

Accreditation Models and Digital Platforms Used for University Academic Programs in Peru

Igor Aguilar-Alonso
Research Group: IT Governance and Management Platforms, Professional School of Systems Engineering National Technological University of Lima Sur
Lima, Perú
iaguilar@untels.edu.pe

Frank Escobedo
Professional School of Systems Engineering National Technological University of Lima Sur
Lima, Perú
fescobedo@untels.edu.pe

Myrna Manco
Professional School of Systems Engineering National Technological University of Lima Sur
Lima, Perú
mmanco@untels.edu.pe

Marco Amasifuen
Professional School of Systems Engineering National Technological University of Lima Sur
Lima, Perú
2016200012@untels.edu.pe

Abstract—Due to the problems presented by university higher education programs in Peru, the senior executives of the universities must take the necessary measures that allow them to identify institutional procedures to subsequently implement correct activities that contribute to growth in university education service quality and thus meet the standards necessary to achieve the accreditation of university programs. The main objective is to identify and offer a relevant description of some accreditation models, which allow the development of an institutional culture based on quality management to obtain accreditation in university higher education in Peru, as well as digital platforms used for education. The methodology used was the literature review. As a main conclusion is the identification of 15 publications selected, during the full review of each of the papers, we found 5 accreditation models and 7 digital platforms that support university quality management systems.

Keywords— *ABET, ICACIT, SINEACE, NVAO, Accreditation Models, Digital Platforms*

I. INTRODUCTION

The COVID-19 crisis that affected in all countries of world has very clearly demonstrated that universities do not have a strategic plan to prevent and control the risks as well as pandemics, which is why it is necessary propose the use of information technology (IT) to develop digital platforms that can contribute to best IT government and the IT services management [1], [2], in public and private universities, and will enable efficient coordination to continuously monitor the progress and maintenance of the different processes and activities, to achieve the quality assurance of education in a university program, allowing senior executives to make strategic decisions at universities [3].

In many countries of the world there are populations with low and middle economic incomes, for this reason the assembly of the United Nations (UN) organization established the 2030 Agenda, with a sustainable development plan in which two most important objectives stand out: healthy lives and quality education. In the educational

context, it is necessary to transform university higher education programs to promote sustainable education, so it is important to understand what the structural deficiencies are in universities and then discuss strategies to limit them [4].

The vast majority of countries in the world have been based on the accreditation systems implemented in the United States of America. In the case of Thailand, has the Office for National Education Standards and Quality Assessment (ONESQA), considered as a public organization, this organization acts in a neutral way to evaluate quality, whereas the Office of the Higher Education Commission (OHEC) has as its main function to evaluate the internal quality of higher education. OHEC, considers the accreditation process as an important tool with the adequate mechanisms for its implementation, taking into account the procedures, rules, laws, and adequate conditions that allow monitoring of higher education institutions (HEIs) in order to maintain quality standards in higher education [5].

Many Latin American universities have begun to work on their accreditation programs for their different professional schools since the 1990s, some private universities and public emblematic universities, which have high incomes, have successfully carried out this certification. However, the majority of public universities due to their low economic resources have not yet begun with the preparation to achieve this purpose and their authorities are concerned about this situation.

Currently in Peru, it is important that university higher education has quality accreditation, to provide quality services to the students employed by the institution, allowing them to recognize their weaknesses and strengths, in such a way that it allows planning their progress, and that their continuous improvement, covering all aspects of the system, achieving recognition in providing quality education.

The quality assurance in higher education has been developed and has been totally reformed in the last decades

in the different countries of the world to verify the performance of university study programs [6].

Peruvian universities, in order to obtain accreditation, require going through various internal evaluation processes, these will help raise the standard of education provided, improving their demand and quality in their work. In Peru there are currently 51 public universities and 92 private universities according to SUNEDU, some universities that have a heterogeneous quality level, but many universities do not have an adequate quality level, therefore, it is necessary that there be accreditation models that help to optimize university education.

