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PROF-XXI: Teaching and Learning Centers to Support the 21st Century Professor

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Abstract— PROF-XXI is a European-funded project whose aim is the creation of Teaching and Learning Centers (TLCs) for Latin American Higher Institutions in an effort to promote the development of competences for university professors and foster teaching innovation in onsite, but also in online and hybrid education. PROF-XXI includes a partnership of seven higher education institutions, three from European countries (Spain, France, and Portugal), and four from Latin American countries (two from Guatemala, and two from Colombia). This article presents the main results of the first part of the project, including the diagnosis of institutional practices, the state of the art of TLCs around the world, the framework on 21st century professors in Latin America, and the PROF-XXI framework.

Keywords—teaching and learning centers, teacher training, competences, educational innovation.

I. INTRODUCTION

In this rapidly evolving and increasingly digitized society, especially after covid-19, all stakeholders in Higher Education Institutions must learn to adapt to the new circumstances, which bring with them challenges that invite to rethink educational processes for the transformation of pedagogical practices. This means that both faculty and university governance must learn to teach in the digital world. Setting up units for professional development of faculty, hereinafter referred to as TLCs (Teaching and Learning Centers), is now more important than ever. This is the main objective of the European-funded Erasmus+ project called PROF-XXI in the context of the Latin American region [1].

PROF-XXI has its origins in the concern of Latin American universities to improve the quality of their teaching and learning processes [2][3]. This concern is increased by the rapid growth of tertiary education institutions in the Region, and the lack of trained professors with the proper competences to carry out effective innovational processes in the several educational modes that currently exist (onsite, online, and hybrid education) [4]. This problem is especially relevant in Guatemala and Colombia, where many private institutions appeared in the last years, with very high tuition fees, but without this being a differentiating factor in the quality of the education received by students [5]. PROF-XXI has a strong focus in Guatemala and Colombia and counts with public and private institutions of different sizes (small, medium, and large higher education institutions) in its consortium.

In this context the PROF-XXI project emerges, with the main objective of building capacities for the development of TLCs for Latin American Higher Education Institutions (HEIs) in the 21st century, taking into account the current context of the Region, and the particular context of four Latin American HEIs that will serve as reference models (two in Guatemala and two in Colombia). This overall objective is divided in five specific objectives: 1) development of guidelines of TLCs focused on the development of teaching competences on pedagogy, technology, and strategic management; 2) installation of four TLCs as reference models following these guidelines; 3) development of management and innovation capacities in the staff working on these TLCs; 4) design and development of teacher training plans in the four TLCs with a focus on active and hybrid methodologies, monitoring and evaluation strategies through learning analytics, and research on the teaching practice itself for continuous improvement in line with the SoTL (Scholarship of Teaching and Learning) movement [6]; and 5) promotion of a sustainable cooperation between Latin American and European HEIs, through a cooperation network on TLCs.

The objective of this article is to present the first results of the PROF-XXI project after the completion of the first half of the project (first 18 months) and serve as a space for discussion at a round table at the 2021 WEEF/GEDC conference for the continuation of the second half project. Specifically, this article addresses in Section II the results of the work package that lays the groundwork for the project, including the diagnosis of institutional practices in the four Latin American partner universities [7], the state of the art of TLCs around the word [8] (including the directory of TLCs available on the project website [9]), and the framework on 21st century professors in Latin America [10]. This groundwork serves as the basis for the creation of the guidelines for the implementation, management and evaluation of TLCs and the PROF-XXI framework [11], which are presented in Section III. The relationship between SoTL and PROF-XXI is discussed in Section IV, indicating how this project can serve as a reference for the expansion of this movement in the Latin American region. The article ends in section V by reflecting on the round table in which this project is presented, and which is intended to serve as a reference to guide the following actions of PROF-XXI.

II. GROUNDWORK

A. Diagnosis of Institutional Practices

In recent years, Higher Education Institutions (HEIs) in Latin America have been generating a culture of evaluation of the quality of academic programs, which has allowed identifying opportunities for the continuous improvement and rethinking of educational practices. In this sense, one key reference point for the development of PROF-XXI was the elaboration of a diagnosis of institutional practices about teaching and learning in the participating universities [7].

