ACCUEE
AGENCIA CANARIA DE CALIDAD UNIVERSITARIA Y EVALUACIÓN EDUCATIVA

Gobierno de Canarias

Report II

Proposal for an evaluation model for university academic staff

Enrique Orduña-Malea
Núria Bautista-Puig
Carmen Perez-Esparrells

This publication is funded by ACCUEE with the aim of improving the quality of the dialogue on universities in general, and in the Canary Islands in particular. ACCUEE merely proposed the research topic, leaving the content of the study in the hands of the authors. Therefore, the opinions and conclusions of this study are not necessarily those of ACCUEE.

Report prepared in Valencia and Madrid between May and November 2022.

ISBN: 978-84-09-48013-5

CONTENTS

1. INTRODUCTION

The report entitled "The public assessment of scientific research in the international context: possibilities and limits" (Perez-Esparrells, Bautista-Puig and Orduña-Malea, 2022) provides an analysis of research assessment in which the following four complementary, but currently disjointed and misaligned, dimensions are taken into account.

It first describes the evaluation of teaching and research staff internationally, highlighting the changing context arising from the publication of various declarations and manifestos, including the *San Francisco Declaration on Research Assessment* (DORA, 2012) and the *Leiden Manifesto* (Hicks et al., 2015), and the emergence of the open science movement, an umbrella term that brings together different issues related to the creation and dissemination of scientific knowledge (Fecher and Friesike, 2014).

All these challenges to prevailing evaluation systems that are dominated by a disproportionate reliance on bibliometric indicators have merely compounded an existing problem. Leaving the rest of Europe aside, at the end of the 20th century warnings were already being sounded about the limitations of bibliometric indicators and their possible effects in Spain (Sancho, 1990; López Piñero and Terrada, 1992; González de Dios, Moya and Mateos Hernández, 1997; Bordons, 1999). A term was even coined – *impactolatría* ("impactolatry") – to describe such effects (Camí, 1997). We are talking about work published more than twenty years ago. Maltrás Barba (2003) was already discussing how reducing scientific activity to a mere set of numbers is clearly fraught with validation problems.

The changes in evaluation in Spain began in the 1980s with the *University Reform Law* (LRU) in 1983 (*Organic Law 11/1983*) and with the subsequent creation of the *National Commission for the Evaluation of Research Activity* (CNEAI) in 1989 under *Royal Decree 1086/1989*, which was tasked with evaluating the new salary bonuses for university teaching staff for six-year periods (*sexenios*), as established

in the same Royal Decree (*Royal Decree 1086/1989*, Article 2(4)(1)). The name, composition and functions of the CNEAI were set out in the *Ministerial Order of 2 December 1994*, and its rules of operation were regulated by *Order ECD/2713/2003, of 26 September, approving the Internal Rules of Operation of the National Commission for the Evaluation of Research Activity*.

The *University Reform Law* was then repealed by the *Organic Law of Universities* (LOU) (*Organic Law 6/2001*), which created the *National Agency for Quality Assessment and Accreditation* (ANECA) with the aim of "improving the quality of teaching and research, through a new objective and transparent system that ensures that merit and ability are taken into account in the selection and appointment of teaching staff" (*Organic Law 6/2001*). Thus the accreditation system for appointment to academic positions was created. ANECA was subsequently modified by Single Article 29 of *Organic Law 4/2007*, and later by Article 7 of *Law 15/2014*.

The creation of CNEAI, the provision of additional remuneration for recognition of six-year research periods and the establishment of a system of external accreditation of academic staff initially led to improvements, including the professionalisation of the academic and scientific community, a reduction in academic inbreeding and a greater scientific output, albeit in the latter case also as a result of other cyclical factors (Jiménez-Contreras, Moya-Anegón and Delgado López-Cózar, 2003; Osuna, Cruz-Castro and Sanz-Menéndez, 2011). However, this system soon instilled a number of undesirable effects as it toughened the criteria based on purely quantitative indicators, including changes in individual behaviour (Rey et al., 1998; Jiménez et al., 2002; Oviedo-García, Casillas Bueno and González Rodríguez, 2021; Delgado López-Cózar and Martín-Martín, 2022). This has led to various calls for action in the Spanish context, notably the recent appeal by Delgado-López-Cózar, Ràfols and Abadal (2021), urging the Spanish authorities to abandon current research evaluation policies, which are based on the indiscriminate and excessive use of bibliometric indicators and are applied by people who are unversed in bibliometrics. Such practices have

been described as "bad bibliometrics" (Aguillo, 2015) or low-quality "citizen bibliometrics" (Leydesdorf, Wouters and Bornmann, 2016).

All these movements have brought to light the tensions of a scientific community subjected to evaluation criteria that are not only outdated but in some cases unscientific or arbitrary, which have directly influenced the unparalleled growth of opportunistic practices (optimising research careers by focusing on what earns the most points; CV engineering) in the best of cases, and of blatantly fraudulent practices (false authorship, fake citations, manipulation of academic profiles, tampering with bibliometric indicators, bogus publications, plagiarism, etc.) in the worst-case – limited but real – scenarios.

Evaluation agencies have adopted different solutions in different regions and countries (it should be noted that a detailed analysis of the role of evaluation agencies is clearly beyond the scope of this study). For example, in the Netherlands, universities have started to adhere to *Room for Everyone's Talent*, a position paper that advocates a new evaluation system in which quality of work is recognised over quantitative results.[1] At the same time, several universities, such as Utrecht University, are abandoning the use of the *Journal Impact Factor* (Woolston, 2021).[2] China's Ministry of Education and Ministry of Science and Technology have set out measures to "reverse the excessive and distorted reliance on indicators linked to Web of Science, balance the use of qualitative and quantitative evaluation methods and strengthen the local relevance of research" (see Arellano-Rojas, Calisto-Breiding and Peña-Pallauta, 2022; Zhang and Sivertsen, 2020), a move that would suggest the implementation of protectionist policies. Latin America, on the other hand, is the exact opposite. The region was marked by protectionist policies at the end of the 20th century, with the creation of regional journal indexes (*Latindex*, *SciELO* and *RedALyC*), but is currently going through a period of internationalisation through the establishment of government policies to promote science (Alperin and Rozemblum, 2017) and a clear push

[1] https://www.nwo.nl/sites/nwo/files/media-files/2019-Recognition-Rewards-Position-Paper_EN.pdf
[2] See Annex I

towards university rankings to promote research in all areas (Gomez-Sancho and Perez-Esparrells, 2012). In some countries of the region, research assessment focuses first on categorising scientific journals, and second, on quantifying the number of works published in journals according to their categorisation (database in which the journal is indexed). A clear example is the *Publindex* system[3] in Colombia, authorised by *Decree 1279 of 2002*[4] to incentivise the teaching staff of public universities, and which has affected the country's entire publishing and academic output (López-López, 2019).

Research assessment is an inherently complex task where no single, simple solution is expected to be found, particularly when the public value generated by research is increasingly required for its positive external effects with a tangible and intangible impact. As such, three overarching goals may be envisioned in the evaluation of public research: 1) to control and account for the use of public funds; 2) to help improve the implementation of policies and programmes; and 3) to report on the distribution of public resources among individuals or objectives that compete for these resources (Molas-Gallart, 2015).

The use of bibliometric indicators as a determining factor in evaluating research results is a delicate task due to the nature of citations (Moed, 2006), especially when the object of evaluation is an individual, and even more so when we extend it to areas such as humanities, arts, and social sciences (Engels, Ossenblok and Spruyt, 2012; Thelwall and Delgado, 2015; Ochsner, Hug and Daniel, 2016; Bonaccorsi, 2018; Engels and Kulczycki, 2022), areas, fields and disciplines in which citations are not the best evidence of an individual's impact, relevance or career path, and when the public, social political and economic value of research in those disciplines is a matter of great complexity (Molas-Gallart, 2015; Reale et al., 2018).

[3] https://scienti.minciencias.gov.co/publindex/
[4] https://minciencias.gov.co/sites/default/files/upload/reglamentacion/decreto-1279-2002.pdf

New avenues of research – such as mobility (Robinson-García et al., 2019), author credit allocation (Shen and Barabási, 2014), the measurement of multidisciplinary, interdisciplinary and transdisciplinary research (Wagner et al., 2021), the quantification of transfer beyond teaching and research (Montesinos et al., 2008), the gender perspective in science and its possible effects on bibliometric studies (Larivière et al., 2013), sustainability in universities (Bautista-Puig et al., 2021) or open science and its influence on citation analysis (Ortega, 2021) – modify, shape, enrich and complicate the evaluation of research, and are all aspects that must be given due consideration.

Secondly, the first report conducted a review of the literature on research assessment (Perez-Esparrells, Bautista-Puig and Orduña-Malea, 2022). Although this analysis does not claim to be exhaustive (selecting only the papers with the greatest impact through *Scopus* and *Dimensions*, with the known coverage limitations), it is sufficiently broad to achieve the intended objectives, namely to identify the main issues of contention. After performing a content analysis of 356 publications, the following topics of debate were identified:

A. ***Bibliometric indicators***. This category comprises research centred on the compilation of indicators used in evaluation processes, proposals for the improvement of existing indicators and the design of new indicators.
B. ***Evaluation systems***. Studies that describe the functioning of different research evaluation systems, showing their advantages and disadvantages.
C. ***Bibliographic databases***. Studies that describe the features of the databases used as sources of bibliometric indicators for evaluation processes, essentially *WoS* (including, in particular, *Science Citation Index*, *Social Science Citation Index* and *Journal Citation Reports*).
D. ***Altmetrics***. Studies that assess the performance of alternative metrics in evaluation processes.
E. ***Assessment methodologies***. Studies that address the advantages and disadvantages of the use of quantitative (essentially bibliometric indicators) and qualitative indicators (essentially peer reviews and narrative CVs).

F. ***Opportunistic behaviour***. Studies that identify malpractice among research staff, and its consequences, as a result of the evaluation systems.

G. ***Manifestos***. Studies on declarations, manifestos, recommendations or principles aimed at improving research evaluation, including studies that describe and analyse the characteristics of these manifestos.

H. ***Cross-cutting issues***. Studies related to the inclusion and assessment of other complementary aspects in evaluation processes, such as interdisciplinary, cross-cutting and multidisciplinary research, gender mainstreaming, diversity, sustainability, local impact, etc.

Thirdly, the report identified and compiled bibliometric indicators used in research evaluation processes (Perez-Esparrells, Bautista-Puig and Orduña-Malea, 2022). It did not attempt to identify all existing bibliometric indicators (a practically impossible and impractical task) or all the indicators used, to a greater or lesser extent, in different international, national or regional research evaluation agencies (in many cases this information is not public), but simply to describe the most important and most widely used indicators worldwide, while outlining the dangers and noting the caveats of using them. Thus, indicators are identified at source level (e.g. *Journal Impact Factor*), at author level (e.g. *h*-index), at publication level (e.g. number of citations received) and, finally, the report mentions various alternative metrics (e.g. number of readers, downloads or mentions from alternative publications such as reports). The compilation also includes non-normalised and normalised indicators (the latter are rarely used in evaluation systems). This section of the report draws attention to the problem of reducing evaluation to a few, non-normalised, journal-level metrics (an artificial aggregation for individual evaluation purposes), and recommends using a wide range of indicators, preferably normalised, at publication or author level (based on the aggregation of publication metrics), and finally adding inclusive open sources of indicators, alongside the traditional closed and, in many cases, elitist sources. Not forgetting disciplinary differences, diverse document types, metrics not based on citations, and impact in non-scientific contexts. The section shows the dissociation between bibliometric indicators as analysed and discussed in the

literature and by the bibliometric community through empirical studies and reviews, and what the evaluation agencies incorporate into their evaluation models. Regrettably, the two communities are not entirely in alignment.

Fourthly, the report identifies misconduct that is largely caused by the pressure to publish and the evaluation criteria and requirements defined by the institutions (internal evaluation) and by the evaluation agencies (external evaluation), distinguishing between CV engineering and opportunistic behaviour and unethical and fraudulent practices (Perez-Esparrells, Bautista-Puig and Orduña-Malea, 2022). These include actions at a more individual level (such as consciously altering an academic profile in *Google Scholar Profiles* or coercive citation) and more organised actions (paper mills, which include the buying and selling of co-authorship, peer-review rings and fake reviewers, inter alia).

This report therefore sets out to develop a proposal for a framework for the evaluation of academic staff in the Spanish university system, in which the complexity of the university as an institution is taken into account (Orduña-Malea, 2012). The proposal seeks to reduce the identified cases of malpractice to a minimum, to adapt to the standards and recommendations set out in the scientific literature and to include the cross-cutting aspects that are needed to evaluate the impact of research in the environment in which the evaluation is carried out, without losing sight of the possibility of extrapolating the model to any other evaluation environment (departments, institutes and research centres, etc.).

The proposal is also designed to be a holistic, flexible, inclusive and customisable model, open to discussion by different stakeholders: the scientific community, universities, evaluation agencies, government bodies, public, private and non-profit organisations, trade union and business associations, research staff, evaluation professionals, business professionals, among many others.

To achieve the aims of this report, the following specific objectives were set out:

Objective 1. Compare the existing teacher evaluation systems in Spain as implemented by the different evaluation agencies, both national and regional (autonomous communities), to provide an overview of the criteria established and the indicators used, taking due caution in view of the heterogeneity of the different systems in question.

Objective 2. Design the framework of a model for the evaluation of academic staff, with special focus on the identification and classification of the different items to be evaluated and their organisation (dimensions) and structure (categories, subcategories, items), while excluding scales, specific scores or academic ranks.

With regard to the design and development of the proposed evaluation model, the following considerations should be noted:

a) Research assessment at the individual level always involves a judgement of the teacher's performance, development and even potential. It therefore involves a judgement not only on the past but also on their present and future plans and aspirations.

b) The model proposes a non-competitive individual assessment (i.e. it is oriented towards accreditation, not recruitment), where the performance and potential of applicants is compared to a performance standard, although the model can be readily adapted and tailored to competitive processes.

c) The proposed model calls for commitment, time and investment – financial (qualified staff), technical (adequate IT infrastructure) and social (cultural change of perspective in evaluation) – along with a change in the culture of research and in the concepts of excellence and impact.

d) While the introduction to, and rationale for, this report have focused on the problems of research evaluation, the proposed model encompasses the full range of tasks and functions that can be performed by academic staff – teaching, research, transfer, management – in addition to their academic and professional development. Therefore, the model must be contextualised within the requirements and needs of universities, which

in Spain are in the midst of a process of change, in light of the future *Organic Law of the University System* (LOSU), currently being drafted,[5] which will replace the LOU, the recently passed *Law 17/2022, of 5 September, amending Law 14/2011, of 1 June, on Science, Technology and Innovation*, the new *Statute of Teaching and Research Staff*, currently in its fourth draft,[6] the relatively recent *Royal Legislative Decree 5/2015, of 30 October, approving the revised text of the Law on the Basic Statute of the Public Employee*, in addition to all the legislation on salary supplements (six-year periods) and access (accreditation). All of these elements combine to form a complex legal framework within an uncertain geopolitical scenario (post-pandemic and financial crises) in an environment of growing global competition, where teaching, research, social transfer and even management activities are being completely overhauled by the digital transformation.

[5] https://www.universidades.gob.es/stfls/universidades/Servicios/articulos/transparencia_gobierno/participacion_publica/audiencia/ficheros/APLOSU_20210903_Texto_audiencia.pdf

[6] https://www.uv.es/ugt/lou/cuarto_borrador_estatuto_pdi.pdf

2. BENCHMARKING

The aim of this section is to identify and compare the practices of evaluation agencies, both at national level (ANECA) and at regional level (including ACCUEE). The purpose is to identify the requirements and conditions to be fulfilled, the sources and indicators used and the general criteria applicable to the first steps in an academic career: assistant professor (*ayudante doctor*) and associate professor (*contratado doctor*). This information, together with the previous report (Perez-Esparrells, Bautista-Puig and Orduña-Malea, 2022), will provide the framework for the proposal. The authors are fully aware of and acknowledge the existence and specific features of other academic ranks in some agencies (e.g. in *AQU* or *Unibasq*). The posts of assistant professor and associate professor were used as models because they are currently evaluated by ACCUEE.

2.1. Assessment Agencies in Spain

2.1.1. External/internal assessment

The evaluation system for academic staff in Spain is regulated by the *Organic Law on Universities* (Official State Gazette, 2001; 2007). The system of recruitment to the different ranks of civil-servant academic staff at public universities (associate professor and full professor) is partly centralised (through accreditation by a committee) and partly decentralised (competition for recruitment to the different ranks is carried out by each university through a committee). Although the external criteria are generally similar to the internal criteria, in some cases they may vary considerably, especially as regards the weighting assigned to certain achievements. The external evaluation therefore acts as a filter to limit the competition to those candidates that meet minimum requirements. The internal process thus allows the institution to establish certain requirements that are appropriate to or necessary for the local or regional environment of the institution (e.g. in some universities it is a requirement to demonstrate a level of proficiency in the official languages of the region).

Moreover, recruitment to non-civil-servant academic ranks (assistant professor and associate professor) is slightly different. Accreditation may be obtained either through the national body (ANECA) or through the external evaluation body of the autonomous community with its corresponding agency. The two-stage process (accreditation–recruitment) remains the same, with slight differences depending on the institution. Nevertheless, universities retain a high degree of autonomy in their selection processes (e.g. some academic staff selection processes involve an achievement test, others an achievement test and interview, etc.).

To benchmark the assessment systems, a comparative review was carried out of the assessment criteria (indicators), the achievements (different indicators) and the weights assigned to each of them, both at national level (ANECA) and in each autonomous community (only agencies currently in operation). For all the evaluation systems, the criteria of the last published call for applications have been considered, focusing on the positions of assistant professorand associate professor, as specified above.