Evaluation is the strategy that drives change and improvement. The processes of change are not unique, nor are they established in a general way for all, it is for them that the various models that the universities used in Peru to achieve accreditation will be shown.

The main objective is to identify and offer a relevant description of some accreditation models, which allow the development of an institutional culture based on quality management to obtain accreditation in university higher education in Peru, based on the support of digital platforms.

The structure of this paper is as follows: Section (1) is an introduction based on quality management to obtain accreditation in university higher education in Peru. Section (2) defines digital platforms and quality management in university higher education. Section (3), defines methodology to carry out the Literature Review of papers related with the research. Section (4), refers to found results. Section (5), refers to analysis of the proposals and answer to the investigation questions. Section (6), some conclusions are drawn as research result.

II. BACKGROUND

A. Digital platforms

A digital platform, also known by the name of virtual platform, are virtual spaces that work with the internet, where software programs or computer applications are executed to satisfy the needs of a certain set of users.

Currently, there are many platforms working but each one of them is designed to fulfill different functions or applications of use and help end users to solve their problems more easily, using fewer resources.

According Sanchez [7], Baldwin [8] argue that a digital platform is composed of several modules or components with different functionalities of a certain software product. These modules can be considered as complementary software subsystems, that are designed and developed by software developers of other companies. These software applications are executable components that are offered as information systems, software applications or services ready to be utilized by end users.

Reuver [9], consider that a digital platform is a set of technical artefacts built based on software code, this ecosystem comprises modules developed by third-party. A digital platform is characterized by the combination of technical elements such as hardware and software for automating business processes meeting certain quality

standards and its functionality is shared through modules or components that interact with its interfaces.

Digital platforms allow tasks to be carried out through the web and these are created for different functions, among the platforms we can find: platforms for educational use, social platforms, platforms for electronic commerce, platforms for management, among other specialized platforms.

B. Quality management in university higher education

Students from a certain region or city select the best universities to carry out their professional studies, which must provide quality educational services in their different forms, these services are characterized by being constantly monitored and managed in an appropriate way, taking into account considering the constant measurement of the indicators implemented in a management system, the results obtained will serve the senior executives to make the best decisions for the benefit of the students, the reputation and sustainability of the university.

The quality of service is defined as a form of attitude, which is related to customer satisfaction but is not the same, it results from the comparison of expectations with perceptions of performance. Today, customers are more informed due to the information provided by IT, this concept is currently very important. There are different approaches and many digital tools have appeared to measure the quality of the service and are taken into account by those who direct the various industries and offer services to their clients, such as: supply chain and logistics, the service of public institutions, service of educational institutions, banking service, catering services, food services, service at airports, among other types of service [10].

In Peru, as well as in the different countries of the world, universities face multiple complex challenges that society requires, due to the new demands for professionalism and emerging skills associated with the knowledge society. Added to this are the new pedagogical tasks and the requirements to be accountable and efficient in institutional management. There are several studies that address quality management in higher education.

III. METHODOLOGY

To carry out the review we use the guide established by Kitchenham y Charters [11], which consists of three important parts:

- **Review planning:** in this phase, is planned the activities for the articles review, include the research questions, search strings, inclusion and exclusion criteria, consultation sources and the protocol for selecting the most suitable articles to help in our research.
- **Carrying out the review:** the second phase of the protocol, is considered the operative part of the process in accordance with the considerations defined in the planning phase. The most important articles are methodically selected as shown in Fig. 1.

- **Results of the review:** here are presented the results found in each of the consultation sources as shown in Table II.

A. Review planning

The following sources were used to search for information: IEEE Xplore, Google Scholar, and Science Direct.

The research questions were as follows:

- *What accreditation models exist for the Academic Programs in university higher education?*
- *What digital platforms are used for the Academic Programs in higher university education?*

The key terms used for the search string were:

- ACCREDITATION MODELS AND UNIVERSITY HIGHER EDUCATION.
- DIGITAL PLATFORM AND UNIVERSITY HIGHER EDUCATION AND ACCREDITATION.