A self-assessment instrument was designed based on the guide “Fostering Quality Teaching in Higher Education: Policies and Practices” [3] of the OECD Institutional Management of Higher Education Programme (IMHE). The guide includes 7 policy levers: (PL1) Raising awareness of quality teaching; (PL2) Developing excellent faculty; (PL3) Engaging students; (PL4) Creating an organization for change and teaching leadership; (PL5) Aligning institutional policies to foster quality teaching; (PL6) Emphasizing innovation as a driver of change; and (PL7) Evaluating impacts. The instrument was translated into Spanish and adapted to the Latin American context by experts from each of the four participating universities: Universidad de San Carlos de Guatemala (USAC) and Universidad Galileo (UG) in Guatemala, and Universidad del Cauca (Unicauca) and Universidad de San Buenaventura Cali (USBC) in Colombia.

To carry out the survey, a web application was developed with a design adaptable to different screen sizes using AngularJS as the client application and a REST API with an Apache/PHP server and MySQL database. The web application incorporated: (1) general instructions about the PROF-XXI project; (2) an electronic consent that included the voluntary acceptance to participate in the survey; (3) a contact section with the e-mail addresses of the participating institutions; and (4) the section of questions by policy lever.

A total of 130 completed surveys were obtained, where 35% corresponded to responses from administrative managers and 65% to professors. The analysis of the information was carried out in two phases: 1) analysis of the Likert scale questions, and 2) analysis of the open-ended questions. In the first phase, the Likert scale was grouped into three colors: red (very poor - poor); yellow (fair) and green (good - very good). In addition, the following metrics were established: (a) current situation average; (b) importance average; (c) selection sum; (d) don't know count; and (e) not relevant count.

Figure 1 shows the distribution of results by policy and university. Regarding PL1, Latin American universities have developed practices related to the quality of teaching and the strengthening of links between teaching and research at a regular and good level. Regarding PL2, which seeks excellent teacher training, there is a niche of opportunity for improvement framed in (a) integrating teaching to the quality culture of the institution, (b) identifying and articulating the pedagogical competencies necessary for quality teaching, (c) updating pedagogical skills through professional development, and (d) supporting inspired teaching. Results from PL3 evidence that the practices and policies developed in Latin American universities need to empower students in fostering quality teaching and develop reliable instruments and techniques to collect and use student feedback and use it to improve educational practices. PL4 was assessed on average between poor and fair, and thus shows the need to

strengthen practices that promote leadership in quality teaching and implement specific units that contribute to building universities for change. PL5, which is framed in the alignment of institutional policies for quality teaching, has also been valued on average between poor and fair; this means that it is necessary to strengthen the coherence between policies, human resources, technology, learning environments, students, and internalization. PL6 and PL7, which are related to the incorporation of educational innovation practices and impact evaluation, also show opportunities for improvement in their integration in HEIs.

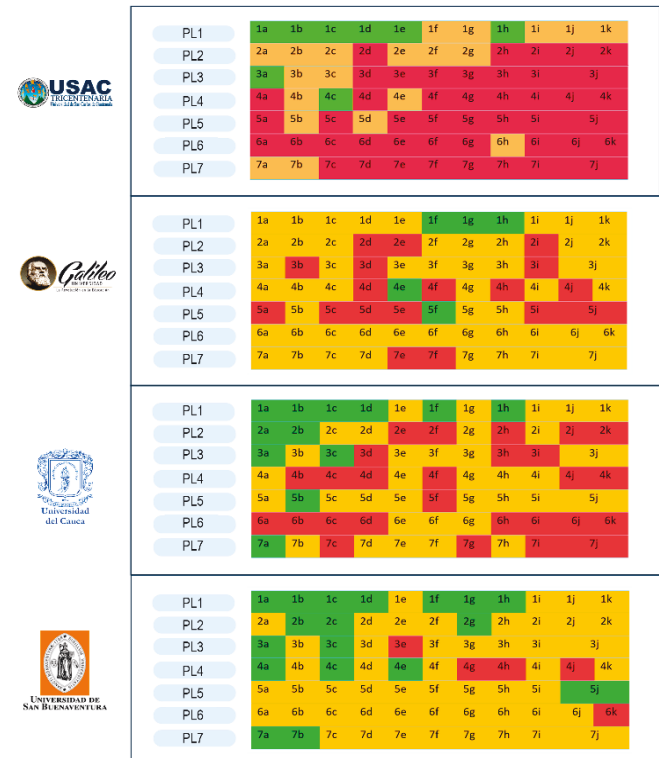


Figure 1. Distribution of results by policy and university

For the analysis of the open-ended questions, categories were created based on a process of estimation according to the patterns presented in the responses that served to group, count and analyze the incidence, highlighting that among the institutional practices and policies that should be strengthened, the following stand out:

1. Academic updating of teachers
2. Institutional educational leadership
3. Student empowerment
4. Management of technologies for learning
5. Innovation and transformation of educational processes
6. Development of policies for educational quality
7. Evaluation of the quality of education
8. Implementation of new teaching methodologies
9. Development of inter-institutional projects
10. Strengthening educational research

As a result of the diagnostic, the panorama shows that a high percentage of the policies and practices have not been developed as stated in the self-evaluation instrument. Moreover, the responses of the participants show that there is a niche of opportunity in the universities to carry out an improvement plan focused on the quality of teaching and the implementation of innovative training practices in Latin American universities.

