on 12 February 2021).
71. Jones, D. Exploring knowledge reuse in design for digital learning: Tweaks, H5P, constructive templates and CASA. In *Personalised Learning. Diverse Goals. One Heart. Conference Proceedings of the 36th International Conference of Innovation, Practice and Research in the Use of Educational Technologies in Tertiary Education, ASCILITE 2019, Singapore, 2–5 December 2019*; Chew, Y.W., Chan, K.M., Alphonso, A., Eds.; Australasian Society for Computers in Learning in Tertiary Education: Sydney, Australia, 2019; pp. 139–148.
72. Ellis, R.A.; Goodyear, P. *The Education Ecology of Universities: Integrating Learning, Strategy and the Academy*; Routledge: New York, NY, USA, 2019.
73. European Parliament; Council of the European Union. *Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data, and Repealing Directive 95/46/EC (General Data Protection Regulation) (Text with EEA Relevance)*; European Commission: Brussels, Belgium, 2016.
74. Campbell, J.P.; DeBlois, P.B.; Oblinger, D.G. Academic Analytics. A new tool for a new era. *Educ. Rev.* **2007**, *42*, 40–42, 44, 46, 48, 50, 52, 54, 56, 57.
75. Gómez-Aguilar, D.A.; García-Peñalvo, F.J.; Therón, R. Analítica Visual en eLearning. *El Prof. De La Inf.* **2014**, *23*, 236–245. [\[CrossRef\]](#)
76. Gómez-Aguilar, D.A.; Hernández-García, Á.; García-Peñalvo, F.J.; Therón, R. Tap into visual analysis of customization of grouping of activities in eLearning. *Comput. Hum. Behav.* **2015**, *47*, 60–67. [\[CrossRef\]](#)
77. Sarikaya, A.; Correll, M.; Bartram, L.; Tory, M.; Fisher, D. What Do We Talk About When We Talk About Dashboards? *IEEE Trans. Vis. Comput. Graph.* **2018**, *25*, 682–692. [\[CrossRef\]](#)
78. Vázquez-Ingelmo, A.; García-Peñalvo, F.J.; Therón, R.; Amo-Filvà, D.; Fonseca-Escudero, D. Connecting domain-specific features to source code: Towards the automatization of dashboard generation. *Clust. Comput. J. Netw. Softw. Tools Appl.* **2020**, *23*, 1803–1816. [\[CrossRef\]](#)
79. Ifenthaler, D.; Tracey, M.W. Exploring the relationship of ethics and privacy in learning analytics and design: Implications for the field of educational technology. *Educ. Technol. Res. Dev.* **2016**, *64*, 877–880. [\[CrossRef\]](#)
80. Mills, A.J.; Plangger, K. Social media strategy for online service brands. *Serv. Ind. J.* **2015**, *35*, 521–536. [\[CrossRef\]](#)
81. Embid Irujo, A.; Michavila, F. *Hacia una Nueva Universidad. Apuntes para un Debate*; Tecnos: Madrid, Spain, 2001.
82. Paulsen, M.B.; Toutkoushian, R.K. Economic Models and Policy Analysis in Higher Education: A Diagrammatic Exposition. In *Higher Education. Handbook of Theory and Research*; Smart, J.C., Ed.; Springer: Dordrecht, The Netherlands, 2008; pp. 1–48. [\[CrossRef\]](#)