Table 1 lists the evaluation agencies in Spain: the national agency (ANECA) and those in operation in eleven autonomous communities, and their year of creation. It should be borne in mind that not all the autonomous communities have evaluation systems. This is the case of Asturias, Cantabria, Extremadura, La Rioja, Murcia and Navarra, where no such external assessment body has been set up. Furthermore, Aragon provides accreditation only for the post of associate professor with clinical links. Finally, some agencies are no longer in operation, as is the case in Castilla La Mancha and the Community of Madrid.

Table 1. National and regional evaluation agencies and their year of creation

Level	Evaluation Agency	Year of creation
National	Agencia Nacional de Evaluación de la Calidad y Acreditación (ANECA)	2002

Andalusia	Dirección de Evaluación y Acreditación de la Agencia Andaluza del Conocimiento (DEVA-AAC)	2005
Aragon	Agencia de Calidad y Prospectiva Universitaria de Aragón (ACPUA)	2005
Canary Islands	Agencia Canaria de Calidad Universitaria y Evaluación Educativa (ACCUEE)	2002
Castilla y León	Agencia para la Calidad del Sistema Universitario de Castilla y León (ACSUCYL)	2001
Castilla-La Mancha	Agencia de Calidad Uniersitaria Castilla-La Mancha (ACUCM)	2005-now defunct
Catalonia	Agència per a la Qualitat del Sistema Universitari de Catalunya (AQU)	2003
Valencian Communit y	Agència Valenciana d'Avaluació y Prospectiva (AVAP)	2006
Galicia	Axencia para a Calidade do Sistema Universitario de Galicia (ACSUG)	2001
Balearic Islands	Agència de Qualitat Universitària de les Illes Balears (AQUIB)	2003
Communit y of Madrid	Sección de Evaluación, Certificación y Acreditación de la Calidad de la Enseñanza Superior de la Fundación para el Conocimiento madrimasd	2003-now defunct
Basque Country	Agencia de Calidad del Sistema Universitario Vasco (UNIBASQ)	2004

Note: List based on http://www.aneca.es/Agencias-de-las-Comunidades-Autonomas and the study conducted by Galán, González-Galán and Rodríguez-Patrón (2014).

For the comparative analysis only the external evaluation agencies that are currently active were considered.

Assistant Professor (Ayudante Doctor)

With regard to the evaluation criteria used, **Table 2** provides a comparison of the general dimensions assessed (research experience, academic qualifications, teaching experience, professional experience and other achievements), together with the score assigned by each agency for accreditation as assistant professor. The date on which the criteria were published is also specified, as well as the

minimum score required to obtain this position. On this point, it may be noted that some agencies update the criteria more frequently (Castilla y León in 2021; Catalonia in 2022) while other regions have had the same general criteria for more than a decade (Basque Country since 2011; ANECA since 2007). The minimum score for obtaining this position is similar across the different agencies (generally between 50 and 55 out of 100), with the Galician evaluation agency having the lowest score (40/100).

It can also be seen that for the position of assistant professor, research experience is the criterion that carries the most weight, with an average of 52% of the total score. In some assessment systems, such as the national (ANECA) or regional systems in Catalonia, the Basque Country and the Balearic Islands, this value even exceeds 65%, demonstrating the disproportionate weight given to research work in a post at the base of the academic career pyramid. Academic and teaching qualifications have a lower weight, averaging 25%. The Andalusian agency (with 40%) and the Canary Islands and ANECA (with 35%) are the agencies that give the greatest weight to these two dimensions, although they are grouped together, while in other regions these dimensions carry less weight (academic qualifications account for 15% in the Basque Country and 14% in the Valencian Community). After analysing the weights of each of the indicators in detail, it can be seen that professional experience – while it does carry significant weight for some agencies (e.g. in Andalusia or ANECA) – is not valued very highly. For example, Andalusia only gives it a weighting of 5 points.

Table 2. Comparison of the criteria for assistant professorin the Spanish evaluation agencies (national and regional).

Assistant Professor	Research experience	Academic qualifications	Teaching experience	Professional experience	Other achievements	Publication date/ Score
ANECA	60%	35%	35%	35%	5%	2007/ Minimum 55/100
Canary Islands	30%	35%	25%	10%	10%	Not specified/ Minimum 50/100
Andalusia	55%	40%	40%	40%	5%	2017/ Minimum 55/100
Castilla y León	50%	20%	20%	10%	10%	2021/ Minimum 50/100
Catalonia	65%	20%	25%	4%	5%	2022/ Minimum 50/100.
Valencian Community	55%	14%	25%	6%	2%	2021/ Minimum 55/100.
Galicia	25%	20%	20%	15%	5%	2010/ Minimum 40/100
Balearic Islands	60%	27%	10%	3%	2%	2013/ Minimum 55/100
Basque Country	65%	15%	25%	25%	5%	2011/ *Adjunto* / Minimum 55/100

Notes:

Categories that share a box with the adjacent category and are colour-filled are assessed together (e.g. academic qualifications, teaching and professional experience in the case of ANECA or teaching and professional experience in the Basque Country). In the case of Catalonia, Research Experience and Other Achievements form one group, while Academic Training and Professional Experience form another group.

Overall scores are considered. In other words, the total score is given and is not broken down by each specific item within each group.

In the evaluation system of the Valencian Community there is an Other Achievements section within all categories, with a maximum score of 2 points (this is the only exception where the score of the subgroup is listed); in the Autonomous Community of Galicia there is an additional section for research and teaching placements (15). For this agency, the category of Management Experience has been considered as Other Achievements (5%); in the Basque Country there is a Management Activities category which has been counted under Other Achievements.

The job title of *ayudante doctor* also varies: in Catalonia it is *lector* and in the Basque Country, *adjunto*.

In the case of Catalonia, the scores are divided by sub-areas, with Table 2 showing the maximum score for each dimension.

Associate Professor (Contratado Doctor)

Table 3 shows the criteria for the position of associate professor, where differences can be observed in comparison with the position of assistant professor. Research experience has a higher weight (an average of 57%), especially in the case of Catalonia (75%), the Canary Islands (70% in the case of *contratado doctor tipo II*) and the Basque Country (65%). For this category of teaching staff, academic training has a lower weight (<15%), while teaching experience increases by 4 percentage points (average of 29% compared to 25% in the case of assistant professor). Professional experience has a lower weight (16% for assistant professor and 11% for associate professor). These variations are a way of controlling the development and advancement of the applicants. In the lowest rank (assistant professor) it is assumed that people are in their first stage of their academic career, so they have had few opportunities to teach and publish research work, so academic qualifications should be rewarded more. As their career progresses, both academic and professional development and work experience acquired outside academia are given less weight.

In the case of Catalonia, there is no overall result for each category (assistant professor and associate professor), but the percentages are different for each of the six areas considered (Humanities, Social Sciences, Sciences, Life Sciences, Medical and Health Sciences, and Engineering and Architecture). **Table 4** and **Table 5** show each of the indicators and their scores. Thus, it can be seen that in the areas of humanities and social sciences the percentage for research experience is lower (55% and 60%, respectively), when compared to the other areas (65%).

Table 3. Comparison of the criteria for associate professor in the Spanish evaluation agencies.

Associate Professor	Research experience	Academic qualifications	Teaching experience	Professional experience	Other achievements	Scores
ANECA	60%	8%	8%	30%	2%	2007/ Minimum 50/100
Canary Islands	45%	15%	10%	30%	10%	Not specified/ Type I/ Minimum 50/100
	70%	10%	10%	10%	10%	Not specified/ Type II/ Minimum 50/100
Andalusia	50%	8%	8%	40%	2%	2017/ Minimum 55/100
Castilla y León	50%	10%	10%	30%	10%	2021/ Minimum 60/100
Catalonia	75%	10%			13%	2022/ *Acreditació de recerca* (Lecturer)
Valencian Community	55%	4%	6%	35%	1%	2021/ Minimum 55/100
Galicia	45%	10%	10%	30%	5%	2010/ Minimum 55/100
Balearic Islands	55%	10%	5%	30%	2%	2013/ Minimum 55/100
Basque Country	65%	10%	30%	30%	5%	2011/ *Agregado*/ Minimum 65/100

Notes:

The job title of *contratado doctor* is *acreditació de recerca* in Catalonia and *agregado* in the Basque Country.

In the Canary Islands there are two types of associate professor (type I and type II).

In the Valencian evaluation system there is an Other Achievements section within all the sections.

Table 4. Evaluation criteria 2022 for assistant professor in Catalonia by subject area

Assistant Professor	Humanities	Social Sciences	Sciences	Life Sciences	Medical and Health Science	Engineering and Architecture
Research experience	55%	60%	65%	65%	65%	65%
Other achievements	5%	5%	3%	4%	4%	0%
Academic qualifications	15%	20%	20%	20%	20%	15%
Professional experience	0%	0%	2%	0%	4%	0%
Teaching experience	25%	20%	15%	15%	15%	20%

Notes:

Categories that share a box with an adjacent category and are colour-filled are assessed together. Since the Other Achievements section is broken down under Research Experience in all categories, it is displayed jointly. In contrast to the previous tables (where the overall score for the section is considered), in this case, the specific score for Other Achievements (and not for the general section) has been specified.

In the Medical and Health Sciences section, special criteria for Nursing and Physiotherapy are specified (not specified in Table 4).

Table 5. Evaluation criteria 2022 for associate professor in Catalonia by subject area

Associate Professor	Humanities	Social Sciences	Sciences	Life Sciences	Medical and Health Science	Engineering and Architecture
Research experience	70%	70%	75%	70%	70%	70%
Other achievements	8%	13%	5%	5%	5%	5%
Academic qualifications	8%	8%	10%	10%	10%	10%
Projects	15%	10%	10%	15%	15%	15%

Notes:

The category of Projects is also considered in this figure.

2.1.2. Comparison of the databases used

Figure 1 shows the databases used by the different evaluation systems and by subject area (where this information is disaggregated). For the purposes of this analysis, only those databases explicitly indicated in the different regulations have been considered. For this reason, statements such as "in similar databases" have been omitted. The evaluation systems of the Canary Islands and Galicia are the only ones that do not give details on the databases used (they refer to "indexed publications" or "scientific publications in medium/high-level journals in their area"). In the case of the *Agència Valenciana d'Avaluació i Prospectiva-AVAP* (Valencian Community), the regulations identify the databases, but do not indicate the area.

As **Figure 1** shows, the *Web of Science Core Collection* (with the databases *Science Citation Index Expanded* (SCI), *Social Sciences Citation Index* (SSCI) and *Arts & Humanities Citation Index* (A&HCI)) is by far the most widely used product by all the evaluation agencies. This shows the enormous weight that *WoS* (and, consequently, the *Journal Impact Factor*) has in the assessment of research activity. It is followed by the multidisciplinary database *Scopus* (explicitly mentioned by five evaluation agencies, 71%). In a similar position, listed by frequency of use by evaluation agencies, are the more specialised databases by subject area: Technical Education (such as the *Avery Index to Architectural Periodicals*) and Social Sciences and Humanities (such as the *International Medieval Bibliography*, *Philosopher's Index*, *Repertoire Bibligraphique de Louvain* or *RILMS Abstracts of Music Literature*, mentioned by five agencies; 71% of use).

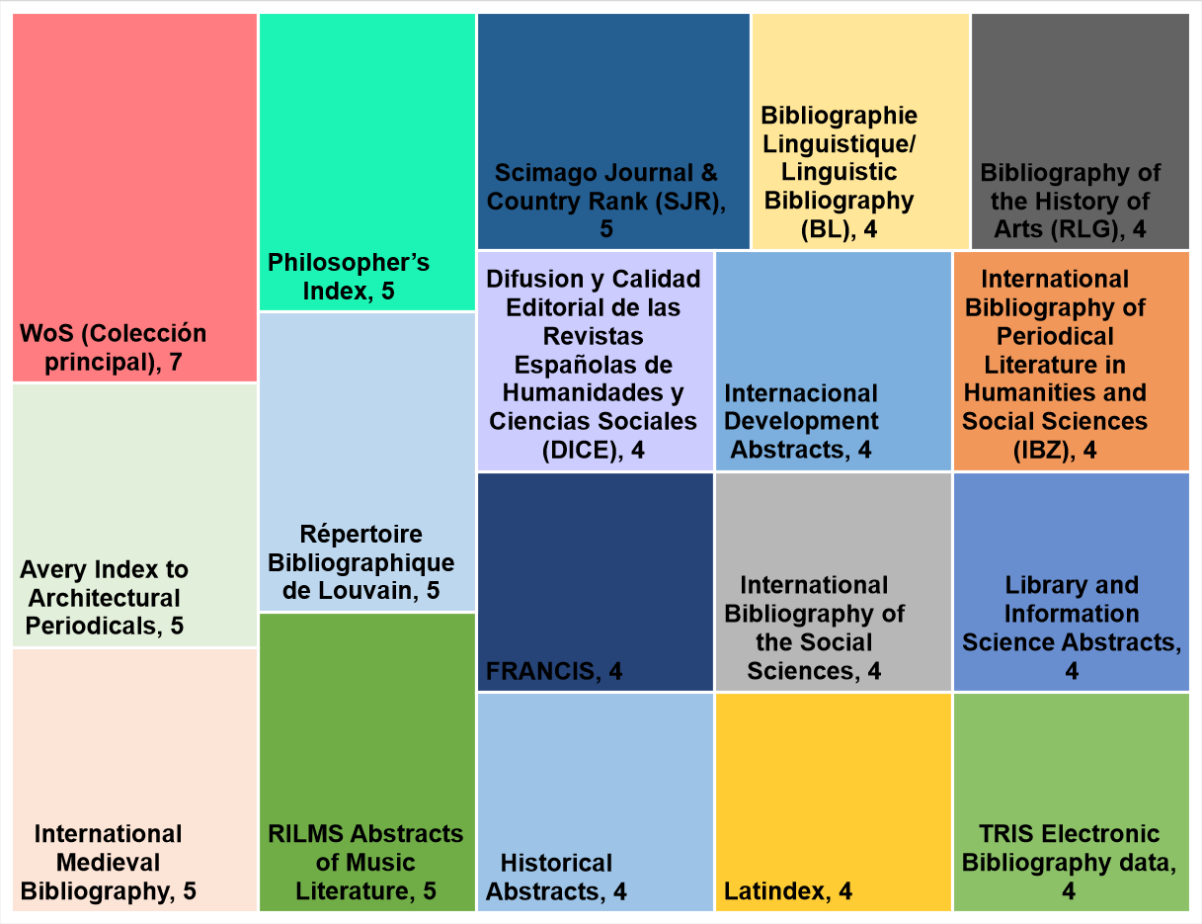

Figure 1. Main databases used for evaluation (>4) and explicitly mentioned by evaluation agencies in Spain.

It is worth mentioning that some of the evaluation agencies not only use bibliographic databases, but also score publications according to the position the journal occupies in the quartile of a discipline. By way of example, in Catalonia, a quartile weighting system is established (level A, B or C publications) (**Table 6**).

Table 6. Weight of publications for the area of Social Sciences

Level A:	For all fields of knowledge: JCR Q1, JCR Q2; Scopus Q1 (SJR) For the field of Law: CARHUS Plus+ A
Level B:	For all fields of knowledge: JCR Q3; Scopus Q2 (SJR) For the field of Law: CARHUS Plus+ B
Level C:	For all fields of knowledge: JCR Q4; Scopus Q3 (SJR) For the field of Law: CARHUS Plus+ C

2.2. Context for the assessment of academic staff

Academic staff must not only be familiar with the process (transparent criteria, scales and weights) and possess the achievements to successfully pass an evaluation, but they must also have a positive attitude or motivation towards the evaluation (accreditation) on account of the learning component that it entails. Therefore, the personal and emotional context of the person being evaluated is of great relevance.

With regard to the motivation of the teaching and research staff, there are four types of goals that may motivate them when they are being evaluated:

1. *Goals related to self-improvement*: understanding and experiencing improvements in their teaching and research skills, and acknowledging that they are voluntarily submitting to an evaluation, because people want to do so out of professional and personal motivation, to learn about their improvement and progress (beyond the fact that the system requires them to pass the accreditation test, especially in the early stages of their academic career).
2. *Goals related to self-worth*: aimed at preserving and boosting self-esteem.
3. *Goals related to reputation*: contributing to the search for recognition and the need for peer acceptance.

4. *Goals related to financial rewards*: obtaining a positive judgement or score almost always involves a reward in financial terms (through promotion in a research career and consequent salary increase), in addition to other types of rewards such as the possibility of a reduction in the number of credits taught or choosing how to divide time between teaching and research.

However, depending on the personal and academic background of the applicants and the stage of their research career, their motivational processes will be different for recruitment, accreditation and promotion; their main goals will vary depending on whether the performance review is competitive (in the case of recruitment and promotion) or non-competitive (in the case of accreditation, which is the focus of this report).

Extrinsic motivation is motivation that comes from outside the individual, which means that the motivation is generated by external rewards (e.g. financial or recognition-based goals), rather than by pleasure or satisfaction that the task itself (undergoing evaluation) cannot provide. In contrast, intrinsic motivation is that which comes from within the individual, that is, motivation is generated by the satisfaction inherent in performing the task (passing the assessment), and not by the expected reward or intrinsic incentives.

However, applicants' attitudes towards the evaluation process may differ depending on how they approach an uncertain outcome. For some applicants the goal is self-improvement and assessment is a challenge, while for others the goal is self-esteem and assessment may become a threat.