B. State of the Art of Teaching and Learning Centers

Teaching and Learning Centers (TLCs) arise from the need of HEIs to have an independent academic unit to provide different services to teachers and students. TLCs aim to improve the overall teaching and learning processes and become a support to all the university faculties, independently of the area of knowledge and courses taught. Teachers' professional development is also one of the main tasks tackled by TLCs, helping teachers develop the necessary competences to improve the way they teach and implement teaching innovation processes. In this way, TLCs try to address one of the main problems of current educational systems, which is the focus on the domain (subject) knowledge of teacher, not paying enough attention to the teaching-learning process, the pedagogical content, the methodology, or the various technological tools and strategies that are vital to increase the quality of students' learning experience. Many teachers have not been trained in teaching methods that respond to the needs of education today, presenting difficulties in transmitting content and concepts to students. It is for this reason that knowledge must move at the speed of change, and it is here where the TLC provides the pedagogical and technological elements to teach teachers to move in this world from the transformation of educational practices [8].

TLCs may have different kinds of names, such as Learning Resource Center (LRC), Learning Academic Center (LAC), Centers for teaching excellence, Learning and Success Center (LSC), Center for Learning and Student Success (CLASS), Center for Academic Support and Enrichment (CASE), among many other names; a common abbreviation is TLC, which is translated to Spanish as CEAs (Centros de Enseñanza y Aprendizaje) [12]. The variety of services offered by the TLCs is also quite broad and may include the promotion of provision of support resources and initiatives, offering mentoring, orientation, and peer support to teachers and students, or the creation of learning communities, among others [8]. TLCs may also facilitate meetings between groups of faculty and staff interested in learning more about pedagogical or technological issues, support faculty at all stages of their career, or bridge faculty innovation with curricular changes in the academic programs.

The analysis conducted as part of the state of the art of TLCs around the world showed that institutions from the United States, Europe, and Australia/New Zealand have much more experience in developing, implementing and incorporating this type of centers in their educational institutions. This contrasts with the case of Latin America which is far behind in the creation of TLCs [8][9] (see Table 1). The full list of TLCs is available in the PROF-XXI website [9]. This full list was compiled for the first time in June 2020. Nevertheless, as the creation of TLCs in HEIs is a very dynamic topic, institutions that create TLCs can share their contact information through a form available on the PROF-XXI website so that their TLC can be added to the directory.

Table 1. Number of TLCs per Region [9]

Region	Number of TLCs
North America (USA, Canada)	376
Europe	26
Asia and Middle East	15
Australia and New Zealand	42
Latin America	6
TOTAL	465

The results also reinforced the fact that this type of centers have evolved into a multifaceted professional operation. Table 2 presents the distribution of the types of services most commonly found in TLCs. These include 1) the creation of contents to support teachers and students (e.g., guides or tutorials in text/video formats, etc.), 2) the organization of training and dissemination activities (e.g., workshops, webinars, lectures, courses, conferences, etc.), and 3) other services related to e.g., certification of competences, research on teaching and learning, or career development for professors. Figure 2 presents the groups targeted by the actions of the TLCs according to the analysis carried out [8]. These target groups are either teachers (to a greater extent), students (to a lesser extent), or both.

Table 2. Types of services offered at TLCs [9].

Type of service	Examples	TLCs (%)
Contents	Guides, tutorials, texts, video tutorials, lecture recordings	27.66%
Activities	Workshops, webinars, lectures, online sessions, courses, conferences	36.07%
Others	Certifications, career development, research	36.28%

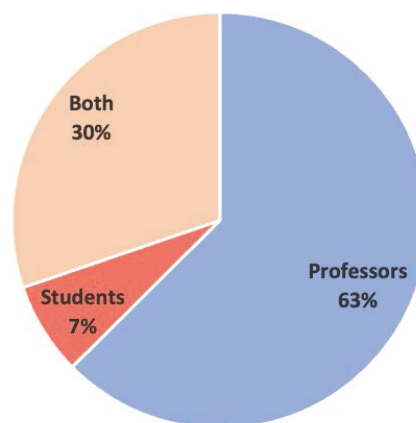


Figure 2. Target groups of TLCs [9].