The inclusion and exclusion criteria that were taken into account are detailed in Table I.

TABLE I. INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria	Exclusion Criteria
Scientific articles related with the research topic.	Scientific articles which do not meet specifications of inclusion criteria.
Scientific articles ranging from 2015 to 2020.	Letters to the editor, posters, erratum and books
Articles that are in journals or congresses	

B. Conducting the review

The identification of possible selected studies useful for our research was carried out taking into account the process established by Kitchenham, as explained in detail in the diagram in Fig. 1.

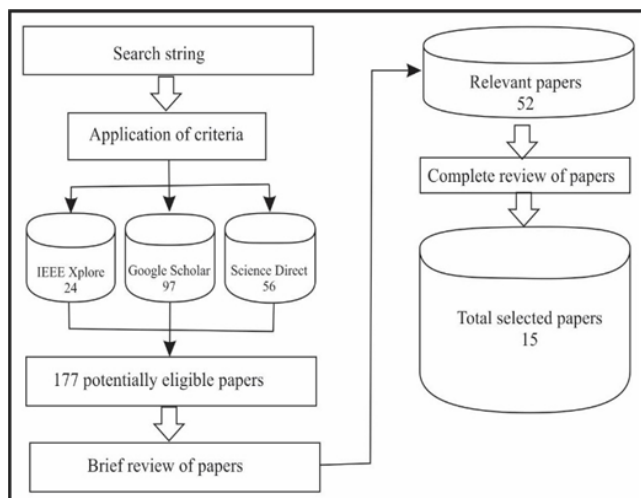


Fig. 1. Process for the search and selection of papers

Fig. 1, shows the process of conducting the literature review, from the elaboration of the search chain based on the criteria established in Table I, the application of the search chain to each of the databases of information, a brief review of the abstract of the papers, selection of the most relevant papers, the complete review of the relevant papers and finally the selection of the desired papers.

During the review process, several articles were excluded because they did not match the specified criteria in Table I.

C. Results of the review

The result of the literature review process was possible after elaborate the search string, taking into account the inclusion and exclusion criteria established, and then applied in each of the sources of information (IEEE Xplore, Google Scholar, and Science Direct), thus managing to identify 177 potential documents.

Subsequently, after reviewing the abstracts of the documents, 52 relevant documents were selected. Finally, we conduct a complete review of relevant papers of which 15 documents were selected. Table II shows the results obtained in each of its selection stages.

TABLE II. STUDIES FOUND, RELEVANT STUDIES AND SELECTED STUDIES

Databases consulted	Studies Found	Relevant studies	Selected studies	Percentage
IEEE Xplore	24	8	3	20%
Google scholar	97	18	5	33%
Science Direct	56	26	7	47%
TOTALS	177	52	15	100%

IV. FOUND RESULTS

The found results during the review process, is result of exploration each of papers through full reading of the 15 documents selected, at which was identified 5 accreditation models and 7 digital platforms, as is detailed below.

A. Accreditation models for higher education

According to García [12], argues that the Institute for Quality and Accreditation of Programs, Engineering and Computer Technology (ICACIT), is a non-profit and non-governmental organization. The ICACIT is characterized by being a specialized organization in the accreditation of educational programs in computing, engineering and engineering technology. This accrediting body ensures that the programs to be accredited comply with international standards so that its graduate students from a certain program are ready to begin their professional activities. The accreditation offered by ICACIT is only applied to study programs, not to professional degrees, academic departments, universities, institutions or individuals. ICACIT, due to its trajectory as an accreditation body, is specialized exclusively in the accreditation of study programs in Computing, Engineering and Engineering Technology. For the accreditation process, the accrediting body takes into account the following criteria that are indicated below: the students, the educational objectives of

the program, the results of the students, the continuous improvement, the curriculum, the teachers, the infrastructure of the facilities, institutional support and research and innovation criteria [13].