Assessment planning that is able to address the above goals and take into account the different types of teaching and research staff is more likely to successfully motivate the applicants. All of the above provides clues as to how those in charge of the evaluation process (evaluation agencies, professional evaluators, university governing bodies, academics involved in committees and boards, etc.) can create

conditions and a climate centred on the benefits of assessment through a holistic, flexible, inclusive and customisable model that fosters the motivation of teaching staff regardless of their personal situation and academic standing (academic age, seniority). In other words, the aim is to create an environment in which people are motivated to be good in certain facets of the three dimensions (teaching, research and transfer) so that they may progress gradually and be accredited, hired and/or promoted, rather than being concerned about being good in all the items of all the dimensions, which leads to academic stress.

Therefore, there are many actions (and types of actions) that can be performed by an evaluation agency to foster this positive attitude towards the evaluation process at the beginning of the teaching and research career: guidance and structured evaluation process (scaffolding); contextualisation of indicators so that they are scalable; time dedicated to the preparation of the teaching staff evaluation process (easing the burden of bibliometric indicators on the applicant by reducing their weight in the evaluation, and strengthening the narrative component); and coherence between the design and application of the criteria (including achievements) and the objectives of the post to be filled (in particular, the achievements must be scalable according to the academic rank and the respective areas).

Such a system would prevent university teaching from becoming a “bullshit job” (Graeber, 2018), namely, a sham job with no real value for society, where the bulk of the work consists of pursuing accreditation instead of performing the functions attributable to academic staff (i.e. acquiring knowledge and transferring it to students, researchers and society in general). It is a scenario in which academic staff devote their time to accomplishing tasks that count towards accreditation (or getting other people to do them for them), thus minimising their dedication to all other tasks.

Teacher motivation, moreover, may be linked to their emotional processes. This relationship between emotion and motivation has also been demonstrated in the field of neurophysiology, which has confirmed that environmental conditions generate an emotion (often unconscious) in the individual, which in turn gives rise to a predisposition to act (reactive motivation) (Bisquerra, 2000). This emotional factor cuts across all of the teacher's assessment-related activities.

The emotional impact of a successful accreditation process is that the individual gains self-confidence from feeling capable of attaining the required minimum standards, whereas teachers with negative appraisals doubt their teaching and research ability, lose confidence in their abilities and may give up on further attempts at appraisal to avoid the risk of failure, which in turn may lead to disruption of their academic progression and consequent abandonment or stagnation of their professional careers.

At the same time, the discussion on the reform of individual research evaluation models must be distinguished from the discussion on the long and precarious careers of researchers (YERUN, 2021), which also has a bearing on academic stress and demotivation and abandonment of teaching and research careers. The latter aspect is not directly addressed in the report because it is beyond its scope, but it certainly affects the expectations of researchers, especially the younger ones.

If a person decides that the evaluation is beyond their reach or that the risk of failure is too great or too daunting, then, whatever the evaluation system used by the agency, it ends there. Therefore, the evaluation and feedback system (and indeed any message issued by evaluation agencies or practitioners) should include among its objectives that teachers feel that undergoing the evaluation process is positive and that, given their previous and future teaching and research skills and achievements, the proposed objectives are within their reach.

In short, the aim is to generate empathy and to foster the belief among the teaching and research staff (who are characterised by their resilience) that there is always room for improvement, thereby creating a safe space in which they can experiment with their own assessment process and reflect on their teaching and research careers with more informative evaluations (as outlined in the proposal below) beyond positive (PASS) or negative (FAIL) evaluations. The identified cases of malpractice (Perez-Esparrells, Bautista-Puig, Orduña-Malea, 2022) must be discouraged at all costs and the abandonment of academic career progression must be avoided, along with the academic stress caused by the expectation that one must excel in all dimensions, as previously discussed.

To this end, doctoral and teacher training programmes dealing with time management, ethics in research and mental health and wellbeing in academia are essential. Needless to say, the recommendations and suggestions provided by such programmes must not be at odds with or contrary to the strategic actions on promotion and recruitment instigated by the universities themselves. Similarly, and in a cross-cutting manner, it will be necessary to align the interests of the universities both with the local environment and context and with the university strategies of the respective regional governments.

Finally, the Science Laws (as in the case of Catalonia) and the Strategic Plans relating to Higher Education of the Autonomous Communities lay down the system-wide action priorities. Accreditation is now compulsory, as it is a question of identifying and filtering out those people with academic qualifications that exceed the threshold and are therefore fit to carry out the teaching, research and transfer tasks entrusted to the teaching and research staff in each institution (current and future). They guarantee, in the first instance, the quality of academic staff that join and then progress in the Spanish university system and in the university systems of the different autonomous communities.

3. PROPOSED EVALUATION MODEL

This section outlines the framework of a holistic, flexible, inclusive and customisable model for the evaluation of academic staff. The model aims to provide a taxonomy of achievements based on dimensions, categories, subcategories and items, without attempting to be exhaustive in the identification of all possible achievements, but seeking rather to classify them. The scales and weights assigned to these four elements are not included in this proposal, but are left for later discussions between the different actors involved, who should seek maximum consensus. For this reason, the proposal is independent of the academic grade to be accredited.

The intention is thus to provide the structure of a general and scalable assessment model, which can subsequently be adapted to all circumstances (both existing and future) by assigning appropriate weights and adding/removing subcategories and items depending on the area of knowledge or discipline (only the dimensions and categories of the model are fixed).

Although the model is geared towards the Spanish university system, it can be easily adapted to the reality of the different regional university systems and even to foreign university systems.

The analysis of the Spanish evaluation agencies (Section 2) and the results obtained from the analysis of the scientific literature and the good practices and recommendations published by LERU (League of European Research Universities), adopted by the universities that are members of this association (Appendix I), have been taken into account in its preparation. The proposal does not, of course, contain all the recommendations found (as this would make the model unfeasible), but rather attempts to offer a realistic structure or framework that minimises the problems of current evaluation.

3.1. General outline

The model is based on a scoring system that ranges from 0 (minimum) to 100 (maximum) points.

The vast majority of evaluation systems only provide the applicant with a binary result (FAIL/PASS), even if there is a more specific scale internally. This approach has the effect of minimising possible appeals and complaints about the score, based on the assumption that accreditation is a cut-off system. However, we believe that this system may demotivate the most qualified applicants, and that it is less transparent in terms of the evaluation received from the agency. Furthermore, it encourages a "boundary effect", whereby applicants with a significant but insufficient research track record are considered to be in the same bracket as those with a virtually empty CV.

An evaluation system based on four categories (insufficient, sufficient, good and excellent) is therefore proposed (**Figure 2**), which can be of great help to universities when it comes to having more information about the CVs of applicants for academic promotions, both for civil-servant and non-civil-servant staff positions.

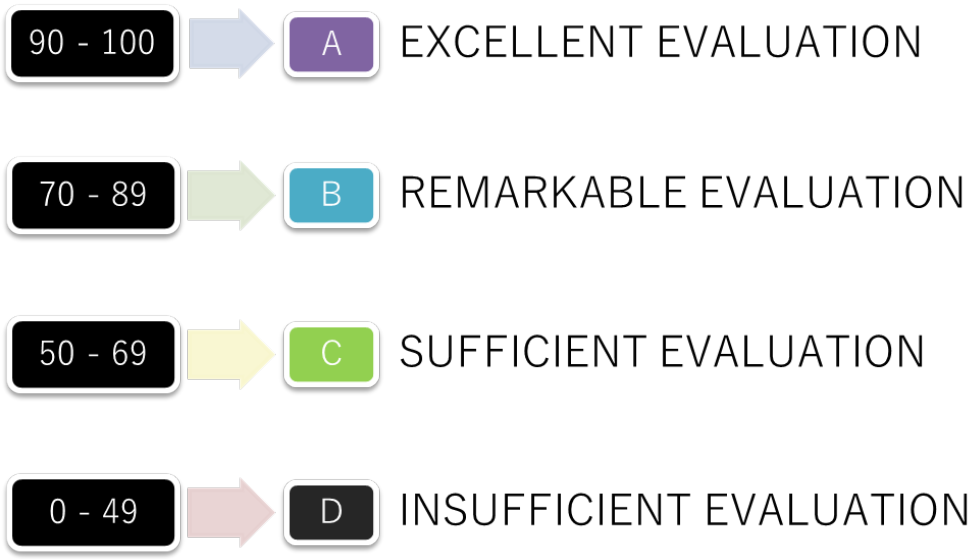

Figure 2. Global assessment scheme

We are, however, aware that, for reasons of administrative simplicity, each agency may wish to continue with the binary evaluation system and only establish a distinction within the positive evaluation for those applicants who have obtained an excellent rating (90–100).

The model is based on four main dimensions (education, teaching, research and transfer). In the case of the latter dimension, we are aware of the academic debate as to whether transfer is a continuation of research activity or of teaching. As Montesinos et al. (2008) and De la Torre et al. (2018) have pointed out, the "third mission" goes beyond teaching and research and, although it may be a more artificial division, it would include all the activities of the teaching and research staff that bring them closer to society.

Each of these four dimensions comprises a set of 10 categories, as shown in **Figure 3**.

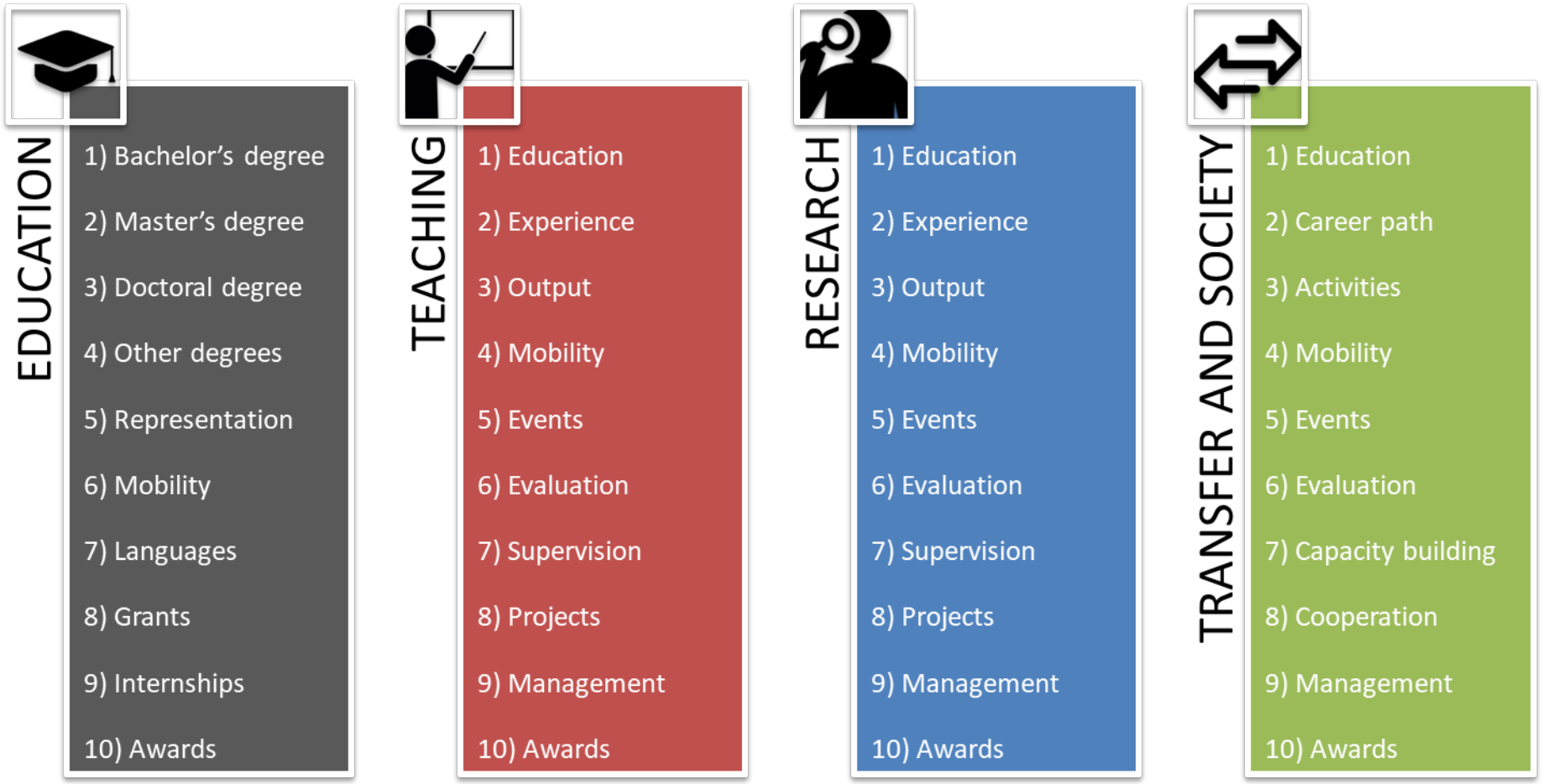

Figure 3. Figure 3. Evaluation dimensions: education, teaching, research and transfer

The dimensions shown in **Figure 3** describe the fundamental tasks of teaching and research staff (teaching, research and transfer), leaving aside the education dimension, which is particularly relevant for young applicants who are starting their academic careers and therefore do not yet possess certain merits that may be taken into account in the other dimensions.

The aim is to give some consistency to the categories across the dimensions – with the exception of Education – with some small differences in the Transfer dimension (e.g. capacity building instead of education), which will be discussed in more detail in later sections.

New features of this design include the integration of management activities in each of the three main dimensions (research management, teaching management, management in transfer activities), as we believe that management activities differ greatly in nature. This eliminates the need to create a specific Management dimension, which would dilute merits related to the other dimensions, thus allowing objective assessment of the impact of the applicant's management achievements in a specific dimension. Another innovative feature of the model is the absence of an "Other" section in each of the dimensions. The rationale for this is that the model seeks to provide a structure or framework in which more items can be added according to the needs and evolution of teacher assessment over time, thus avoiding "catch-all" and "miscellaneous" items, which should be avoided in ranking models as far as possible.

3.2. Education

The actions included in this dimension involve all those activities of the applicant related to his/her academic qualifications.

These activities include both the attainment of undergraduate, postgraduate or doctoral degrees and extra educational activities, including placements in other countries or establishments, language skills, work experience (grants and internships) or awards received (**Table 7**). This block does not include specific courses to develop innovative teaching skills, research methodology and knowledge transfer, which are recognised and assessed in the dimensions corresponding to these activities.

Table 7. Categories, subcategories and items of the *Education* dimension

Category	Subcategory	Items	Evaluation
Bachelor's degree	Average grade bachelor's degree	N/A	Average grade
Master's degree	Average grade postgraduate degree	N/A	Average grade
Doctoral degree	Dissertation grade	N/A	Grade
Other degrees	Official university degrees	Bachelor's degree	By degree
		Double degree	By degree
		Official master's degree	By degree
		Non-official master's degree	By degree
		Doctoral degree	By degree
	Other degrees	Postgraduate	By hours
		Special status	By hours
		Vocational training	By hours
		Training courses	By hours
Representation	Subject level	N/A	By academic year
	Course level	N/A	By academic year
	Establishment level	N/A	By academic year
	University level	N/A	By academic year

Mobility	Placement	National/International	By months
	Visit	National/International	By days
Languages	Language	A1, A2, B1, B2, C1, C2	By language
Grants	N/A	N/A	By months
Internships	N/A	National/International	By months
Awards	Extraordinary Award	N/A	By award
	Final Degree Project	N/A	By award
	Extraordinary Award for Thesis	N/A	By award
	PhD with distinction (European or international)	N/A	By award
	Consejo Social (Social Council)	N/A	By award
	Academic competitions	N/A	By award
	Other awards	N/A	By award

The first four categories relate to the award of academic degrees. The bachelor's degree is a prerequisite for the doctoral degree, which in turn is a prerequisite for accreditation. For this reason, and similar to other existing evaluation proposals, consideration is only given to whether the average grade obtained in the bachelor's degree was significantly high (good or excellent). The same applies to the award of the official master's degree (since the non-official master's degrees do not entitle the holder to pursue a doctoral degree, these are only considered in the category of Other Degrees) and the doctoral degree, where the highest grade is *cum laude* (including the now-defunct category of *cum laude* requiring unanymity).

In the case of university degrees that no longer exist in Spain, a system of equivalences must be established:

- *Diplomatura and Ingeniería Técnica* = ***Bachelor's Degree***
- *Licenciatura and Ingeniería Superior* = ***Bachelor's Degree + Master's Degree***
- *Second Cycle Licenciatura* = ***Master's Degree***

Regardless of the qualification provided as a requirement (bachelor's degree, postgraduate degree and doctoral degree), the system recognises additional academic qualifications in those applicants who have obtained more than one

qualification. In this case, the model distinguishes between other university degrees (official and non-official master's degrees, doctoral degrees) and other qualifications, including non-official university postgraduate degrees ("university expert", "university specialist"), special-status qualifications (artistic and sports education), vocational training qualifications (intermediate and advanced cycles) and all types of training courses completed by the applicant.

The fifth category focuses on participation in different student representative bodies, recognising the applicants' work in management, organisation and participation in the design of educational policies and strategic decisions of the bodies in which they are involved. In this case, participation is distinguished according to whether it is at the level of a specific subject, an entire academic year, a degree-awarding body, or at university level (e.g. representation on the Governing Board).

The sixth category focuses on student mobility. Two types of mobility are recognised: placements (longer than one month) and visits (shorter than one month, longer than one day). In each of these two modalities, consideration is given to whether the placement or visit has been made to a national or international destination. By way of example, a placement would include an *Erasmus/Socrates* grant, and a visit would include a one-week stay through an *Erasmus+* action.