For Latin America, which is in an incipient stage in terms of TLCs, it is necessary to define a framework that allows and guides the implementation of this kind of centers within the institutions in a successful and sustainable way, taking into consideration best practices and lessons learned from the implementation of TLCs around the world. A TLC may go through different stages before finally establishing itself in the institution. For example, in the first stage, the main priority could be education and promotion. Stage two could focus on the development of programs, initiatives and plans. The third stage should try to keep up the pace, while the last stage would focus on how to continue this cycle, innovate, and stay ahead to give a better service to students and teachers [13]. Taking all this into account, it is evident the need to have guidance and support from institutions that have already passed through all these phases, institutions that may be a referent and distinguish themselves for their best practices. This could help to define a standard approach for the creation of TLCs in the Latin American region that can be tailored to the specific HEIs, considering that they all share certain cultural similarities.

C. Framework “21st Century Professors in Latin America”

University teachers represent one of the strongest and most influential forces in ensuring equity, access, and quality of education. They are the key to sustainable global development [14]. The role of the university teacher is to seek and promote learning geared towards professional practice. This not only implies that the teacher has knowledge, knows how to transmit and teach it, but also knows how to create and promote autonomy and critical thinking in his or her students so that they can integrate and serve the community as professionals.

The university teacher of the 21st century in Latin America faces a series of challenges, such as the massification of students, the exponential growth of knowledge, the constant evolution of information and communication technologies (ICTs), the privatization of higher education, the lack of updating and flexibility of curricula, the difference in the quality of education offered in public and private universities, and the evaluation and accreditation processes, among others. These are challenges that affect teaching and the way university teachers approach the construction and transfer of knowledge in each of the disciplines, making university teaching a complex reality [15][16][17], since in addition to the advances and dynamics of disciplinary knowledge, university teachers must incorporate in their practices, educational reforms, standards and public policies that involve new areas in university teaching such as management, organization, research, curriculum, relationship with society, culture, etc. [14].

In this sense, the complexity of university teaching is approached from the transmission of knowledge, from the practice of teaching-learning processes, as a mediator of social changes and generator of development, as a promoter of culture and social insertion, and as a promoter of research. All this is based not only on the teacher’s knowledge but also, to a great extent, on his or her competencies [16]. As mentioned by Cáceres in 2018 [18], the competencies of the university teacher of the 21st century can be grouped in relation to different processes imposed by the roles played by the university teacher: teaching duties, teacher management duties and research duties. In addition to this, there are competencies in the use of ICTs required for all university teachers in the 21st century.

Competencies related to the Teaching Role

Competences of university teachers related to their teaching role must go beyond the limits of the classroom where they carry out their lectures. This includes competencies for the design and planning of teaching and learning activities, for monitoring and tutoring the student learning process, for the formative and summative assessment of students, for the improvement of teaching, as well as competencies to actively participate in the academic-organizational dynamics of the higher education institution, among others (University, Faculty, Area, Department, degrees, etc.) [19].

Competencies related to the Teaching Management Role

University teachers also play an important role in educational management and administration, contributing to the improvement of education in a global context. This role also requires specific competencies, such as the capacity and ability to work in teams, the management of academic platforms or academic information systems, high sense of

responsibility, ability to work autonomously, ability to make decisions, and critical capacity to interpret the policies of the institution, among others [18].

Competencies related to the Research Role

In addition to the competencies related to the teaching and teaching management duties, the university teacher must develop skills for research, to continue creating scientific knowledge and thus improve his/her field. The scientific knowledge created can also be applied to the courses taught by the teacher, especially in the case of postgraduate courses, and therefore benefit the students taking these courses. The research role requires competences related to the design, development and evaluation of research and innovation projects of relevance for teaching, for the higher education institution and/or for the scientific advancement of his/her area of knowledge, and also have skills for dissemination, communication, discussion, and exchange of scientific knowledge in the research community.

ICT Competencies of the 21st Century Professor

We found two references that adequately describe the ICT competencies of teachers [10]: 1) the ICT framework developed by UNESCO [20]; and the Digital Competence Framework for Educators (DigCompEdu) [21].