Aamir Shafi [14] argue that Accreditation Board of Engineering and Technology (ABET) is a well-respected accreditation organization, which itself is nonprofit and ISO 9001:2008 accredited. Currently, they have more than 3,800 accredited programs in 31 countries in four areas namely, Applied & Natural science, Computing, Engineering and Engineering Technology. Similarly, Gabalán-Coello [15], argue that accreditation by the ABET model makes it possible to determine whether a university program has met essential standards, and thus produce quality graduates, to enter the critical fields of applied science, computer science, engineering, technology and engineering. Graduates of a program accredited under the ABET model demonstrate that they have a solid educational foundation and that they are capable of being part of innovation and in the exceptional use of new technologies. It takes into account: students, educational objectives, competencies developed by the program, continuous improvement, curriculum, teachers, infrastructure, and institutional support

According to Gibbs [16], argue that the Accreditation Organization of The Netherlands and Flanders (NVAO) is a body that guarantees the quality of higher education, conducts its activities expertly and independently, publishes information related to the quality of higher education in the Netherlands and Flanders, promotes a culture of quality in higher education institutions, the criteria that it takes into account to evaluate are: orientation and content of the curriculum, expected results, learning environment, facilities, tutoring, staff, quality assurance, evaluation of students, learning results achieved.

Hidalgo [17], argue that National Assessment System, Accreditation and Quality Certification (SINEACE), is a Peruvian Quality Model, that conceives the evaluation of quality as a training process that offers institutions opportunities to analyze their work, introduce changes to improve progressively, permanently and sustainably, strengthen their capacity for self-regulation and install a culture of institutional quality to through continuous improvement. This model takes into account the following dimensions: strategic management, integral formation, institutional support, results, which are distributed in 12 factors: planning of the study program, management of the graduation profile, quality assurance, teaching-learning process, teacher management, student monitoring, research, technological development and innovation, university social responsibility, welfare services, infrastructure and support, human resources and verification of the graduation profile. Likewise, this model has 34 standards that are accompanied by criteria to evaluate accreditation programs in Peruvian universities [18].

According to Jimenez [19], in your paper he refers to the model of the National Agency for Accreditation and Evaluation of Higher Education (ANEAES) of Paraguay, it was created by Law 2072/03, in February 2003 by the Congress of the Paraguayan Nation. ANEAES depends on the Ministry of Education and Culture, but enjoys technical and academic autonomy to carry out its functions. The

ANEAES model considers: Dimensions, Components, Criteria and Quality Indicators to evaluate the different Careers of the higher education system in Paraguay, among the dimensions considered by this model are indicated below: Dimension 1, related to organization and management, Dimension 2, related to the academic project, Dimension 3, related to people, Dimension 4, refers to resources, and Dimension 5, is related to result and impact.

B. Digital Platform Models

According to Valentín [20], argues that the University of Castilla-La Mancha (UCLM) is developing a collaborative project management system management and a set of platforms integrated management for archiving UCLM. Different technology companies have collaborated in the project: Tangram and Odilo, Telefónica, that provide the necessary technological platforms and activities through a service-based model, such is the case of the company Telefónica provided the cloud computing infrastructure, Odilo provides the digital preservation storage system, Tangram provides the processor (TangramBPM) on which the administrative management is based.

Wightman [21], presents the "Digital Diamond" platform. It arises due to the need to have a digital platform to improve management, taking into account the different sectors of the Colombian community. For the construction of the platform, a framework was designed and evaluated to evaluate the management capacity of information technology for the development of smart cities in Colombia. This platform enabled an evolutionary strategic approach for IT-supported projects. The methodology of this platform is based on aspects such as the telecommunications and information technology infrastructure, information technology infrastructure, support infrastructure, information management and level of interconnection and collaboration.