The seventh category addresses the language skills of applicants. For this purpose, all languages other than Spanish are considered (therefore, all co-official languages of the autonomous communities are taken into account). For each language, linguistic ability is assessed according to the *Common European Framework of Reference for Languages* (A1, A2, B1, B2, C1, C2).

The eighth category assesses the participation of applicants in all types of university grants related to their academic career (grants obtained for other

reasons are therefore excluded). This includes fellowships in university departments, institutions or services. Participation must be for at least one month in order to be counted, with additional consideration being given to whether the participation is accompanied by a positive evaluation by the host institution.

The ninth category assesses the experience of applicants in work placements carried out during their university studies. Consideration is given to whether the internship was carried out in Spain or abroad. The participation must be for at least one month in order to be counted.

Finally, the tenth and last category evaluates the recognition and awards obtained by the applicants. These include outstanding final degree project awards, including the *bachelor's degree final project* and the *master's degree dissertation*. Also, other prizes such as those awarded by the *Social Council (Consejo Social)*, for participation in academic competitions and olympiads (especially those in which the student participates representing the university) as well as any other recognition (e.g. best academic record). It also includes the *Outstanding Doctoral Thesis Award* and European or international distinctions in the doctoral degree.

3.3. Teaching

This dimension comprises all the teaching-related activities of the applicant.

These teaching activities include both official (undergraduate, postgraduate) and non-official degree courses. Only ad-hoc on-demand teaching is excluded (for example, courses, workshops and training for companies, associations and institutions and professional associations); it is included in the Transfer block, under Capacity Building.

In addition, actions for teaching improvement and innovation (including service-learning), supervision, evaluation, attendance at related events and teaching management, inter alia, are also covered. **Table 8** shows all the categories, subcategories and items of this dimension.

Table 8. Categories, subcategories and items of the *Teaching* dimension

Category	Subcategory	Item	Evaluation
Education	Official education	N/A	By degree
	Other official courses	N/A	By hours
	Other non-official courses	N/A	By hours
Experience	Activity	Official university teaching	By credit
		Non-official university teaching	By credit
		Doctoral School	By credit
		Teacher training	By credit
		Training Centres	By credit
		MOOCs	By edition
		Non-university teaching	By course
	Career Path	Metric report	Rating
		Narrative report	Rating
Output	Teaching works	Metric report	Rating by work
	Learning objects	Metric report	Rating by work
Mobility	Erasmus+	National/International	By week
	Other programmes	National/International	By week
	Non-programme-related	National/International	By week

Events	Communication	National/International	By participation
	Poster	National/International	By participation
	Lecture/Keynote	National/International	By participation
	Round table	National/International	By participation
	Workshop	National/International	By participation
Evaluation	Resources	Works; learning objects	By participation
	Projects	Institutional; regional; national; international	By participation
	People	Final degree project committees; scholarship and contract committees; selection panels for teaching posts	By participation
Supervision	Works	Bachelor's degree final projects; master's degree dissertations; "expert" and "specialist" degrees	By participation (proportionate)
	Actions	Welcome days; tutorial action plans	By participation
Projects	Teaching innovation	Institutional; regional; national; international	By project
	Service-learning	N/A	By project
Management	Organising Committee	National/international	By event
	Networks/Working Groups	Institutional; regional; national; international	By course
	Coordination	Institutional; regional; national; international	By project
	Positions held	Department; centre; degree (bachelor's and master's); vice-rectorate;	By course
Awards	Career Path	University (five-year term); national (six-year teaching term); others	By award
	Action	University; governmental; educational organisation, media; other.	By award

The first category (*Education*) includes all formal teacher training activities undertaken by the applicant, including the former *Curso de Adaptación Pedagógica* (CAP) teacher training course and the current *Máster Oficial Universitario en Formación del Profesorado* (Official Master's Degree in Teacher Training). In addition, other courses related to teacher training are considered, distinguishing between courses from official (e.g. Institutes of Education Sciences) and non-official institutions.

The second category (*Experience*) includes all teaching activity completed by the applicant. In order to evaluate this category, two sub-categories are established: *Activity* and *Career Path*.

The *Activity* subcategory includes the teaching delivered by the applicant, recognising teaching at different scales and levels of education. This subcategory focuses on the quantity and variety of teaching given. To this end, teaching activity is broken down into official university teaching (official bachelor's and master's degrees), non-official university teaching (non-official master's degree), teaching in subjects offered by the Doctoral School (or, in universities without a Doctoral School, as part of official doctoral programmes). In addition, teaching outside the university provided in training centres (for example, in business schools), participation in massive online courses, considering both MOOCs (Massive Open Online Courses) and other variants such as XMOOCs, SPOCs or NOOCs, taught from the university itself or through platforms (*Coursera*, *EdX*, *Miríada X*, etc.), is also recognised. Finally, teaching activity at other educational levels is recognised, specifically in secondary school, baccalaureate and professional modules.

The *Career Path* subcategory includes information relating to the applicant's entire teaching career, with the aim of obtaining a general picture. This subcategory is, in turn, divided into two blocks: *Metric Report* (quantitative and qualitative) and *Narrative Report* (qualitative), focusing only on official university teaching:

- The Metric Report block gathers different parameters in the form of a scorecard, which summarises teaching experience, among which are:
    - No. of credits taught.
    - No. of subjects taught.
    - No. of subjects as coordinator.
    - No. of subjects taught in another language.
    - No. of subjects with a teaching quality score of at least 7 (out of 10).
    - Average score obtained from the teaching evaluation for all subjects audited by a teaching quality assurance system (DOCENTIA or similar). Subjects not evaluated would not be included in the calculation of the average.

- The *Narrative Report* block consists of a report (approximately 500 words maximum) describing the applicant's teaching experience, focusing on the subjects taught, their relationship with research or transfer, and all those aspects (impact on their career, learning, evolution, etc.) that could not be added in other sections, and which are relevant to better understand or contextualise the applicant's teaching experience.

The third category (*Output*) focuses on the published output of the applicant. It therefore includes teaching materials published by the applicant for the use of students. Therefore, journal articles, teaching conference proceedings or teaching research book chapters (which have undergone a peer-review process) are considered research, and are assessed in the *Research* block.
The document types fall into two categories: *Teaching Works* (monographs, textbooks, subject books) and *Learning Objects* (all digital publications designed for students to use as a basis for passing the subject or obtaining advanced knowledge of the subject).

In order to measure the relevance and impact of each item of evidence provided by applicants, a system of parameters and sources is proposed (**Table 9**), which

combines both quantitative indicators (citations received or number of official downloads, inter alia) and qualitative indicators (the publisher of the work has a seal of quality, the learning object is linked to by websites of proven quality, etc.). In addition, other related parameters (number of co-authors, links with the publisher) provide information on other aspects related to the genesis of the work, which can also be taken into account. The parameters included are a selection of aspects which, as a whole, would enable a complete evaluation of the work provided. Therefore, the presence or absence of some parameters should not be considered positive or negative per se; there has to be an overall assessment.

Table 9. Teaching output (Metric Report)

Category	Parameters	Sources
Teaching materials	Publishing quality	FECYT Seal; other quality seals
	Presence in publisher rankings	*(Scholarly Publishers Indicators (SPI))*
	Inclusion in libraries	*WorldCat*; *Rebiun*
	Citations received (by language)	*Google Scholar*; *Book Citation Index*
	Citations in academic syllabi	*Open Syllabus*; university websites
Learning objects	Number of downloads	*Website (official data)*
	Number of academic and professional websites generating links	Link intelligence tools
	Number of subscriptions	*Website (official data)*
General data	Number of co-authors	Work
	Institutional relationship	Work

The fourth category (*Mobility*) includes the different placements and visits carried out exclusively related to teaching and teaching innovation. In this case, a distinction should be made between national and international visits, as well as their duration (the minimum duration should be one week in order to be counted).

The fifth category (*Events*) is aimed at assessing participation in all types of teaching events and meetings. For this purpose, the following types of participation are considered: oral communication, poster, keynote, round table

(debate) and workshop. This category does not consider publications, but rather the active participation of the applicant in the event.

The sixth category (*Evaluation*) focuses on all evaluation activities performed by the applicant in connection with teaching tasks. For this purpose, three evaluation actions are considered: evaluation of *Resources*, evaluation of *Projects* and evaluation of *People*.

- In the case of *Resources*, the same types previously included in the *Output* subcategory are considered: *Teaching Materials* and *Learning Objects*. Therefore, consideration is given to the participation of the applicant in committees or processes to evaluate these outputs at the request of the publishers (or corresponding institutions).
- In the case of *Projects*, consideration is given to work on the evaluation of funded teaching innovation projects and grants (at institutional, regional, national and international level).
- In the case of *People*, a distinction is made between the applicant's participation in final degree project panels (bachelor's and master's degrees, as well as "expert" and "specialist" degrees, which entail the defence of a final project), participation in evaluation committees for grants and fellowship contracts, and in panels for academic staff positions. Clearly, a person applying for the position of assistant professor will not possess some of these merits (especially that of sitting on panels for positions in the same academic rank or higher). These subcategories must be activated and weighted according to the position for which the evaluation model is applied. In any case, they are merits that would be included in that category when the assessment thereof is appropriate.

The seventh category (*Supervision*) recognises the work of the teaching and research staff in mentorship and supervision activities. Two aspects are considered for this purpose:

- supervision of final degree projects, including bachelor's and master's degrees, and "expert" and "specialist" courses. This achievement is calculated on a proportionate basis (therefore considering the number of thesis supervisors). In addition, the number of supervised final degree projects that have been awarded an outstanding score is also taken into account, to assess the ability to attract high-level students.
- Participation in different tutorial action plans. For example, being a tutor to new students or participating in all kinds of institutional actions to support students and welcome days.

The eighth category (*Projects and other services*) includes the applicant's participation in funded projects aimed at teaching improvement and innovation. This includes projects at institutional, regional, national or supranational level. Active involvement in service-learning or similar methodologies is also an asset.

The ninth category (*Management*) assesses the applicant's participation in teaching management actions. These actions include participation in the organising committee of teaching events, coordination of teaching innovation projects and participation in networks and working groups for teaching innovation and groups or communities related to service-learning. Finally, consideration is given to the applicant having held teaching management positions in different entities, such as department (director, assistant director, academic secretary), centre (dean's office, vice-dean's office, head of studies, etc.), degree (bachelor's or master's degree director) and university (head of area, vice-rector's office, academic committees, etc.). Positions linked to other non-teaching activities will be assessed in the *Research* and *Transfer* dimensions.

The tenth category (*Awards*) includes awards and prizes for teaching awarded by any type of entity (governmental, university, non-governmental organisation, company, etc.). A distinction may be made between awards for specific actions

(e.g. awards for the most highly rated teacher of a course) and awards for career achievements. In the latter case, this would include five-year teaching periods and the future six-year teaching period.

3.4. Research

3.4.1. Scientific disciplines

This section addresses the evaluation of scientific disciplines (formal sciences, natural sciences, social sciences, human sciences, applied sciences). Artistic disciplines require special treatment outside the considerations of traditional scientific evaluation (see 3.4.2).

This dimension encompasses the research activity of applicants. It therefore follows a scheme of ten general categories similar to those for teaching, but focusing exclusively on scientific activity. **Table 10** provides the general taxonomy of categories, sub-categories and items, together with the suggested type of evaluation.

Table 10. Categories, subcategories and items of the *Research* dimension

Category	Subcategory	Item	Evaluation
Education	Official courses	Doctoral school; Doctoral programmes	By hours
	Other courses	N/A	By hours
Experience	Predoctoral	Institutional; regional; national; international	By months
	Postdoctoral	Institutional; regional; national; international	By months
	Research assistant	Institutional; regional; national; international	By months
	Teaching and research staff	Part-time; full-time.	By months
	Company	Internships; part-time; full-time	By months
***Output**	Contribution	Metric Report	Rating
		Narrative Report	Rating
	Career Path	Metric Report	Rating
		Narrative Report	Rating
	Other contributions	N/A	Rating

Mobility	Placements	National/International; predoctoral; postdoctoral; permanent	By months
	Visits	National/International; predoctoral; postdoctoral; permanent	By week
Events	Communication	National/international	By participation
	Poster	National/international	By participation
	Keynote	National/international	By participation
	Round table	National/international	By participation
	Workshop	National/international	By participation
Evaluation	Publications	Peer reviews; open peer reviews; scientific committees; editorial board	By participation
	Projects	Institutional; regional; national; international	By participation
	People	Thesis examination panels; research contracts; selection committees	By participation
Supervision	Doctoral dissertations	Institutional; regional; national; international	By participation (proportionate)
	Contracts	Predoctoral; postdoctoral	By participation
	Other activities		By participation
Projects	Funded research projects	Institutional; regional; national; international	By year; by project
Management	Organising Committee	National/international	By participation
	Project coordinator	Institutional; regional; national; international	By participation; by year
	Positions held	Coordinator of research group; director of research structure (centre, institute); director of areas, vice-rectorate; coordinator of doctoral programme.	By year
	Editorial work	Editing; editing of an issue; editorial office; scientific committee; other positions.	By year

	R&D networks	National; international	By year
Awards	Career Path	University; national (six-year); governmental; non-governmental; learned society; media, journal; other	By award
	Contribution	University; governmental; learned society, media; scientific journal; other.	By award

* Does not apply to artistic disciplines.

The first category (*Education*) includes all courses taken by the applicant related to his/her learning process in the scientific field. This includes courses related to the system of scientific publication (including open access), bibliographic database searching, bibliographic managers, the scientific career, science policy, scientific evaluation, ethics and ethical conduct in science, and courses on methodology (both quantitative and qualitative), intellectual property and dissemination of research findings. These courses are generally taught in the Doctoral Schools (or other centres directly linked to the Doctoral Programmes in universities without a Doctoral School). Consideration is also given to other research training courses in other centres.

The second category (*Experience*) focuses on work experience in the field of research. Traditionally, these aspects are usually included in either *Education* or *Work Experience*. However, we believe that it is much more appropriate to include them in the *Research* dimension. Thus, predoctoral (*FPU*, *FPI*, etc.) and postdoctoral (e.g. *Juan de la Cierva*, *Torres Quevedo*, *Ramón y Cajal*, *Marie Curie*, *ERC Starting Grant*) contracts, with a posting in any higher education institute, hospital or public research organisation, are considered in this section.[7] Experience through contracts (predoctoral or postdoctoral) as research assistants is also included. Work experience in private companies will also be considered, as long as the tasks performed within the company are related to R&D. Finally, work

[7] The different pre- and postdoctoral contracts in the Spanish framework can be found at: https://www.fecyt.es/es/publicacion/researcher-career-path-spain-glance-5th-edition

experience in part-time (*profesor asociado* or part-time instructor) or full-time contracts (different teaching positions) will be rated in the form of work experience, given specific consideration.

The third category (*Output*) assesses the impact of all research outcomes by the applicant. In order to evaluate scientific activity, a breakdown into three sub-categories is proposed: *Contribution*, *Career Path* and *Other Contributions*, as described below.

Contribution

This subcategory aims to provide an exhaustive analysis of the applicant's most relevant scientific output. To this end, a maximum number of works will be evaluated (which could be three or five, depending on whether the applicant is a civil servant or not, for example), to be chosen by the applicant. For each of the publications (or scientific contributions) two reports are produced: a *Metric Report* and a *Narrative Report*.

The selected works must meet the following requirements:

- They have undergone a peer-review process.
- They belong to one of the following document types: journal article; conference article; book chapter; book; patent.
- They are available in open access (preprint, postprint or final version).
- They do not exceed a level of co-authorship specified by area.
- Reports received during the peer-review process must be provided.

Contribution – Metric Report

The *Metric Report* only applies to works that have been published for at least **three full years**. For example, if a work was published in 2018, we add three years (2019, 2020 and 2021) and it would qualify for inclusion in the Metric Report from 2022 onwards.

This requirement stems from the difficulty (and sometimes irrationality) of applying a bibliometric analysis to recently published works, which makes no sense for many disciplines. Therefore, a minimum amount of time is required for evidence of citation-based impact to accumulate. To work around this problem, agencies usually assess the quality of the journal rather than the quality of the work, which does not make sense from a methodological point of view, as the scientific literature has shown.

This requirement may be detrimental to young people starting their careers, who have just defended their theses and wish to be accredited at the lower end of the academic career ladder. Their work has been recently published and may not meet this requirement. For this reason, for the position of assistant professor (or equivalent), contributions will only be evaluated through the *Narrative Report*, and the *Metric Report* is not required.

The Metric Report is an evaluation form that varies according to the document type of the work selected by the applicant, and consists of a series of compulsory and optional elements:

- **Section A**: journal articles, conference articles and book chapters.
- **Section B**: books.
- **Section C**: patents.

Section A (articles and chapters) draws on normalised indicators at publication level, taking into account the three most widespread indicators available in *WoS*, *Scopus* and *Dimensions*. The inclusion of *Dimensions* serves to break the *WoS-Scopus* duopoly. Although there are paid versions of this database, the free version offers the *Field Citation Ratio* (FCR). As complementary elements, consideration is given to the number of citations received (total, without self-citations and recent) from different sources (*WoS*, *Scopus*, *Dimensions* and *Dialnet Métricas*). Moreover, the percentile of

the publication according to its normalised indicator is also a highly informative indicator and is considered accordingly.

In the case of books (*Section B*), the quartile in which the publisher of the book is ranked according to the *SPI* ranking is considered as a mandatory element. This quartile may be given both in national and international rankings, either in the general or in the discipline-specific rankings. The specific score of the publisher is not requested, only the quartile (in reality the quarter) in which it is listed. As elements that complement this information, the citations received per language edition can be provided (*Google Scholar* will be used for this purpose, which will require the citation data to be cleaned up) together with the number of reviews published both in scientific (journals) and professional outlets or in the media. As can be seen, this is a similar evaluation to that carried out for *Teaching Works*, but this section takes into account the scientific nature of the output.