The UNESCO ICT Competency Framework for Teachers considers 18 competencies. These competencies are organized around six aspects of teachers’ professional practice: 1) understanding the role of ICT in education policy; 2) curriculum and assessment; 3) pedagogy; 4) application of digital competencies; 5) organization and administration; and 6) teachers’ professional learning. Each competence has three successive stages or levels of teachers’ development in terms of pedagogical use of ICT (acquisition, deepening and creation of knowledge).

The DigCompEdu proposes 22 essential competencies organized in 6 areas (see Figure 3). Area 1 is the broadest and is aimed at teachers’ professional environment, i.e., the use that teachers make of digital technology in professional interactions with their colleagues, students, parents, and stakeholders. Area 2 covers the competencies needed to use technologies effectively and responsibly and to create and share digital resources for learning. Area 3 is dedicated to managing and orchestrating the use of digital technology in teaching and learning. Area 4 frames competencies for using digital strategies to enhance assessment. Area 5 focuses on the potential of digital technologies in student-centered teaching and learning strategies. Area 6 contains the specific pedagogical competencies required to facilitate students’ digital competencies. Each competence has six levels of achievement (from A1 to C2).

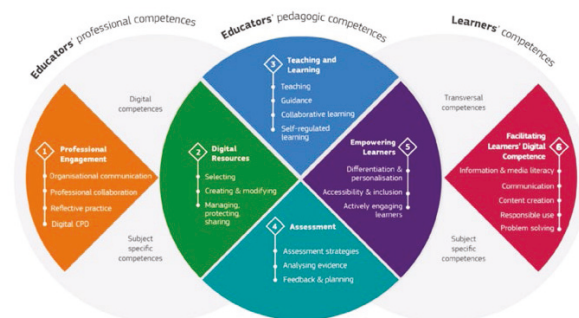


Figure 3. Synthesis of the DigCompEdu framework [21].

III. PROF-XXI FRAMEWORK

The PROF-XXI framework is created to guide HEIs in the design and implementation of TLCs. The PROF-XXI framework builds on the guides for the implementation of TLCs [11] and on two European frameworks: the European Framework for Digitally-Competent Educational Organisations (DigCompOrg) [22] and the European Framework for the Digital Competence of Educators (DigCompEdu) [21]. The PROF-XXI framework proposes a set of competences that institutions can take as a reference to develop the actions and strategies of their TLCs. These actions and strategies will have a direct impact on their teaching staff and students and will support the deep transformation of the institutional strategy. The Prof-XXI framework organizes these competences (50) into 5 levels and 5 dimensions that interrelate (see Figure 4)

5 Levels of Competences

The PROF-XXI framework organizes the competences into 5 levels from 1 (lowest) to 5 (highest).

- Level 1 – “Development”. This level defines the basic competences that any TLC should have to start its activities. Institutions at this level can identify innovative teaching practices and needs of their students and other stakeholders and systematize prior learning about their activity in digital education.
- Level 2 – “Innovation”. This level defines the competences that TLCs must have to be able to generate and promote educational innovation in their institution. Institutions at this level can install new educational experiences of reference, promoting the use of technologies, as well as generating opportunities for training and exchange of good practices among the different actors in the institution.
- Level 3 – “Value generation”. This level defines the competences that TLCs must have to be able to generate value in their institutions, generating changes and promoting transformations that affect their culture. Institutions at this level can disseminate new models of training and excellence to promote change, increase the educational quality of the institution, contribute to the cultural transformation of the institution, promote the installation of good practices in the use of technology, and generate evidence on new practices to support decision-making.
- Level 4 – “New Challenges and Opportunities”. This level defines the competences that TLCs should have to identify new institutional challenges related to innovation and teaching quality. Institutions at this level can identify and visualize new horizons on teaching practice and quality learning scenarios that enhance student learning, define indicators and metrics that allow for the evaluation of educational innovations, involve the institution stakeholders at various levels, and systematize the challenges from the information collected into concrete actions for the institutional strategy.
- Level 5 – “Public accountability of impacts for continuous improvement”. This level defines the competences that TLCs must have to be able to ensure the monitoring and transparency of the actions carried out by the TLC to assess their impact and make this impact visible through both internal and public reporting and research on these actions.