According by Szabó [22], argue that the INTACT digital platform in Bilingual Education has been developed for interactive teaching, this platform contains teaching and learning material based on study plans such as language, mathematics, social sciences, etc., to be shared in an educational community composed of teachers and students. In the development of the digital platform, the HTML5 programming language was used, taking into account the ease of access to the web and allow the interconnection with multiple mobile devices such as mobile phones, touch panels, tablets, whiteboards, among others devices. In addition, the platform must meet the requirements of different technical infrastructures and information systems of the educational community. The structure of the platform is based on the Drupal Solution (free software) with a wide variety of functionalities, it is a content management system that is used in the development of dynamic websites, to be more exact the Opigno Learning Management System (LMS). The Opigno LMS was the base technology in the development of the platform that allows meeting most of the platform requirements in which several adjustments were made to meet the technical specifications such as an easy-to-use interface that is intuitive for members of the community.

Castillejos [23] argue the importance of an Educational Platform for University Students, in his study focuses on the analysis of the information management processes and creation of digital content for the teaching of university students of a public institution in the state of Oaxaca, Mexico. In the study the author identifies basic competences related to the creation of digital content to be developed in different formats and platforms, in this study, the problems related to critical thinking skills to convert information into new knowledge are highlighted.

Briede [24], present a Collaborative Platform for Project Management in the Field of Industrial, this platform is for information management during a workshop for undergraduate Industrial Design students. The results show that unifying and standardizing storage, management and feedback formats through digital means facilitates the control, monitoring and evaluation of projects in the design workshop. Likewise, he points out that this project opted for the incremental development methodology, which allows the process of creating the software to be approached through multiple prototypes, thus updating and improving the version of the software. Free software development technologies were used: PHP 5.2.8 (the source code programming language), MySQL 5.1.30 (to develop a solid database), JQuery 1.7.1. mins (libraries that allow interaction with the web browser), Smarty-2.6.9 (PHP template engine).

Herrero [25], make reference to the Studium digital platform at University of Salamanca (USAL). The main objective of the use Studium digital platform is oriented so that students can reach sufficient levels in the management of both quality dental clinic and dental treatments are performed, as well as, increase access to multimedia content in the studies of dentistry, strengthen the learning and knowledge environment for the student in the degree in Dentistry.

Gisbert [26], make reference that INCOTIC-degree is a tool designed to carry out a self-diagnostic evaluation of the digital competence of first-year university students, to then be able to adjust the teaching planning of this competence when necessary. This tool is used by professors from the Rovira i Virgili University of Tarragona. INCOTIC-Grade, is integrated in the Web 2.0 interface using Google Docs technologies.

V. ANALYSIS AND ANSWERS TO THE RESEARCH QUESTIONS

A. Analysis of accreditation models

In Peru, it is very common to hear about institutions that have passed the evaluation of international entities to achieve their accreditation, in the same way, universities that have been accredited under the SINEACE national model; this asserts that there is a lot of concern about achieving this certification, not only that it will give institutional prestige, but also that it will allow them to have a different panorama of evaluation, measuring and controlling each stage of the accreditation of their professional careers.

Two of the accreditation models (SINEACE and ANEAES) remain with the structure detected by Acosta

(2016), which ranges from the general to the particular, and three of the models, on the contrary, start with a larger group of criteria. The ICACIT and ABET models share the eight criteria, but ICACIT adds one more, which is “research and innovation criteria”.

As a criterion / dimension transverse, in the five models we can highlight student results (ICACIT and ABET) or achieved learning results (NVAO) or results and impact (ANEAES) or simply results (SINEACE) in which all the models coincide.

Responding to the research question, it can be indicated that 5 accreditation models have been found for the academic programs in university higher education.

B. Analysis of digital platforms

Although it is true that, after the collection of the respective information, it is appreciated that there are indeed digital platforms with diverse and education-related purposes, and in the same way, there are universities that have quality management systems, in many of them at the dashboard level; in this way we could consider that the technological support would generate excellent advantages since it could be monitored from the self-evaluation, to the complete modeling of the quality management system.

Responding to the research question, it can be indicated that 7 digital platforms have been found for the academic programs in higher university education.