Finally, *Section C* (patents) covers industrial property. Although these contributions are generally considered in the *Transfer* category, a patent (or utility model) is a scientific work if we consider that they are original publications that have undergone a review process. Transfer occurs when the patent is exploited by a company or organisation, but a patent held by a university is the result of research work. In this case, it is considered mandatory to provide the status of the patent (granted or in exploitation), a range of citation-based impact indicators, and data related to the financial impact of the patent, as well as its level of protection in different countries, which may demonstrate greater reach and internationalisation.

Although three sections are proposed, there is no obligation to fill in only one section. It may happen that a book chapter may have been published by a publisher with a quality seal, that a book may have been cited in *Scopus* or

that an article may be cited in patents. Therefore, for each contribution, all three sections may be completed, if desired.

Table 11 summarises the mandatory and optional elements for each of the sections, with details of the indicators and their sources.

Table 11. Sections of the *Metric Report* for the *Research* Category – *Output/Contributions*

SECTION	MANDATORY		OPTIONAL	
	INDICATOR	SOURCE	INDICATOR	SOURCE
SECTION A	CNCI	*WoS*	*Citation Percentile* (in the area)	*WoS*, *Scopus*, *Dialnet Métricas*
	FWCI	*Scopus*	Citations received (total)	**WoS*, *Scopus*, *Dimensions*, *Dialnet Métricas*
	FCR	*Dimensions*	Citations received (without self-citations)	*WoS*, *Scopus*, *Dimensions*, *Dialnet Métricas*
	N/A	N/A	Years since publication	*WoS*, *Scopus*, *Dimensions*, *Dialnet Métricas*
			Recent citations (last year)	*WoS*, *Scopus*, *Dimensions*, *Dialnet Métricas*
SECTION B	Cuartile	SPI	Inclusion in libraries	*WorldCat*, *Rebium*
	N/A	N/A	Citations received (by language)	*Google Scholar*, *Book Citation Index*
			Citations in academic syllabi	*Open Syllabus; university websites*
			Number of reviews	*Scientific and professional publications and the media.*
SECTION C	Status	*Lens*	Citations in patents	*Lens*

	N/A	N/A	Citations in articles	*Lens*
			Revenue	*Applicant*
			Registration at other offices	*Google Patents; Lens*

* Citations listed in the WoS database.

Social Science Citation Index (SSCI); Science Citation Index Expanded (SCI-Expanded); Emerging Sources Citation Index (ESCI); Conference Proceedings Citation Index (CPCI-S, CPCI-SSH); Arts & Humanities Citation Index (A&HCI); Book Citation Index (BKCI-S, BKCI-SSH)

Contribution – Narrative Report

The purpose of this report is, on the one hand, to complement the more quantitative information in the Metric Report in order to contextualise the impact of the work (not necessarily scientific) and, on the other hand, to determine the contribution of the applicant to the work (in terms of authorship).

To this end, we propose a report divided into thirteen blocks of text, each of a maximum of 250–350 words. None of these blocks is compulsory. The description of each block is given below:

1. Source

The indicators available in the Metric Report refer to metrics at the level of the publication, not the source (e.g. journal or publisher). This information can be provided in this block, which is intended to indicate the standing of the source publication for each of the works selected for the *Output* category (this does not apply to patents).

In the case of indexed journals, normalised journal indicators will be considered: *Journal Citation Indicator* (JCI) provided by *WoS* and *Source Normalized Impact per Paper* (SNIP) provided by *Scopus*. In the case of Social and Human Sciences, the *Índice Dialnet de Revistas* (IDR) will be considered, indicating the quartile and corresponding area.

In the case of non-indexed journals (not in *WoS*, *Scopus*, *Dimensions* or *Dialnet*), the applicant may provide the following information:

- A list of five multidisciplinary databases in which the source is indexed (including in *MIAR*).[8]
- A list of five specialised databases in which the source is indexed (including in *MIAR*).
- If the source is a journal, indicate whether the journal was less than three years old at the time of publication, and whether it was subsequently indexed.

In the case of books and book chapters, applicants may indicate in this block whether the publisher (or collection) has received any quality distinction (e.g. FECYT quality seal, etc.).

2. Contribution of the publication

Include a brief explanation of the context of the selected work (motivations, objectives), and its main contributions. The format would be similar to that of a cover letter.

Attention should be paid to the generation of new ideas, hypotheses, tools or knowledge, also including knowledge outside academia. Similarly, the multidisciplinary, interdisciplinary or transdisciplinary aspects of the work can be mentioned.

3. Contribution of the applicant

The aspects and tasks of the study (design, analysis, drafting, etc.) conducted by the applicant should be briefly outlined.

[8] https://miar.ub.edu

We suggest using *CRediT* (*Contributor Roles Taxonomy*), giving details of each role (https://casrai.org/credit).

Contributions should be scientific tasks, never management or funding tasks, nor merely mechanical work.

4. *Alternative impact*

In this section the following evidence of alternative impact will be assessed:

- Number of readers (*Mendeley* or *Altmetrics* provider).
- Mentions in the media (according to *Altmetrics* provider).
- Citations in policy reports (according to *Altmetrics* provider).
- Citations in clinical guidelines (according to *Altmetrics* provider).
- Citations in academic syllabi (*OpenSyllabus* + university websites).
- Other evidence (referring to the publication, not to the source, including exploitation of the data obtained).

5. *Local impact*

Brief explanation of the possible impact (social, economic, cultural, environmental) of the results of the work on the local setting.

This setting is not limited to the autonomous community of the evaluation agency, or to the place of residence of the applicant (if different), but to a recognisable physical space that has been the object of analysis.

6. *Contribution to the SDGs*

Determine the extent to which the work is linked to one of the Sustainable Development Goals (SDGs). For each SDG identified, the following elements would be provided:

- Rate the linkage from 0 to 10.
- Brief explanatory statement.

7. Link to project

Indicate whether the contribution is linked to any source of funding from a regional, national or supranational project.

The role of this work within the funded project should be briefly described. The linkage should also be reflected in the published contribution for work published from 2010 onwards.

8. Link to research contract

Indicate whether the work is linked to a predoctoral or postdoctoral grant, whether institutional, regional, national or supranational. The recipient of the grant must be a co-author of the contribution.

9. Complementary material

Indicate whether the work includes open access to complementary material. This includes: raw data, software and pre-registration. For each item, the content (brief description of the item) and the URL for access must be indicated.

10. Fieldwork

Describe whether the study required fieldwork or access to special facilities or infrastructure:

- Archaeological sites.
- Marine platforms.
- Natural areas.
- Collectives and groups.
- Etc.

11. Personal data protection

Describe whether the study has been required to comply with the *General Data Protection Regulation* (GDPR), and how this was done.

12. Data exploitation

Describe whether the outcomes of the study (including data and software) are being exploited in any way. Exploitation includes commercialisation, obtaining patents or utility models, trademark registrations, etc.

13. Future work

Describe whether the work has led to new publications, new collaborations, visits, has been used to prepare project applications, or any other type of subsequent action or collaboration.

Career Path

While the *Contribution* subcategory aims to carry out an in-depth and detailed analysis of the applicant's most outstanding works, this section is intended to obtain more general information about their entire scientific output. Again, this subcategory is divided into two much broader and more synthetic blocks: *Metric Report* and *Narrative Report*.

Career Path – Metric Report

This should include a list of all the applicant's publications, covering only the same types of publications considered in the *Contribution* section, i.e. journal articles, conference papers, books, book chapters and patents. The list of publications can only be obtained from the following bibliographic databases: *Web of Science Core Collection* (*Science Citation Index* and *Social Science Citation Index*), *Scopus* and *Dimensions*. For social and human sciences, *Emerging Sources Citation Index* (*Web of Science*) and *Dialnet Métricas* are also accepted.

From the list of publications obtained in each accepted bibliographic database, a series of bibliometric parameters are calculated that define the

applicant's scientific profile. Therefore, each indicator can be calculated and provided for each of the accepted databases.

First, an aggregate value is obtained for the publications, which is the weighted sum of the normalised indicators obtained for each contribution. The normalised indicators already used in the *Output* subcategory (CNCI, FWCI, FCR) should be used. This aggregate value minimises the publish or perish effect, as it only increases when the publication acquires impact, and does not establish limits or thresholds based on the number of publications. It also avoids the use of journal indicators, obtaining career progression data through the indicators of each publication.

Second, a range of parameters are applied to the publications in order to determine the applicant's publication profile: cross-gender collaboration, collaboration with other institutions, both national (from different institutions) and international, and collaboration with a company. Although there are no good or bad values, percentages between 25 and 75% are sought, while extreme values are avoided. Authorship credit and responsibility, adapted to the traditions of each discipline, are also taken into account. In any case, no particular scores are to be achieved; the aim is to determine the applicant's publishing record.

Third, citation-based impact data (total citations, number of citing documents, *h*-index) are calculated, removing all self-citations. The *i-10* index (number of publications with at least 10 citations) is added to show the ability to publish work that achieves a threshold citation impact, which should be normalised by field.

Table 12 lists the indicators and sources used to calculate the scientific *Career Path* block, within the *Output* category.

Table 12. Metric report for the *Research* category – *Output/Career Path*

CONTRIBUTION	MANDATORY	
	INDICATOR	SOURCE
Publication	$\sum$ normalised impact	*WoS, Scopus; Dimensions*
Profile	Cross-gender collaboration (%)	*WoS, Scopus; Dimensions; Dialnet Métricas*
	International collaboration (%)	*WoS, Scopus; Dimensions; Dialnet Métricas*
	National collaboration (%)	*WoS, Scopus; Dimensions; Dialnet Métricas*
	Collaboration with companies (%)	*WoS, Scopus; Dimensions; Dialnet Métricas*
	No. of national institutions collaborated with	*WoS, Scopus; Dimensions; Dialnet Métricas*
	No. of international institutions collaborated with	*WoS, Scopus; Dimensions; Dialnet Métricas*
	No. of companies collaborated with	*WoS, Scopus; Dimensions; Dialnet Métricas*
	Authorship credit (first; last; other; corresponding author).	*WoS, Scopus; Dimensions; Dialnet Métricas*
Impact	Citations received (without self-citations)	*WoS, Scopus; Dimensions; Dialnet Métricas*
	Number of citing publications (without self-citations)	*WoS, Scopus; Dimensions; Dialnet Métricas*
	H-index (without self-citations)	*WoS, Scopus; Dimensions; Dialnet Métricas*
	i10-index	*WoS, Scopus; Dimensions; Dialnet Métricas*

* Citations listed in the WoS database:

Social Science Citation Index (SSCI); Science Citation Index Expanded (SCI-Expanded); Emerging Sources Citation Index (ESCI); Conference Proceedings Citation Index (CPCI-S, CPCI-SSH); Arts & Humanities Citation Index (A&HCI); Book Citation Index (BKCI-S, BKCI-SSH)

Career Path – Narrative Report

Applicants should highlight their academic career to date, with special emphasis on the elements listed in the other sections: relevance of their placements, of their participation in projects, of their scientific qualifications, events of special relevance as well as other milestones to be highlighted that could not be included in the *Metric report*.

Other contributions

A list of a maximum of five contributions that, in the opinion of the applicant, represent valuable contributions to his/her research career may be included. Applicants will include the evidence of impact they consider appropriate (we suggest using the sections of the Narrative Report in the *Contribution* section as a reference).

The following contributions, among others, may be included:

- Letters in prestigious or highly cited journals.
- Reviews of relevant works published in scientific channels.
- Conference posters that have received awards or have been cited.
- Drafting of accepted proposals for funded projects.
- Coordination of collective works (including journal special issues).
- Reports and working papers.
- Open peer reviews.

This subcategory could possibly include applicants' participation in research work through secondary or support roles, namely as non-author contributors that provide technical assistance or logistical assistance (securing funding, equipment or access to facilities).

The fourth category of research (*Mobility*) assesses the learning and experience of applicants through placements (minimum one month) and visits (minimum one week). In this case, similar to teaching mobility, different values are assigned to national and international mobility, and to the moment of the stay (predoctoral, postdoctoral, or when in a stable position). To evaluate this category, we recommend counting months for placements and weeks for visits, without combining non-consecutive days.

The fifth category (*Events*) covers the participation of applicants in scientific events and meetings. As with the *Teaching* dimension, different types of participation are considered (communication, guest lecture or keynote, poster, participation in a debate or round table and workshops), with special emphasis on contributions to international meetings and those meetings where a language other than Spanish has been used. In the case of a communication, consideration will be given to the presentation of research (conference paper or poster) but not to its publication (an aspect that will be assessed in *Contribution* and *Career Path*). In the case of papers or poster with several authors, and for the purposes of this category, only the person who presents the research at the event is assessed.

The sixth category (*Evaluation*) recognises the work of the applicant in different scientific review processes. For this purpose, the following activities are considered: evaluation of *Publications* (peer review), *Projects*, and *People*.

- For the evaluation of *Publications*, journal articles, book chapters, books, conference proceedings (as part of the *scientific committee* of an event) will be considered. In the case of journal articles, contributions included in the former *Publons* (now integrated with the *WoS* profile) as well as certificates from the publisher may be supplied. In the case of conferences, membership of a *scientific committee* will be considered. In the case of books, membership of an *editorial committee* will be considered.

- For the evaluation of *Projects*, roles performed in the evaluation of projects and research grants financed at institutional, regional, national and international level will be considered. The contract signed with the institutions to draw up the relevant review reports will be taken into account for the assessment.

- For the evaluation of *People*, three achievements are considered: member of doctoral dissertation committees, member of predoctoral/postdoctoral grant committees, and member of selection committees for civil-servant academic staff positions (*titular* or associate professor, *catedrático* or full professor) and public research bodies.

The seventh category (*Supervision*) assesses the applicant's experience in supervising students and research staff, making a distinction between the supervision of doctoral theses (split to take into account co-supervision), the supervision of research assistants, predoctoral and postdoctoral fellows, and any other mentoring activities (for example, some conferences organise mentorship programmes for doctoral students).

The eighth category (*Projects*) addresses the participation of the applicants in various research projects that have received funding in any form. The coordination of these projects is counted in the *Management* category, not in the participation category. This achievement is assessed not only by project, but also by project duration (in years).

The ninth category (*Management*) encompasses all scientific or research management positions held by the applicant, as well as other management and coordination activities. The following activities are considered: participation in the *organising committee* of events, *coordination* of funded research projects (PI), *editorial tasks* in scientific journals and publications (editor-in-chief, editor, scientific committee, editor of special issues or other positions), *individual positions* of responsibility related to research (mainly, vice-rector of research, director of

research department or service, coordinator of research groups, director of research centres and institutes and coordinator of doctoral programmes) and, finally, participation in different research and development *networks*.

The tenth and final category (*Awards*) considers awards and recognition both for research careers in general (*career path*) and for specific contributions and projects (*contribution*). In this section, the successful completion of the six-year research period is taken into account. The awards may be granted by different university, governmental and non-governmental bodies, the media, learned societies, journals and publications, etc.

3.4.2. Artistic disciplines

The arts, by their very nature, cannot be measured and evaluated in the same way as the sciences. The main reason for this is that the result of artistic activity is a work or an interpretation, not necessarily recorded in the form of a publication, and not necessarily reviewed by peers. This renders the evaluation of the arts (essentially music, painting, drawing, sculpture, literature, dance and drama) on the basis of the criteria outlined in the previous sections fundamentally invalid. Moreover, it generates unnecessary tensions and forces university teachers in the arts to engage in activities outside of what is expected in their disciplines and profession.

While most of the categories (*Education*, *Experience*, *Mobility*, *Events*, *Evaluation*, *Supervision*, *Projects*, *Management*, *Awards*) can be adapted with relative simplicity to the arts, it is the *Output* category that needs to be approached in an entirely different way, both in terms of the works that are assessed and the way in which this is done.

In this case, the *Contribution*, *Career Path* and *Other Publications* blocks seem appropriate, but it is the type of works and their evaluation that call for a change. The inclusion of an additional section (apart from Sections A, B and C as set out

for scientific disciplines) oriented towards artistic output would be the most appropriate option (Section D for artistic works). For this purpose, the different types of artistic works should be taken into account, from the point of view of their readiness for an audience (**Table 13**).

Table 13. Type of contributions in the arts

Type of contribution	Category	Type of Indicator	Examples of indicators
Work	Physical	Related to distribution	No. of sales; number of exhibitions (temporary or permanent), competitions or festivals (relevance of the exhibition space or event); number of visitors; etc.
		Related to expert critics	Number of positive reviews
	Virtual	Related to distribution	Number of views; number of downloads
		Related to expert critics	Number of positive reviews
Performance	Execution	Related to distribution	Number of performances (rating the relevance of the venue); etc.
		Related to expert critics	Number of positive reviews

A distinction is made between a work (object or artefact, physical or virtual) that is created and made available to an audience, and a performance, in which the object is a person performing a series of actions.

A physical work can be a single object or an object that can be mass-produced. In both cases, its distribution to an audience can take different forms (rental, sale, viewing, temporary exhibition, permanent exhibition, etc.). Depending on how it is distributed, different metrics can be obtained (revenue, number of temporary exhibitions in which it has been exhibited, quality or relevance of these exhibitions, etc.).

A virtual work, for example a digital drawing or a non-fungible token (NFT), can also be distributed or consumed in different ways. It is their consumption and use that will allow us to assess their relevance, together with critical appraisals by experts in the respective field.