5 Dimensions of Competences

The PROF-XXI framework organizes the competences into 5 dimensions (A, B, C, D, and E) that refer to the institutional aspects that are affected by the competences related to the TLC:

- Dimension A – “Teacher support”. This dimension refers to those competences of the TLC that are related to supporting teaching processes. Actions related to these competences will have a direct effect on teachers at the institution.
- Dimension B – “Student support”. This dimension refers to the competences of the TLC that are related to student support. Actions related to these competences will have a direct effect on the students registered at the institution.
- Dimension C – “Leadership, Culture and Transformation”. This dimension refers to TLC competences that are related to leadership initiatives that promote a cultural transformation of the institution towards educational innovation. Actions related to these competences will have a direct effect on the internal processes of the institution, both in terms of its practices and policies.
- Dimension D – “Technology at the service of learning”. This dimension refers to the competences of the TLC that are related to technological educational initiatives, both in terms of practices and infrastructures (tools, services, applications, equipment, etc.). Actions related to these competences will have a direct effect on the development of the technological infrastructure of the institution as well as on its educational models, which can be conditioned by these infrastructures.
- Dimension E – “Evidence-based practice”. This dimension refers to the competencies of the TLC that are related to initiatives that aim to collect and analyze data and information to understand the effect of the transformations and initiatives carried out in the institution. Actions related to these competences will have a direct effect on the evaluation of the institutional initiatives carried out, as well as on the evaluation of the TLC itself, and may affect decision-making in the definition of concrete policies and initiatives.

Usages of the PROF-XXI Framework

The PROF-XXI framework can be used in three different manners. An institution can choose one of the three proposed usages or combine two or the three of them depending on its objective:

- Usage 1 - As a self-assessment instrument. Institutions can use the PROF-XXI framework to measure, assess, and understand the competence level of the institution.
- Usage 2 - As a reference for strategic planning definition. Institutions can use the PROF-XXI framework to identify the strategic aspects to be developed.
- Usage 3 - As an accreditation framework. Institutions can use the PROF-XXI framework to ask for a particular accreditation that certifies the innovation competence level of their TLC.

LEVEL OF COMPETENCE	OBJECTIVE	DIMENSIONS (A-E) AND COMPETENCES (1-5)				
		A. Teacher Support	B. Student Support	C. Leadership, Culture and Transformation	D. Technology for Learning	E. Evidence-based Practices
1	Development	A1. Identify innovative good practices with high impact considering the institutional educational project and local, national and international trends and good practices. A2. Design a model and/or actions for teacher training and counselling based on good practices and the characteristics of the disciplines. A3. Implement initially designed actions considering different scenarios and contexts.	B1. Diagnose student characteristics and needs in order to enhance teaching and learning processes. B2. Develop actions to support students considering the diagnosis, the educational project and the characteristics of the disciplines. B3. Implement actions or initiatives, considering emerging situations, and adjustments for continuous improvement.	C1. Identify stakeholders, taking into account characteristics, socio-cultural scenarios, leadership and cultural particularities within the institution. C2. Analyze previous experiences within the institution, linked to organizational cultural changes, identifying strengths, weaknesses and challenges. C3. Conceive a plan for the TLC adapted to the University's strategy, taking into account international reference models and good practices.	D1. Systematize prior learning in digital education and Technology Enhanced Learning (TEL), implemented within the institution. D2. Design a pedagogical model for quality digital education and TEL. D3. Implement digital education and TEL actions, in an initial way, considering the contexts and available resources.	E1. Identify available evidence and good practice in relation to teaching and learning at higher education level and disseminate these findings within the education community. E2. Collect initial results and effects on the actions taken, considering feedback from stakeholders and external non-participating peers.
2	Innovation	A4. Set up benchmarking and innovative experiences. A5. Promote innovation processes among teachers that have an impact on learning. A6. Encourage the coverage of teachers who implement innovations.	B4. Promote meaningful practices and tools for learning among students in the various disciplines. B5. Foster the articulation of teaching innovation with the effective learning experience of students.	C4. Promote groups of innovative teachers and support their transformational dynamics. C5. Generate collaboration and work networks among the various members of the university community.	D4. Train the various actors of the university community for the development of innovative practices with the use of digital technology. D5. Observe new TEL trends at international level.	E3. Use available evidence on teaching and learning. E4. Promote peer exchange related to innovative practices in teaching and learning.
3	Value Generation	A7. Disseminate innovative internal models and experiences of excellence for teaching practices. A8. Generate changes in teaching practices and their effects on the student experience.	B6. Contribute to increasing the quality of learning. B7. Bring about positive effects on the student experience.	C6. Actively participate in the generation of an institutional culture of sustainable transformation and quality. C7. Position the unit as relevant within the educational process.	D6. Encourage the increased implementation of TEL in everyday learning. D7. Model TEL best practices among the educational community.	E5. Generate evidence on results, outcomes and impacts. E6. Share the evidence collected among the different levels and actors of the organization.
4	New Challenges and Opportunities	A9. Visualize new horizons on teaching practice, capable of fostering transformative pedagogical practices.	B8. Visualize new challenges and scenarios in student learning as lifelong practice. B9. Ensure the overall increase of student learning outcomes.	C8. Define metrics and indicators to evaluate the impact of pedagogical innovation. C9. Contribute to the process of transforming the University into a learning and innovative organization.	D8. Sustainably involve the teaching staff in TEL pedagogical practices.	E7. Systematize the new challenges arising from the work, the available evidence and the good practices in actions for the institutional strategy.
5	Public Accountability of Impacts for Continuous Improvement	A10. Ensure tools to monitor and report on the quality of innovative teaching practices. A11. Support institutional decision-making based on challenges and good practices.	B10. Implement evaluation surveys on the university and student learning experience. B11. Support institutional decision-making based on the student experience.	C10. Evaluate the transformative impact of innovative teaching practices. C11. Generate spaces for dialogue and meetings that foster co-responsibility for results, effects and impacts among the different actors in the educational community.	D9. Implement public reports that account for the effects of TEL on educational practice.	E8. Communicate scientifically in different formats and external academic communities, the processes implemented within the unit.