VI. CONCLUSIONS

The conclusions of the investigation process are indicated below:

We identified the results in 15 publications selected and during the full review of each of the papers, we found 5 accreditation models and 7 digital platforms that help to the support university quality management systems.

We could argue that there is a lot of concern on the part of the training centers to implement it, and this is where we would offer the value of digital platforms, which would serve as support for such a process.

The use of digital platforms, as support to the accreditation process, allows an efficient and effective control of dimensions, factors and standards, no matter which model are chosen for that purpose.

ACKNOWLEDGMENT

The paper was developed as part of research project identified with RCO 193-2019-UNTELS. The authors are grateful for the financial funds allocated to the project managed by the Research Institute (IR) of the National Technological University of Lima Sur, Peru.

REFERENCES

- [1] I. Aguilar Alonso, J. Carrillo Verdún, and E. Tovar Caro, “Description of the structure of the IT demand management process framework,” *Int. J. Inf. Manage.*, vol. 37, no. 1, pp. 1461–1473, 2017, doi: 10.1016/j.ijinfomgt.2016.05.004.
- [2] C. M. Macías and I. A. Alonso, “Proposal for the identification of information technology services in

- public organizations,” *Symmetry (Basel)*, vol. 11, no. 10, 2019, doi: 10.3390/sym11101269.
- [3] C. Wang, Z. Cheng, X.-G. Yue, and M. McAleer, “Risk Management of COVID-19 by Universities in China,” *J. Risk Financ. Manag.*, vol. 13, no. 2, p. 36, 2020, doi: 10.3390/jrfm13020036.
- [4] M. Bogren, A. Banu, S. Parvin, M. Chowdhury, and K. Erlandsson, “Findings from a context specific accreditation assessment at 38 public midwifery education institutions in Bangladesh,” *Women and Birth*, no. 2019, pp. 6–13, 2020, doi: 10.1016/j.wombi.2020.06.009.
- [5] C. Chaiyaphumthanachok, K. Tangdhanakanond, and S. Sujiva, “Indicators Development for Accreditation of Teacher Education Programs in Thailand,” in *Future Academy®’s Multidisciplinary Conference Indicators*, 2016, pp. 430–434, doi: 10.1016/j.sbspro.2016.02.008.
- [6] I. Stura, T. Gentile, G. Migliaretti, and E. Vesce, “Accreditation in higher education: Does disciplinary matter?,” *Stud. Educ. Eval.*, vol. 63, no. November 2018, pp. 41–47, 2019, doi: 10.1016/j.stueduc.2019.07.004.
- [7] R. O. N. Sanchez and J. T. Mahoney, “Modularity , Flexibility , and Knowledge Management in Product and Organization Design,” *Strateg. Manag. J.*, vol. 17, pp. 63–76, 1996.
- [8] C. Y. Baldwin and C. J. Woodard, “The architecture of platforms: A unified view,” in *Platforms, Markets and Innovation*, In A. Gawee., 2009, pp. 19–44.
- [9] M. De Reuver, C. Sørensen, and R. C. Basole, “The digital platform : a research agenda,” pp. 124–135, 2018, doi: 10.1057/s41265-016-0033-3.
- [10] Y. Ozdemir, S. K. Kaya, and E. Turhan, “A scale to measure sustainable campus services in higher education: ‘Sustainable Service Quality,’” *J. Clean. Prod.*, vol. 245, 2020, doi: 10.1016/j.jclepro.2019.118839.
- [11] B. Kitchenham, “Systematic literature reviews in software engineering ,” vol. 51, no. 1, pp. 7–15, 2009, doi: 10.1016/j.infsof.2008.09.009.