In the case of performances, these would be a dramatic interpretation (e.g. a theatre performance), the performance of a piece of music (e.g. a piano concert) or bodily expression (e.g. dance). In these cases, the assessment would also involve elements related to distribution and use (e.g. number of performances) and critical appraisal by experts.

In all these cases, reviews published in trade publications would be given greater importance and relevance in the evaluation.

3.5. Transfer and Society

Actions related to knowledge transfer and engagement with society (also known as social transfer or third mission) consist of all activities carried out by academic staff that bring them closer to society in general and to citizens in particular. Therefore, they are actions deemed to be sufficiently important to differentiate them from the two previous dimensions.

These activities are not limited exclusively to the dissemination and transfer of science, but also include other dissemination, cooperation, volunteering or training activities, directed at both public (society) and private audiences (companies, foundations and non-profit associations, citizens, etc.), and are not necessarily university-related teaching or learning activities.

As with the other dimensions analysed, **Table 14** lists the 10 categories to be considered in the evaluation of *Transfer*.

Table 14. Categories, subcategories and items of the *Transfer* dimension

Category	Subcategory	Item	Evaluation
Education	Official courses	University	By hours
	Other courses	Business; government bodies; NGOs; media; other.	
Career Path	N/A	Narrative Report	Rating
Activities	In other institutions	Contracts; secondment; committees and working teams	By activity
	For other institutions	Consultancy; reports; translations; expertise; other	By activity
	With other institutions	Agreement; other	By activity
	Production	Resources	By work
	Dissemination	Media; outreach activities; other	By activity
Mobility	Company placements	National/International	By months
	Other organisations	National/International	By months

Events	Dissemination	National/international	By participation
	Communication	National/international	By participation
	Guest lecture	National/international	By participation
	Debate	National/international	By participation
	Poster	National/international	By participation
Evaluation	Professional projects	National/international	By participation
	Resources	National/international	By participation
Capacity building		Universities; professional associations; companies, governmental bodies; NGOs; learned societies; others	By hours
Cooperation	Collaboration	Government agencies; NGOs; professional associations; other.	By year
Management	Spin-off		By year
	Positions held	Director of structures (centre, institute); director of areas, services and vice-rectorates; others.	By year
	Events	National/International	By year
	Citizen participation platforms		By year
Awards	Career Path	University; national (six-year period); governmental; non-governmental; company; media, other	By award
	Action (individual/collective)	University; national; governmental; non-governmental; company; media, other.	By award

* Does not apply to artistic disciplines.

The first category (*Education*) comprises all training courses attended by the applicant related to transfer activities. This includes courses and workshops related to the creation and management of companies and spin-offs, collaboration with companies and technology parks or the commercial exploitation of research results. It also includes training in development cooperation, sustainable

development goals, social aid, communication and dissemination of science to society, etc. Beyond the subject matter, the following types of courses are identified: university extension, courses offered by companies or governmental or non-governmental agencies.

The second category (*Career Path*) is equivalent to the *Narrative Report* on *Output* in the *Research* dimension. This section should include a written description (maximum 500 words) in which the applicant gives a generic account of the transfer activities carried out. Value will be placed on there being a thread connecting the different activities and establishing a link between them and the teaching and research activity, if applicable.

The third category (*Activities*) also bears a certain similarity to the *Output* category in *Research*, but includes the contributions made by the applicant that are not related to publishing activities. In this case, the following activities are included:

- *Activities in other institutions*

  These activities include secondments, special services and study leave, generally covered by Articles 18 and 19 of *Law 14/2011 on Science, Technology and Innovation*. They involve working for other institutions on a temporary basis for the duration of the activity. Activities considered include contracts with commercial companies, secondments to public funding agents and membership of boards of directors of innovative companies, committees and working teams.

- *Activities for other institutions*

  This category includes participation in contracts with companies and other institutions, public or private, for-profit or not-for-profit, as permitted under Article 83 of *Law 14/2011 on Science, Technology and Innovation*. In this case, the applicant works under the auspices of his/her institution, transferring his/her knowledge to the organisation that hires him/her

temporarily for a service. Activities to be included in this section include consultancy work, diagnostic reports, expertise activities, translations, etc.

- *Activities with other institutions*

  This includes participation in projects with companies and other public or private institutions, for-profit or not-for-profit. In this case it is not a request for services but joint implementation of a range of activities or a joint project, other than a research project. As such, the main activity envisaged in this category would be covered by a specific arrangement, e.g. a corporate-sponsored chair or professorship.

- *Own activities (production)*

  This includes the publication and development of resources within the applicant's field of knowledge. The development of these resources may or may not derive from other included transfer activities. Activities covered include, but are not limited to, the development of dissemination books, concept books, design bibles, sound, visual or multimedia material, websites, videogames, booklets, maps, scores, etc. These resources must not be confused with the works to be included by applicants from the field of the arts in the category of *Artistic Production*, since in this category emphasis is placed on the transfer of work, and not on artistic experimentation.

The fourth category (*Mobility*) covers placements. In this case, a distinction is made between periods spent in companies (this excludes company internships, which are valued in *Education*) and in other organisations, where the activity is clearly linked to social transfer (e.g. an NGO, a non-profit association, a foundation, etc.).

The fifth category (*Events*) is similar to the *Teaching* and *Research* categories, with the addition in this case of outreach events, which may include appearances in the media (general and trade press, television, etc.) or science outreach activities

(exhibitions, fairs, etc.), inter alia. Apart from these activities, participation in events may also include communications, keynote lectures, round-table debates or posters.

The sixth category (*Evaluation*) covers activities in which the applicant is hired to perform evaluation tasks, as an expert in the field, including the following:

- *Evaluation of professional projects*
  Participation in review panels of funding projects for companies or institutions, for the provision of infrastructure or human or financial resources.
- *Evaluation of Resources*
  Participation of the applicant in processes to evaluate all types of resources related to his/her area of knowledge. For example, on review panels for literary prizes, innovation projects in schools, institutes and non-profit institutions, entrepreneurship projects in universities, etc.

The seventh category (*Capacity Building*) assesses the delivery of courses, workshops and ad-hoc training to companies, associations, institutions and professional associations. Therefore, this type of training is separated from teaching activities, as it is aimed at people who request it on demand from outside the university, as in the case of in-company training.

The eighth category (*Cooperation*) consists of independently assessing the participation of the applicant, in the field of his/her knowledge, in activities that involve collaboration with a professional, academic, governmental or non-governmental, non-profit organisation, both in development cooperation actions and in collaboration with all kinds of associations, federations, colleges, societies, etc.

The ninth category (*Management*) considers all activities related to the management of transfer actions. Activities include the following:

- Founder/partner of spin-offs/start-ups, technology companies and/or knowledge-based companies.
- Management positions (non-teaching, non-research).
- Membership of event organisation committees.
- Membership of innovation and/or knowledge transfer committees.
- Citizen participation activities.

Lastly, the tenth category (*Awards*) assesses all the recognition received, both for a specific action and for a career, as with the *Teaching* and *Research* dimensions. Both individual and collective awards are recognised, including the six-year transfer period (*sexenio de transferencia*).

3.6. Special situations

There are special situations in which applicants for accreditation have not been able to work at full capacity for a certain period of time, which we will call “period of partial activity”.

In order to ensure that this circumstance does not diminish the chances of achieving accreditation, we propose a system of compensation whereby 25% of the score obtained for merits achieved during the period of partial activity is added. In the case of publications, the date of submission, not the date of publication, will be taken into account.

Therefore, the merit is considered to have been achieved under limiting circumstances, involving an extraordinary effort on the part of the applicant.

The following special situations are covered:

a) Mothers

Women who give birth in year *X* are entitled to receive an additional 25% for items completed in years *X*+1 and *X*+2.

b) Partners of mothers

Cohabiting partners of mothers that give birth in year *X* receive an additional 25% for items completed in year *X*+1. These persons must have applied for the corresponding maternity/paternity leave.

c) Adoptive parents

Persons who adopt a baby in year *X* receive an additional 25% for items completed in year *X*+1.

d) Persons with serious illness

Persons suffering from a serious illness (for more than 6 months) receive an additional 25% for items completed during their illness or convalescence.

e) Persons caring for relatives

Persons who are caring for an elderly or seriously ill relative are entitled to an additional 25% for items completed during the period of care.

f) Other special situations

People who can provide proof of a special situation (gender transition processes, legal issues, exile, etc.) during year *X*, receive an additional 25% for items completed during year *X*+1.

3.7. General considerations

The preceding sections have described a proposed framework for an academic staff evaluation model. In this section the authors wish to address some general considerations to be taken into account in further discussion, and clarification, of the model.

First, the framework presents a taxonomy of criteria arranged into different levels (dimension, category, subcategory, item). We believe that this taxonomy is also suitable for use as a structure integrated into an official academic curriculum vitae template. In this way, applicants could fill in an official CV that would be aligned with the accreditation requirements. This taxonomy is not intended to be a definitive list, but rather the structure of a workable model that is subject to review and debate with policy makers (European Commission, relevant ministries, different regional ministries or departments) and stakeholders (agencies, university governance bodies, trade unions, business organisations, students, individuals and society as a whole) so that it can be implemented over time and have a real impact on society, in line with new trends in research assessment.

The taxonomy has certain new features when compared to previous models, chief among which are the following:

- ✓ The three main dimensions (*Teaching*, *Research*, *Transfer*) consist of a range of cross-cutting categories that are adapted to each dimension, with some minor variations, especially in *Transfer*, where *Output* is replaced by *Activities* and *Capacity Building*.

- ✓ Management is integrated in each of the main dimensions, which avoids the creation of an ad-hoc category. The reason for this is that the management tasks in question are of a very different nature and are necessarily linked to one or other of the three main dimensions. For example, the coordination of a bachelor's degree or the supervision of a

master's degree may be considered a teaching management position, while the position of vice-rector for research is a post linked to research, and the position of vice-rector for innovation or university extension may be a post linked to knowledge transfer and engagement with society. Therefore, these activities should be assessed in their respective dimensions, at the discretion of the applicant, where they can be better contextualised in relation to the other achievements in each dimension.

- ✓ The taxonomy is not intended to provide an exhaustive list of items. The subcategories and items can be expanded within their corresponding categories. Clearly, it is not possible to draw up a list of all possible achievements, in addition to considering all the dimensions of the teaching and research work and the specificities of each scientific field or discipline. In any case, the framework offered is sufficiently broad to capture a significant percentage of the activities that should be considered in accreditation processes, allowing for an easily scalable and customisable model.

The main new features in each of the dimensions are listed below:

Teaching:

- ✓ Non-university teaching (both in secondary education, professional modules and in business schools) is recognised as teaching experience.
- ✓ A brief Narrative Report is included so that applicants can provide details of their teaching career, including aspects beyond the merely quantitative, and outline their involvement in research and knowledge transfer activities.
- ✓ Teaching excellence is recognised, with additional points for teaching in languages other than Spanish, the number of subjects with a high teaching rating and the supervision of projects receiving a high score.
- ✓ Innovation in teaching and service-learning activities are considered.

- ✓ Consideration is given to the creation of teaching materials specifically aimed at students (especially learning objects), MOOCs and other similar courses.
- ✓ The teaching publications taken into consideration are only those aimed primarily at students (syllabi, textbooks). All teaching research publications, i.e. scientific publications that have undergone a peer-review process and are published and disseminated through scientific channels, are therefore excluded from this section. These contributions are considered, but in the *Research* section.

Research

- ✓ This includes the applicant's work experience in research tasks, taking into account both predoctoral and postdoctoral contracts, as well as work experience in R&D tasks for companies. These achievements are usually included in *Education*, but we believe it is preferable to include them as a category within research activities, as they are employment contracts (not internships or scholarships).
- ✓ The achievements related to scientific output (publication and impact) are broken down into *Contribution* (a selection of a few publications), *Career Path* (all publications indexed in one of the accepted databases) and *Other Contributions*, thus allowing for a multi-level analysis (more in-depth for a few publications, a general overview for the entire bibliographic output, and additional assessment of other papers not indexed due to particular circumstances, such as their type or nature).
- ✓ The selected contributions are analysed in detail through two reports (metric and narrative), which complement each other.
- ✓ The Metric Report features many new elements: it is structured in three different sections according to the characteristics of the work; it does not use journal metrics; it includes normalised metrics at publication level; it breaks the *WoS*/*Scopus* duopoly by integrating *Dimensions* and *Dialnet Métricas* (to capture publications in social and human sciences written in

Spanish); and it distinguishes between mandatory metrics and optional metrics. However, the main new features stem from the establishment of various requirements for the metric analysis: the requirement of review reports provided by the sources during the peer-review process; the availability in open access of the publications selected for the *Contribution* section; and the minimum age requirement for the publications evaluated using bibliometric indicators (three full years after publication).

- ✓ The Narrative Report is another contribution of the evaluation model framework. A taxonomy of thirteen content blocks is proposed for applicants to explain their contribution, allowing for the inclusion and assessment of aspects such as the public and social value of the research, its originality and methodological impact, aspects related to sustainability, open data or local impact, inter alia. Perhaps the most novel feature is that the indicators at publication and journal level are included as an additional block of the Narrative Report (prestige of the source) and not directly in the Metric Report.
- ✓ While the proposal tries to adhere to the qualitative philosophy underlying both DORA[9] and the recent *Agreement on Reforming Research Assessment*[10] (European Comission et al., 2022), a mixed approach has been chosen. The combination of a Metric Report and a Narrative Report seeks to address the weaknesses of each separately. The proposed Metric Report is not inconsistent with the criticism of the use of bibliometric indicators, but rather a shift from relying on an inadequate metric (Impact Factor) to a more appropriate, normalised set of metrics, without necessarily presupposing any positivist assumption as to their use. It is precisely for this reason that a Narrative Report is added, to make up for the shortcomings of the Metric Report in those cases where it is necessary. For example, assessing multidisciplinary aspects using bibliometric indicators is a complex task and not without its limitations (there are indicators based on the thematic

[9] https://sfdora.org/
[10] https://coara.eu/

categories of the sources of the citing and cited documents, although bibliographic databases do not provide them directly, making it difficult to use them and include them in the evaluation model). However, the Narrative Report can capture the multidisciplinary quality of an applicant in general, or of a scientific contribution in particular.

- ✓ The scientific *Career Path* allows for a complementary assessment of the individual's career, focusing on metrics of productivity, impact and publishing profile, thereby accommodating multidisciplinarity. The assessment focuses more on normalised impact than on mere productivity through the sum of the normalised impact of each of their contributions.
- ✓ Patents are included as research achievements (*Output*) and not as transfer, as they are original documents, have undergone a review process and are the result of research work and activities, even though the purpose of the document is industrial property. The use of a patent in industry and society is an achievement that can be included in the *Transfer* dimension.
- ✓ *Other Contributions* is a subcategory that allows applicants to contribute work that does not fall under *Output* and *Career Path*, but which clearly represents scientific achievement. Although this subcategory would have a reduced weight in the overall tally in the *Output* category, and an even lower weight in the total accreditation (*Output* is only one of the ten *Research* categories), this section would recognise and value other alternative forms of scientific communication. Another new aspect is the recognition of research support activities, especially technical and logistical contributions. In some cases these activities are credited in the acknowledgements section and, in others, this participation is rewarded through co-authorship. In order to bring about a situation in which the role of authorship and intellectual responsibility for a work is not distorted, but the contribution is still recognised, applicants could add this achievement to *Other Contributions*. The CRediT system could be used, although we believe that the best option is for journals and other sources to begin to explicitly acknowledge these forms of contribution to a work, which should coexist alongside authorship.

Taking this into account in the accreditation system could minimise bogus claims of authorship.

- ✓ Assessment of the arts should take a different approach. To that effect, we propose that the *Research/Output* category be adapted by including an additional section (in addition to the three sections provided for all other disciplines) that is specifically designed for the assessment of artistic works. Defining the indicators to be used in these disciplines is beyond the scope of this report, and should be addressed in future stages of the model's development.

Transfer

- ✓ A taxonomy of activities is provided which distinguishes between secondments and membership of committees of organisations external to the university, consultancy activities, agreements and even the creation of works and resources for non-teaching and non-research activities, thus extending the range of activities beyond the mere dissemination or transfer of research activities. The aim is thus to bring this section into line with the taxonomy of activities eligible for the six-year transfer period.
- ✓ Activities related to the participation of academic staff in citizen participation platforms/activities are included, thus reflecting their engagement with society.
- ✓ Management positions oriented or related to transfer activities are included, not being restricted to the university/company relationship, but broadening the focus to university/outside the university, including development cooperation actions and non-profit associations.

Second, the proposed model does not include weights and scales. It will, however, need to incorporate them to be an effective instrument tailored to the needs of each individual academic post and each evaluation agency or higher education institution. The establishment of weights (at dimension, category, subcategory

and item level) is key to minimise bias. For this reason, the authors wish to put forward some considerations that we believe to be of particular relevance:

- ✓ The teaching and research dimensions should have the same overall weight in the evaluation of each academic rank. We understand that accreditation qualifies the person for recruitment for a teaching and research position, and that there is no preponderance of one over the other.
- ✓ The overall weights of the dimensions should vary according to academic rank being evaluated. It stands to reason that the *Education* dimension carries a higher value in the lower ranks, and that this value will be lower for the higher ranks, and that the opposite will be true of the weighting of the *Transfer* dimension.
- ✓ The model should have performance thresholds both in general (50 points) and per dimension, especially in the *Teaching* and *Research* dimensions. In addition, minimum thresholds should be set in some categories (in particular in *Teaching/Experience* and *Research/Output/Contribution*). Finally, no dimension or category should be given undue weight, such that it becomes decisive in the final assessment.
- ✓ When assessing the *Output/Contribution* category, the *Narrative Report* and the *Metric Report* should both have the same weighting for each contribution provided, thus avoiding dependence on one type of assessment over the other. It should be remembered that the different fields of the Narrative Report are optional (the applicant can fill in only those that apply and still obtain the maximum score in this section), and that many of the indicators included in the Metric Report are optional (i.e. their omission is not penalised, but their inclusion is rated positively).
- ✓ Applicants for the lowest rank should only be assessed on the basis of the narrative reports.