Figure 4. PROF-XXI framework: 50 competences classified into 5 dimensions and 5 levels of competence.

IV. TLCs AND SoTL

Teaching and Learning Centers (TLCs) have shown to be an effective strategy for promoting quality education in higher education institutions. Nevertheless, TLCs must be able to demonstrate their value both for users (i.e., teachers) [23][24][25] and for institutional accountability in a relevant and flexible manner [26]. In this sense, one of the most pertinent elements to achieve these objectives is to follow the logic related to the research of the practice itself and transformation in the processes of teaching and learning from the disciplines [27]. The Scholarship of Teaching and Learning (SoTL) is located as an interpretative approach and framework for action on the development of teaching, the quality of processes, continuous improvement, the generation and use of evidence, and the scientific communication between the learning of the discipline and the different related stakeholders [28][29][30]. The difference between SoTL and other research approaches, especially educational research, lies in advancing teaching in the discipline and stakeholders, opening new frontiers, and generating communities of practice [31]. Consequently, SoTL becomes the transformative approach to TLCs in university academic environments, as it enables the articulation between educational practice, continuous improvement, and research. Table 3 shows the substantial differences between traditional research approaches and SoTL [31].

V. NEXT STEPS

The PROF-XXI project is currently reaching the end of the first half of its duration (18 months). This first half of the project will finish with the installation and operation of the TLCs in the four Latin American institutions of the project (two in Guatemala and two in Colombia) and the training of the TLCs personnel through a series of workshops delivered throughout June 2021. Once the four Latin American institutions have installed their TLCs, they will be able to use the PROF-XXI framework as a self-assessment instrument and as a reference for the definition of their strategic plans (usages 1 and 2 of the PROF-XXI framework). The four TLCs implemented as reference models in Guatemala and Colombia will also be responsible for the definition of four teacher training plans which will be implemented during the next academic year (2021/2022) based on the specific needs detected by each institution. In addition, the PROF-XXI project has created a network of Latin American and European HEIs in relation to TLCs. Institutions belonging to this network can receive assistance and guidance on the installation and operation of their TLCs from project members. Eventually the PROF-XXI framework will be used as an accreditation framework (usage 3) for the Latin American institutions that install and run their TLCs following the guidelines provided by the PROF-XXI project.

Table 3. Comparison between research approaches and SoTL.

COMPARISON QUESTIONS	TYPES OF APPROACHES TO RESEARCH				
	Disciplinary Investigation	Educational Research	Action Research	Design-Based Research	SoTL
What is the purpose/objective of the research?	It depends on the research, but it is always about the generation of knowledge and advancing the discipline.		Social change and transformation from situated practice to the educational context	Change and generation of learning environments that propose proto-theories or explanatory theories.	Change and advance/transform teaching and learning in the discipline or peer groups.
How and from where is research generated?	It depends on research (questions, problems, or emerging)		From practice in particular contexts	From practice-based on hypotheses and their continuous improvement.	From evidence of the effectiveness of one's practice in relation to disciplinary learning or related groups.
What kind of knowledge does it generate?	Normative and Generalizable		Context-specific and not generalizable	Guidance and transferable	
What phases of development/implementation Do you consider it?	Methodologically delimited		Emerging and discontinuous	Cyclical and linear	
What is the original context in which the research type or approach is born or originates?	Discipline	Educational Contexts	School	Any context	Higher education from the discipline and related groups
How do you intend to transform?	Generation of knowledge for its eventual use.		Contextualized proposals	Prototypes and models	We are opening new frontiers of teaching and learning in the discipline or related groups.