- [12] O. García Saldarriaga, A. Madrid Alamo, M. Palma Lama, J. Quinde Li Say Tan, C. Wiese López, and M. Zapata Ojeda, “Key factors to consider prior to the start of an accreditation project,” in *Simposio Internacional de Acreditación y Educación de Ingeniería (ICACIT)*, 2019, pp. 0–6.
- [13] ICACIT, “Criterios de Acreditación Programas de ingeniería.” ICACIT, pp. 1–17, 2019, [Online]. Available: www.icacit.org.pe.
- [14] A. Shafi, S. Saeed, Y. A. Bamarouf, S. Z. Iqbal, N. Min-Allah, and M. A. Alqahtani, “Student Outcomes Assessment Methodology for ABET Accreditation: A Case Study of Computer Science and Computer Information Systems Programs,” *IEEE Access*, vol. 7, pp. 13653–13667, 2019, doi: 10.1109/ACCESS.2019.2894066.
- [15] J. Gabalán-Coello and K. Huggins, “From the institutional mission to the evaluation instrument using an ABET accreditation approach,” *ACM Int. Conf. Proceeding Ser.*, pp. 106–111, 2018, doi: 10.1145/3233347.3233372.
- [16] A. Gibbs, A., De Vries, O., Beccari, L., & Raijmakers, “NVAO - Accreditation Organisation of the Netherlands and Flanders,” no. September, 2017.
- [17] M. A. Hidalgo Tupia, “Implantación del modelo de calidad del SINEACE para las carreras profesionales,” *Quipukamayoc Rev. la Fac. Ciencias Contab.*, vol. 23, no. 43, pp. 51–59, 2015, doi: 10.15381/quipu.v23i43.11599.
- [18] SINEACE, “Modelo de Acreditación para Programas de Estudios de Educación Superior Universitaria.” 2016. [Online]. Available: <https://www.sineace.gob.pe/acreditacion/acreditacion-educacion-superior-universitaria/>.
- [19] V. E. Jimenez Chaves, G. Molinas Santana, A. P. Riego Esteche, J. L. Vazquez Noguera, M. Garcia-Torres, and S. Duarte Masi, “Self-Assessment of the Computer Engineering Career at the Universidad Americana,” in *Proceedings of the 2019 International Symposium on Engineering Accreditation and Education, ICACIT 2019*, 2019, pp. 0–5, doi: 10.1109/ICACIT46824.2019.9130282.
- [20] F. J. Valentín Ruiz, “Hacia Un Modelo Basado En Servicios Para La Gestión Del Archivo Y La Preservación Digital. El Caso Del Archivo De La Universidad De Castilla-La Mancha (España),” *RUIDERAE Rev. Unidades Inf.*, vol. 0, no. 14, pp. 1–21, 2018.
- [21] P. M. Wightman *et al.*, “Diamante digital, una apuesta territorial por el desarrollo a partir de las TIC,” *Rev. Colomb. Comput.*, vol. 20, no. 1, pp. 6–22, 2019, doi: 10.29375/25392115.3604.
- [22] I. Szabó and L. Sarolta, “Development, Evaluation and Implementation of Digital Resources and an Online Platform (INTACT Project) in Bilingual Education,” “*With Internet*” - Proj., no. November, 2015, doi: 10.15503/emet2016.118.127.
- [23] B. Castillejos López, “Information management and digital content creation in the prosumer of the millennial generation,” *Apertura*, vol. 11, no. 1, pp. 1–19, 2019, doi: 10.32870/ap.v11n1.1375.
- [24] J. C. J. C. Briede, M. B. Cabello, C. E. Pérez, and A. G. Arriagada, “Plataforma Colaborativa para la Gestión de Proyectos de Diseño Industrial,” *Form. Univ.*, vol. 9, no. 3, pp. 61–74, 2016, doi: 10.4067/S0718-50062016000300008.
- [25] H. P. Julio Joaquín and M. Cano Rosás, “Tutorial para el aprendizaje de alumnos de odontología en cuestiones relacionadas con gestión de la calidad odontológica, mediante el uso de una plataforma digital,” 2017.
- [26] M. Gisbert Cervera, C. Espuny Vidal, and J. González Martínez, “INCOTIC. Una herramienta para la @utoevaluación diagnóstica de la competencia digital en la universidad,” *Profesorado*, vol. 15, no. 1, pp. 75–90, 2011.