Third, the people tasked with evaluating the applications must be qualified to do so. In this report, we reject the idea that people without proven experience

(professional or scientific) should be entrusted with preparing the necessary metric reports. We hereby call for the creation of an official accreditation (by means of a master's degree or other type of qualification) that would qualify people to carry out the tasks of evaluating scientific activity in a professional manner, both for the agencies and for academic staff and educational institutions.

Therefore, we propose three profiles for conducting the evaluation:

- ✓ *Administrative staff*: tasked with verifying the correctness of the documentation provided (certificates that attest to the activities).
- ✓ *Technical staff*: tasked with drawing up the metric reports.
- ✓ *Staff specialised in the area*: tasked with evaluating the narrative reports and assessing the accreditation as a whole on the basis of the administrative and bibliometric information provided by the rest of the evaluation staff.

Fourth, the proposed model does not take into account the costs, both in terms of personnel and technical requirements, for efficient implementation and management. Therefore, it is a somewhat conceptual system, but completely feasible and realistic. An expert in bibliometrics could gather the data from an applicant in a few hours of work (the interpretation of the data is another matter). This time would be even shorter if he/she had a prepared and customised online tool to facilitate his/her task within the corresponding evaluation requirements, partially automating the process. It is self-evident that evaluation agencies (of degrees, persons, projects, etc.) need adequate infrastructures to be able to accomplish these functions.

This requires an initial investment, an outlay that makes financial sense. Developing a complete database that implements the evaluation model, enabling the collection of data from bibliographic sources (both closed and open) and designing a user-friendly interface suitable for both evaluators and those being evaluated are necessary to efficiently manage and evaluate scientific activity, and

such actions are relatively affordable. Moreover, it is a worthwhile investment given the importance of scientific activity not only for the economic development of the country, but also for the well-being of its citizens.

In addition, the staff who will carry out the evaluation tasks (administrative, technical and specialist staff) need to be adequately trained. And finally, transparent communication with citizens is needed. Without these three pillars (infrastructure, trained staff and communication), no evaluation model will work.

4. REFERENCES

Aguillo, Isidro F. (2015). La Declaración de San Francisco (DORA) y la mala bibliometría. *Anuario ThinkEPI*, *9*, 183-188. http://dx.doi.org/10.3145/thinkepi.2015.43

Alperin, J.; Rozemblum, C. (2017). La reinterpretación de visibilidad y calidad en las nuevas políticas de evaluación de revistas científicas. *Revista Interamericana de Bibliotecología*, *40*(3), 231-241. https://doi.org/10.17533/udea.rib.v40n3a04

Arellano-Rojas, P.; Calisto-Breiding, C.; Peña-Pallauta, P. (2022). Evaluación de la investigación científica: mejorando las políticas científicas en Latinoamérica. *Revista española de documentación científica*, *45*(3), e336. https://doi.org/10.3989/redc.2022.3.1879

Bautista-Puig, N.; Aleixo, A. M.; Leal, S.; Azeiteiro, U.; Costas, R. (2021). Unveiling the research landscape of sustainable development goals and their inclusion in higher education institutions and research centers: major trends in 2000–2017. *Frontiers in Sustainability*, *2*, 620743. https://doi.org/10.3389/frsus.2021.620743

Bisquerra, R. (2000). *Educación emocional y bienestar*. Barcelona: CISSPRAXIS

Bonaccorsi, A. (Ed.). (2018). *The evaluation of research in social sciences and humanities: Lessons from the Italian experience*. Springer.

Bordons, M. (1999). Evaluación de la actividad científica a través de indicadores bibliométricos. *Revista española de cardiología*, *52*(10), 790-800. https://doi.org/10.1016/S0300-8932(99)75008-6

Camí, J. (1997). Impactolatría: diagnóstico y tratamiento. *Medicina clínica*, *109*(13), 515-524. https://www.jcami.eu/documents/Impactolatria.PDF

De la Torre, E.M.; Perez-Esparrells, C.; Casani, F. (2018). The policy approach for the third mission of universities: the Spanish case (1983 – 2018). *Regional and Sectoral Economic Studies*, *18*(1), 13-30. https://www.usc.gal/economet/reviews/eers1812.pdf

Delgado López-Cózar; Martín-Martín, A. (2022). *Detectando patrones anómalos de publicación científica en España: Más sobre el impacto del sistema de evaluación científica*. https://www.researchgate.net/publication/363535388_Detectando_patrones_anomalos_de_publicacion_cientifica_en_Espana_Mas_sobre_el_impacto_del_sistema_de_evaluacion_cientifica

Delgado-López-Cózar, E.; Ràfols, I.; Abadal, E. (2021). A call for a radical change in research evaluation in Spain. *Profesional de la información*, *30*(3). https://doi.org/10.3145/epi.2021.may.09

DORA. American Society for Cell Biology (2012). San Francisco declaration on research assessment (DORA). https://sfdora.org/

Engels, T. C.; Kulczycki, E. (Eds.). (2022). *Handbook on Research Assessment in the Social Sciences*. Edward Elgar Publishing. https://doi.org/10.4337/9781800372559

Engels, T. C.; Ossenblok, T. L.; Spruyt, E. H. (2012). Changing publication patterns in the social sciences and humanities, 2000–2009. *Scientometrics*, *93*(2), 373-390. https://doi.org/10.1007/s11192-012-0680-2

European Commission, Science Europe y European University Association et al. (2022). *Coalition for Advancing Research Assessment* (COARA). Available at: https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/commission-signs-agreement-reforming-research-assessment-and-endorses-san-francisco-declaration-2022-11-08_en

Fecher, B.; Friesike, S. (2014). Open science: one term, five schools of thought. In Bartling, S., Friesike, S. (eds). *Opening science* (pp. 17-47). Springer, Cham. https://doi.org/10.1007/978-3-319-00026-8_2

Gomez-Sancho, J.M. y Perez-Esparrells, C. (2012). International Higher Education rankings at a glance: how to valorize the research in Social Sciences and Cultural Studies. In Asunción López-Varela (Ed.). *Social Sciences and Humanities. Aplications and Theories* (pp. 355-374). InTech.

González de Dios, J.; Moya, M.; Mateos Hernández, M.A. (1997). Indicadores bibliométricos: Características y limitaciones en el análisis de la actividad científica. *Anales Españoles de Pediatría*, *47*(3), 235-244.

Graeber, D. (2018). *Bullshit Jobs*. New York: Simon & Schuster.

Hicks, D.; Wouters, P., Waltman, L.; De Rijcke, S.; Rafols, I. (2015). Bibliometrics: the Leiden Manifesto for research metrics. *Nature*, *520*(7548), 429-431. https://doi.org/10.1038/520429a

Jiménez-Contreras, E.; de Moya Anegón, F.; López-Cózar, E. D. (2003). The evolution of research activity in Spain: The impact of the National Commission for the Evaluation of Research Activity (CNEAI). *Research policy*, *32*(1), 123-142. https://doi.org/10.1016/S0048-7333(02)00008-2

Jiménez-Contreras, E.; Delgado López-Cózar, E.; Ruiz-Pérez, R.; Fernández, V. M. (2002). Impact-factor rewards affect Spanish research. *Nature*, *417*(6892), 898-898. https://doi.org/10.1038/417898b

Larivière, V.; Ni, C., Gingras, Y.; Cronin, B.; Sugimoto, C. R. (2013). Bibliometrics: Global gender disparities in science. *Nature*, *504*(7479), 211-213. https://doi.org/10.1038/504211a

Ley 15/2014, de 16 de septiembre, de racionalización del Sector Público y otras medidas de reforma administrativa. (BOE núm.226, de 17 de septiembre de 2014). https://www.boe.es/eli/es/l/2014/09/16/15

Ley 17/2022, de 5 de septiembre, por la que se modifica la Ley 14/2011, de 1 de junio, de la Ciencia, la Tecnología y la Innovación. (BOE núm.214, de 6 de septiembre de 2022). https://www.boe.es/eli/es/l/2022/09/05/17

Ley Orgánica 11/1983, de 25 de agosto, de Reforma Universitaria. (BOE núm.209, de 1 de septiembre de 1983). https://www.boe.es/eli/es/lo/1983/08/25/11

Ley Orgánica 4/2007, de 12 de abril, por la que se modifica la Ley Orgánica 6/2001, de 21 de diciembre, de Universidades. (BOE núm.89, de 13 de abril de 2007). https://www.boe.es/eli/es/lo/2007/04/12/4

Ley Orgánica 6/2001, de 21 de diciembre, de Universidades. (BOE núm.307, de 24 de diciembre de 2001). https://www.boe.es/eli/es/lo/2001/12/21/6/con

Leydesdorff, L.; Wouters, P.; Bornmann, L. (2016). Professional and citizen bibliometrics: complementarities and ambivalences in the development and use of indicators—a state-of-the-art report. *Scientometrics*, *109*(3), 2129-2150. https://doi.org/10.1007/s11192-016-2150-8

López López, W. (2019). El sistema colombiano de medición de revistas Publindex: Las paradojas de un sistema que devalúa el conocimiento producido localmente. *Unilibros de* Colombia, *26*, 13-15. https://unilibros.co/pub/media/unilibros/ediciones/26-2019/page_1.html

López Piñero J.M.; Terrada M.L. (1992). Los indicadores bibliométricos y la evaluación de la actividad médico-científica (I). Usos y abusos de la bibliometría. *Medicina Clínica*, *98*(2), pp. 64-68.

Maltrás Barba, B. (2003). *Los indicadores bibliométricos: fundamentos y aplicación al análisis de la ciencia*. Gijón: Trea.

Moed, H. F. (2006). *Citation analysis in research evaluation*. Springer Science & Business Media. https://doi.org/10.1007/1-4020-3714-7

Molas-Gallart, J. (2015). Research evaluation and the assessment of public value. *Arts and humanities in higher education*, *14*(1), 111-126. https://doi.org/10.1177/1474022214534381

Montesinos, P.; Carot, J. M.; Martinez, J. M.; Mora, F. (2008). Third mission ranking for world class universities: Beyond teaching and research. *Higher education in Europe*, *33*(2-3), 259-271. https://doi.org/10.1080/03797720802254072

Ochsner, M.; Hug, S. E.; Daniel, H. D. (2016). *Research assessment in the humanities: Towards criteria and procedures* (p. 247). Springer Nature. https://doi.org/10.1007/978-3-319-29016-4

Orden de 2 de diciembre de 1994 por la que se establece el procedimiento para la evaluación de la actividad investigadora en desarrollo del Real Decreto 1086/1989, de 28 de agosto, sobre retribuciones del profesorado universitario. (BOE núm.289, de 3 de diciembre de 1994). https://www.boe.es/eli/es/o/1994/12/02/(1)

Orden ECD/2713/2003, de 26 de septiembre, por la que se aprueba el Reglamento de Funcionamiento Interno de la Comisión Nacional Evaluadora de la Actividad Investigadora. (BOE núm.237, de 3 de octubre de 2003). https://www.boe.es/eli/es/o/2003/09/26/ecd2713

Orduña-Malea, E. (2012). *Propuesta de un modelo de análisis redinformétrico multinivel para el estudio sistémico de las universidades españolas (2010)* [Doctoral dissertation]. Valencia: Universitat Politècnica de València.

Ortega, J. L. (2021). El movimiento Open Citations y sus implicaciones en la transformación de la evaluación científica. *Arbor*, *197*(799), a592. https://doi.org/10.3989/arbor.2021.799007

Osuna, C.; Cruz-Castro, L.; Sanz-Menéndez, L. (2011). Overturning some assumptions about the effects of evaluation systems on publication performance. *Scientometrics 86*, 575–592. https://doi.org/10.1007/s11192-010-0312-7

Oviedo-García, M. A.; Casillas Bueno, J. C.; González Rodríguez, M. R.. (2021). *Análisis bibliométrico e impacto de las editoriales open-access en España*. Madrid: Aneca. http://www.aneca.es/content/download/16664/202231/file/210930_Openaccess.pdf

Overlaet, B. (2022). A Pathway Towards Multidimensional Academic Careers. A LERU Framework for the Assessment of Researchers. LERU Position Paper. Available at: https://www.leru.org/files/Publications/LERU_PositionPaper_Framework-for-the-Assessment-of-Researchers.pdf

Perez-Esparrells, C.; Bautista-Puig, N., & Orduña-Malea, E. (2022). *La evaluación pública de la investigación científica en el contexto internacional: posibilidades y límites*. Canarias: Canarias: Agencia Canaria de Calidad Universitaria y Evaluación Educativa (ACCUEE).

Real Decreto 1086/1989, de 28 de agosto, sobre retribuciones del profesorado universitario. (BOE núm.216, de 9 de septiembre de 1989). https://www.boe.es/eli/es/rd/1989/08/28/1086

Real Decreto Legislativo 5/2015, de 30 de octubre, por el que se aprueba el texto refundido de la Ley del Estatuto Básico del Empleado Público. (BOE núm.261, de 31 de octubre de 2015). https://www.boe.es/eli/es/rdlg/2015/10/30/5/con

Reale, E.; Avramov, D.; Canhial, K.; Donovan, C.; Flecha, R.; Holm, P.; Larkin, C.; Lepori, B.; Mosoni-Fried, J.; Oliver, E.; Primeri, E.; Puigvert, L.; Scharnhorst, A.; Schubert, A.; Soler, M.; Soòs, S.; Sordé, T.; Travis, C.; Van Horik, R. (2018). A review of literature on evaluating the scientific, social and political impact of social sciences and humanities research. *Research Evaluation*, *27*(4), 298-308. https://doi.org/10.1093/reseval/rvx025

Rey, J.; Martín, M.J.; Plaza, L.; Ibáñez, J. J., Méndez, I. (1998). Changes on publishing behavior in response to research policy guidelines. The case of the Spanish Research Council in the field of Agronomy. *Scientometrics*, *41*(1-2), 101-111. https://doi.org/10.1007/BF02457971

Robinson-Garcia, N.; Sugimoto, C. R.; Murray, D., Yegros-Yegros, A.; Larivière, V.; Costas, R. (2019). The many faces of mobility: Using bibliometric data to measure the movement of scientists. *Journal of Informetrics*, *13*(1), 50-63. https://doi.org/10.1016/j.joi.2018.11.002

Sancho, R. (1990). Indicadores bibliométricos utilizados en la evaluación de la ciencia y la tecnología. Revisión bibliográfica. *Revista española de documentación científica 13*(3-4), 842-865. https://doi.org/10.3989/redc.1990.v13.i3.842

Shen, H. W.; Barabási, A. L. (2014). Collective credit allocation in science. *Proceedings of the National Academy of Sciences*, *111*(34), 12325-12330. https://doi.org/10.1073/pnas.1401992111

Thelwall, M.; Delgado, M. M. (2015). Arts and humanities research evaluation: no metrics please, just data. *Journal of Documentation*, *71*(4), 817-833. https://doi.org/10.1108/JD-02-2015-0028

Wagner, C. S.; Roessner, J. D.; Bobb, K., Klein, J. T.; Boyack, K. W.; Keyton, J.; Rafols, I.; Börner, K. (2011). Approaches to understanding and measuring interdisciplinary scientific research (IDR): A review of the literature. *Journal of informetrics*, *5*(1), 14-26. https://doi.org/10.1016/j.joi.2010.06.004

Woolston, C. (2021). Impact factor abandoned by Dutch university in hiring and promotion decisions. *Career News*. https://www.nature.com/articles/d41586-021-01759-5

YERUN (2021). *Yerun Position Paper on Research Assessment*. https://yerun.eu/wp-content/uploads/2021/11/YERUN-Position-Paper_Research-assessment.pdf

Zhang, L.; Sivertsen, G. (2020). The new research assessment reform in China and its implementation. *Scholarly Assessment Reports*, *2*(1). https://www.scholarlyassessmentreports.org/articles/10.29024/sar.15/

Annex I. Good practice in academic staff assessment in LERU Universities

The report *A Pathway towards Multidimensional Academic Careers. A LERU Framework for the Assessment of Researchers* (Overlaet, 2022) develops a framework for the assessment of researchers through three different perspectives: multidimensional, developmental and contextual. A selection of good practices from LERU member universities is given below.

Assessment from a multidimensional perspective (emphasis on impact)		
Utrecht University	**TRIPLE Model**	New assessment model based on a new vision of recognition and reward that combines the three domains in which the university generates outcomes (research, education and professional performance) with the three dimensions that reflect how the university wants to work (team spirit, leadership and impact).
Assessment from a multidimensional perspective (emphasis on narrative CV)		
University of Genoa	New **narrative CV** format	Candidates for the Faculty of Medicine can provide details about the different aspects of their career in the narrative CV template.
KU Leuven	**Biosketch model**	Candidates for academic staff positions are asked to reflect on their past performance and on their ideas and plans for the future. The biosketch model continues a tradition of asking candidates to list the five most important achievements of their career and to explain the reasons for their choice. Biosketch allows for the inclusion of contextual information.
University of Cambridge	**Résumé** for Researchers The Royal Society	Tool for providing a personal statement, in structured and granular form, of the candidate's varied contributions in a consistent way and across a wide range of circumstances, reflecting on their overarching goals and motivation for the activities in which they have been involved. https://royalsociety.org/topics-policy/projects/research-culture/tools-for-support/resume-for-researchers/
University of Freiburg	Self-evaluation report for tenure-track professorships	Self-evaluation in the form of a personal statement and accompanying documentation. In the statement the tenure-track professor has the opportunity to present and assess his/her priorities and choices, not only focusing on his/her successes but also on problems and how these should be tackled.

Assessment from a developmental perspective		
University of Zurich	Leadership interviews	Structured leadership interviews during professorial appointments These interviews are developed, individually tailored, conducted and analysed by psychology researchers from the university, while the candidates' answers during the interviews are rated by members of the recruitment panels.
Assessment from a contextual perspective		
KU Leuven	Gender and Diversity Guardian	The "gender guardian" is an appointed, full member of the committee who has volunteered to take on the role. These gender vanguards are trained to recognise and counteract different forms of bias. The title of this role has recently changed to include the concept of diversity, as its impact goes beyond gender issues.
University of Geneva	Equality delegates	Observers of equality issues but not part of the decision-making process, which gives them greater independence in carrying out their role.
Lund University	Gender observers	Trained observers on recruitment and promotion panels that give an external opinion or feedback in deliberations and help prevent bias in gender-related judgements. They are members of the evaluation panels.
Assessment of candidates on the basis of new principles, criteria and metrics		
Leiden University	Academia in Motion	Initiative to address the imbalance in duties; eliminate simplistic criteria; give more recognition to team performance; value diversity and take into account differences between disciplines and institutes. https://www.universiteitleiden.nl/en/news/2021/01/academia-in-motion-a-different-form-of-recognition-and-reward
University College London	Principles for the responsible use of bibliometrics in UCL	Report issued following consultation with departments and researchers on the responsible use of bibliometric indicators aimed at avoiding the inappropriate and misleading use of metrics. https://www.ucl.ac.uk/library/open-science-research-support/bibliometrics/ucl-bibliometrics-policy
University of Zurich	The concept of "academic age"	The concept of "academic age" as practised in some faculties at the University of Zurich means that the candidate's information is put into context according to his or her academic age, thus avoiding the distorting effects of focusing on volume as a criterion. For example, a candidate with 40 publications is not necessarily better than a candidate with 30 publications, as research time (since PhD) will also be assessed qualitatively.

		https://www.mnf.uzh.ch/en/mnf-gleichstellung/counteractingBias.html

Source: Prepared by the authors from *A Pathway towards Multidimensional Academic Careers. A LERU Framework for the Assessment of Researchers* (Overlaet, 2022).

About us

Enrique Orduña-Malea
https://orcid.org/0000-0002-1989-8477

My interest in the processes of creation and communication led me to take my first steps in academia with a vocational qualification in Image and Sound (Filmic Image). Having a keen interest in the technical aspects underlying communication, I then decided to pursue my university studies, and obtained a degree in Telecommunications Engineering (Sound and Image) from the Polytechnic University of Valencia (UPV) in 2003. My final degree project focused on the transmission of ultrasound in underwater environments and marked my initiation into the world of scientific research, both in empirical and methodological tasks and in the process of searching for and retrieving scientific information.

The emergence of the Web, search engines and repositories introduced me to a field of scientific documentation that was undergoing profound changes driven by information and communication technologies. This inspired me to pursue a Bachelor's Degree in Documentation (2007) and an Official Master's Degree in Multichannel Content Management (2008) at the UPV. The findings that I presented in my master's thesis were my first publications in scientific journals, where I first made use of the Web as an analytical space, the first of the three main pillars of my career.

After gaining professional experience as an engineer and as an information professional, I obtained my first research contract at the UPV (2008) while completing my master's degree. In 2009 I obtained a predoctoral contract (FPI – Generalitat Valenciana) to develop my doctoral dissertation on university rankings, a research project in which I introduced the second fundamental pillar in my career: the university as an object of study.

During my predoctoral studies I completed research placements at the *Cybermetrics Lab* (CSIC, Madrid) under the supervision of Isidro Aguillo (head of *Webometrics Ranking*) and at Long Island University (New York), under the supervision of John Regazzi (former CEO of Elsevier and one of the people behind *Scopus*).

In parallel, I collaborate in international consultancy activities related to the academic visibility of universities, which I combine with my university teaching duties (undergraduate and postgraduate) and the delivery of courses, workshops, seminars and conferences on cybermetrics, bibliometrics and research evaluation (to date in more than 30 universities and 10 different countries). I also participate on a temporary basis as an expert in standardisation activities with AENOR (CT50) and act as webmaster (and occasionally coordinator) of the *ThinkEPI Yearbook*, a learning space that brings me into contact with a large part of the Spanish community of practitioners and researchers in my field.

After completing my PhD in 2012 (cum laude and extraordinary award at the UPV) I secured a Vali+d postdoctoral contract (Generalitat Valenciana) in 2013, focused on the application of cybermetric techniques to the business sector, funded by a private technology company, the UPV and the University of Granada (UGR). During this period I completed a research placement with the EC3 Group (Evaluation of Science and Scientific Communication) under the supervision of Emilio Delgado, professor of research methodology and recognised international expert in science evaluation and creator of *IN-RECS*, among other scientific evaluation products. During this stage I embarked on and developed the third basic pillar of my research profile: meta-research or the study of science.

From 2012 to 2016 I participated with the EC3 Group in the development of web-based scientific information tools for authors (*H-Index Scholar*; *Co-author index*), publishers (*Publishers Scholar*

Metrics; *Book Publishers Library Metrics*), journals (*Journal Scholar Metrics*) and disciplines (*Scholar Mirrors*; *La Biblioteconomía y Documentación Españolas*).

From 2015 to 2017 I joined the UPV as a postdoctoral researcher, with placements at the University of Wolverhampton (UK) with Mike Thelwall (*Clarivate Analytics* Highy-Cited Researcher), the National University of La Plata (Argentina) and Pompeu Fabra University (Digidoc Group). Upon completion of my postdoctoral contract, I joined the UGR as a *Juan de la Cierva* researcher, starting in June 2017.

In November 2017 I became assistant professor in the Department of Audiovisual, Documentation and History of Art at UPV. I held the position for three years, during which time I completed a placement at the Scholcom Lab at the University of Ottawa (Canada) with Stefanie Haustein, a leading author in the field of scholarly communication. I was appointed associate professor in December 2020, a position I currently hold.

In the field of research, I have worked on several nationally funded research projects and am currently principal investigator in a regional project to study the processes of web-based university information searches. I have published more than 100 contributions, including nearly 70 articles in journals indexed in *Journal Citation Reports* (JCR), 3 monographs and numerous book chapters, articles in conference proceedings, reports and working papers. On the strength of these publications I have been interviewed in *Nature* (http://blogs.nature.com/news/2014/05/the-decline-and-fall-of-microsoft-academic-search.html) and *Science* (http://news.sciencemag.org/scientific-community/2014/09/just-how-big-google-scholar-ummm). My bibliometric profile includes 76 publications in *Scopus*, with 1,680 citations and an *h*-index of 18 (as of October 2022). A number of my publications have won awards (University of Granada Award for the best article in Social Sciences; Award for Publication Excellence in Social Sciences from the Polytechnic University of Valencia; SCIMAGO-EPI Award for the best article in Library and Information Science).

In the field of management, after serving as Deputy Director of Research, I currently hold the position of Academic Secretary of the Department of Audiovisual Communication, Documentation and Art History (DCADHA).

In the field of teaching, I have supervised more than 50 final degree projects, as well as a large number of student internships in companies. I have taught more than 1200 hours in university degrees and Doctoral Schools, teaching subjects related to web technology and research methodology, receiving a teaching rating of Excellent at UPV during my 5 years as a member of the academic staff. In July 2022 I received the Teaching Excellence Award from the UPV Social Council for my teaching activity.

In the field of social transfer, I have developed and participated in ad-hoc consultancy activities at different universities and national and international research institutions. In 2021, I served on a Technical Committee for ANECA (the National Agency for Quality Assessment and Accreditation) to discuss new trends in research assessment.

My current lines of work focus on the understanding of metrics and indicators in different analytical frameworks and spaces of interaction, placing user behaviour, both offline and online, at the heart of the analysis.

Núria Bautista Puig
https://orcid.org/0000-0003-2404-0683

My academic qualifications include a degree in geography (University of Lleida) and a master's degree in geographic information systems (GIS) and remote sensing at the University of Zaragoza. After gaining professional experience as a geographer at the National Geographic Institute (IGN) with a training grant for graduates and motivated by my interests in the world of research, I was awarded an FPI contract in 2015 by the Ministry of Economy and Competitiveness to develop my dissertation at UC3M's LEMI research group on sustainability research and levels of engagement in universities. During this period, I specialised in the fields of bibliometrics/scientometrics, sustainability science, higher education institutions for sustainable development and the Sustainable Development Goals (SDGs).

After obtaining my PhD in 2020 (with international distinction, summa cum laude and extraordinary prize), I obtained a postdoctoral contract at the University of Gävle (Sweden), with a focus on organisational sustainability analysis, and two research assistant contracts (in the European project SciShops.eu and YUFERING, involved in +8 deliverables). In July 2022 I became an assistant professor in the Department of Library Science and Documentation at the Complutense University of Madrid (UCM), and therefore had to withdraw from the *Juan de la Cierva* training contract at the UPV with Dr Enrique Orduña-Malea.

Prompted by my research during my dissertation, I became involved (as lead scientist) in the development of the OSDG tool (http://osdg.ai/) for classifying publications and text on the SDGs, forging partnerships with the United Nations (SDG AI Lab, UNDP) and PPMI, a Lithuanian research and policy analysis centre. Currently, due to my interest in citizen science and community-based participatory research, I am actively involved in the OSDG Community Platform, a citizen science initiative to raise awareness and help interpret the SDGs, involving +2,000 volunteers worldwide (without any project funding behind it). Also, while working on my dissertation, I was Campus Coordinator of the global sustainability network SDSN Youth (Sustainable Development Solutions Network).

In the course of my career, I have won seven awards: two awards for my PhD dissertation (the international AASHE Campus Sustainability Research Award and the Extraordinary PhD Dissertation Award at UC3M); three mobility-related awards (1st YERUN Research Mobility Award (2018) and Erasmus+ Training Framework Award (2018) and Early Career Grant to attend the 14th RDA Plenary (2019)); and recently, an award as team member in the UC3M Social Council Excellence Awards (2022) and for the best paper presented at the ENANCIB 2021 Conference.

During this period of study, I have completed five research placements at prestigious institutions in the fields of bibliometrics (CWTS, Leiden University; University of Antwerp), sustainability (University of Gävle; University of Aveiro), and citizen participation approaches (Leiden Observatory, Leiden University), enabling me to develop an interdisciplinary approach at the intersection between bibliometrics, sustainability and participatory activities (citizen science). In the process, I have also had the privilege of publishing alongside leading researchers in the field such as Henk F. Moed, Rodrigo Costas and Enrique Orduña-Malea (bibliometrics), Rodrigo Lozano, Javier Benayas and Ulisses Azeiteiro (sustainability).

With regard to research, I have published +35 documents: 23 articles (2 in press), 2 preprints, 3 book chapters, 7 technical reports (e.g. IUNE Observatory reports) and a wide range of conference proceedings (+30 lectures and 11 posters) at international conferences in the field (e.g. ITS, ISSI). Eleven of the articles (and preprints) are international collaborations and I am listed as first author on 12 articles. In terms of visibility, 12 articles were published in JCR-indexed journals (seven in Q1 and five in Q2). In terms of impact, according to Google Scholar, I have a total of 217 citations

with an *h*-index of 7. Also, in terms of participation in R&D projects, I have been involved in two projects funded by the European Commission, two national projects and one regional project.

In terms of transfer, I have provided advice and consultancy services in relation to the scientific output of universities (e.g. IUNE Observatory) at the interdisciplinary INAECU institute (UAM-UC3M), where I am a member. I have also contributed to the conceptualisation and organisation of many participatory events (e.g. co-creation events and knowledge cafés) and I have been invited to speak at many outreach events (Congress on Social Communication of Science). Finally, as regards teaching, I have taught subjects in information science, geography and sustainability, I have sat on the PhD academic committee and have tutored final degree projects.

Carmen Perez-Esparrells

https://orcid.org/0000-0003-4466-9825

After graduating with a degree in Economics and Business Studies (specialising in Monetary Economics and Public Sector) from the Complutense University of Madrid (UCM), I completed my PhD in Economics and Business Studies at the same university. As I was interested in educational issues, I then took a Master's Degree in Economics of Education and Labour Economics at University Carlos III of Madrid (UC3M), and was a graduate of one of only three iterations of this two-year Master's degree. Motivated by my interest in the application of statistical and econometric techniques to public economics and economics of education, I concluded my education at the Polytechnic University of Madrid (UPM-CSIC) with a Specialist Degree in Quantitative Methods and Statistical Techniques.

My teaching career (and university teaching duties) began at the Complutense University of Madrid (UCM), in the Department of Applied Economics VI (Public Finance), and has focused from the outset on research into public expenditure on higher education and university funding, the first pillar of my research career. The findings presented in my master's thesis, supervised by Mª Jesús San Segundo (Minister of Education in the period 2004-2006) at UC3M, were my first publications in scientific journals and working papers, predominantly dealing with higher education in the international context. Similarly, the redistributive effects of university public spending and their funding are the central theme of my doctoral dissertation supervised by Emilio Albi Ibáñez, Full Professor of Public Finance at UCM.

Once I finished my PhD and my teaching and research period at the UCM, I taught microeconomics as Assistant Professor at the University of Extremadura (UEX), but, in view of my specialisation, I was offered the opportunity to teach the Economics of Education module in the Economics and Business PhD programme at the Faculty of Economics and Business Studies of the UEX.

Two years later I obtained a full-time academic staff position at the Autonomous University of Madrid (UAM) in 1998, taking charge of a wide range of degree courses in public economics, and I was appointed associate professor in March 2006, a position I currently hold. Consequently, in the doctoral programme I was entrusted with the subject of social public expenditure together with José Barea Tejeiro, Full Professor of Public Finance, where I focused on education and later on the Master's Degree in Economic Development and Evaluation of Public Policies, and supervised four doctoral dissertations on subjects related to education and the labour market. Two of these dissertations received the Extraordinary Award in Economics from the Faculty of Economics and Business Studies and led to multiple publications in scientific journals on many different aspects in the field of non-university education (school failure, scholarships and study grants in compulsory education, teacher salaries and incentives, inter alia) and in the field of university education (knowledge transfer and third mission, tuition fees and scholarships in universities, academic inbreeding, graduate skills in the labour market, etc.).

The arrival of university rankings on the higher education scene and its booming interest has brought about a paradigm shift worldwide in this 21st century, and I have also shifted my research and social transfer focus to this field. This interest is reflected in the scientific publications on issues related to university rankings, the second pillar of my research career. Furthermore, I combine with the delivery of courses, workshops, seminars and conferences on university fundraising,philantrophy and sustainability for the Spanish community of practitioners, specialists and researchers in my field. At the same time, my research continues into the institutional environments of education systems, the impact of public education policies and access to education. As a result, I am currently co-director of the Economics of Education research group at the UAM together with the Full Professor Javier Salinas Jiménez.

More recently, and in connection with my joining the research group led by Professor Enrique Orduña-Malea (with the regional project to study web-based university information search processes – UNIVERSEO – funded by the Generalitat Valenciana) and my research placement at the UPV, my scientific curiosity has been drawn to issues related to bibliometrics, science and research evaluation, and science policy, the third pillar of my research career. Since its creation, I have been a member of INAECU (Interuniversity Institute for Advanced Research in Science and University Evaluation, affiliated to the UAM and UC3M) and have actively participated with its members in various national open calls for proposals. Likewise, in collaboration with Enrique Orduña-Malea and Núria Bautista-Puig, I have contributed to reports on science and research assessment for ACCUEE (Canarian Agency for University Quality Assessment and Accreditation in Education).

My three lines of research in higher education policy and management (university funding, university rankings and science evaluation) have resulted in substantial scientific work (as evidenced by the scientific publications in my different profiles and ORCID) supported, in turn, by intense social transfer activity with research and consultancy contracts for different public and private organisations related to education and universities, such as ministries of education, vocational training, science and innovation, regional ministries of education and universities, quality assurance agencies, public universities and social councils. In addition, I have participated in numerous groups of experts as an independent member at different times with different governments and institutions at European level such as the EUA (DEFINE-PROJECT, University Funding for Excellence, European University Association), at national level (with the former Ministry of Education, Culture and Sport and the current Ministry of Science and Innovation) and at regional level with the preparation of various reports: "Report oriented to the design of a funding model for the University of Extremadura" for the Regional Ministry of Economy, Commerce and Innovation of the Government of Extremadura and "Report on the modernization of the Madrid Higher Education Area" for the Regional Ministry of Education and Research of the Community of Madrid.

In turn, all these social transfer activities have helped me to learn about the higher education and science system from different perspectives, not only as a member of the teaching and research staff but also with my strong vocation for public service as a manager in different positions of responsibility in strategic decision-making at my current university. Specifically, I have held the positions of Vice-Rector for Innovation at the UAM and Vice-Dean for Internships at the Faculty of Economics and Business.

Among my recent transfer tasks is my participation as editor and quality assurance manager of the blog *Universidad Sí* (with more than 2,000,000 monthly visits) and as a member of the expert group *Studia XXI* of the European Foundation Society and Education. This holistic vision allows my knowledge management, transfer and exchange to feed back into my work as a teacher and researcher at the intersection of economics, public management and economics of education.