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REFERENCES

- [1] PROF-XXI: Centros de Enseñanza y Aprendizaje para las Universidades de Latinoamérica en el siglo XXI (Teaching and Learning Centers for Latin American Universities in the 21st Century), <http://www.profxxi.org>. Last visited: June 2021
- [2] F. Hénard, "Aprendamos la lección: Un repaso a la calidad de la enseñanza en la Educación Superior," OECD, <http://www.oecd.org/education/imhe/47521693.pdf>. Last visited: June 2021.
- [3] F. Hénard and D. Roseveare, "Fostering Quality Teaching in Higher Education: Policies and Practices," OECD, Sep. 2012. <https://www.oecd.org/education/imhe/QT%20policies%20and%20practices.pdf>. Last visited: June 2021.
- [4] M. M. Ferreira, "At a Crossroads : Higher Education in Latin America and the Caribbean," World Bank, Washington, DC, 2017. <https://openknowledge.worldbank.org/handle/10986/26489>. Last visited: June 2021.
- [5] G. Olivier, "Reto de la educación superior privada en América Latina: entre la expansión y la resistencia, IdeAs: Idées d'Amérique," 2012, <https://journals.openedition.org/ideas/382>. Last visited: June 2021.
- [6] P. Felten, "Principles of good practice in SoTL," Teaching and Learning Inquiry, vol. 1, no. 1, pp. 121-125, 2013.
- [7] L. M. Oliva-Córdova and S. A. Recinos-Fernández, "Diagnóstico de las prácticas institucionales de las universidades latinoamericanas participantes en relación con la enseñanza y el aprendizaje," Deliverable 1.1, PROF-XXI, 2020. http://www.profxxi.org/wp-content/files/Diagnostico_Prof-XXI_v05.pdf. Last visited: June 2021.
- [8] M. de la Roca, M. Morales, H. Amado and S. Guzmán, "Estado del Arte de los Centros de Enseñanza y Aprendizaje," Deliverable 1.2, PROF-XXI, 2020. http://www.profxxi.org/wp-content/files/Estado_del_Arte_CEA_VF02.pdf. Last visited: June 2021.
- [9] Directorio de los Centros de Enseñanza y Aprendizaje (Directory of Teaching and Learning Centers), <https://www.galileo.edu/page/directorio-profxxi>. Last visited: June 2021.
- [10] D. Jaramillo, M. C. Carrascal, and M. Solarte. "Marco Referencial Docentes Universitarios del Siglo XXI en Latinoamérica.," Deliverable 1.3, PROF-XXI, 2020. http://www.profxxi.org/wp-content/files/PROF-XXI_E1.3v1.1.pdf. Last visited: June 2021.
- [11] B. García Gutiérrez, C. Alario Hoyos, and C. Delgado Kloos, "Guía para la Implementación, Gestión y Evaluación de Centros de Enseñanza y Aprendizaje," Deliverable 2.1, PROF-XXI, 2021. http://www.profxxi.org/wp-content/files/D2.1_Gua_para_la_Implementacin_Gestin_y_Evaluacin_de_Centros_de_Enseanza_y_Aprendizaje_v1.0.pdf. Last visited: June 2021.
- [12] Learning Support Centers in Higher Education, 1998-2020. The list of learning center synonyms: https://www.lsc.net/lsc_management (click on "Center names"). Last visited: June 2021.
- [13] L. Cruz, M. A. Parker, B. Smentkowski, and M. Smitherman, "Taking flight: Making your center for teaching and learning soar," Sterling, VA: Stylus Press, 2019.
- [14] M. Ghenadenik, "El rol del docente en la universidad," Reflexión Académica en Diseño y Comunicación, vol. 30, pp. 41-43, 2017.
- [15] T. Cañedo, and A. E. Figueroa, "La práctica docente en educación superior: una mirada hacia su complejidad," Sinéctica, no. 41, pp. 2-18, 2013.
- [16] M. M. Cárdenas Martínez, M. E. Morales Martínez, and Y. F. Salamanca Peña, "Tendencias, tensiones y retos de la docencia universitaria a nivel internacional, regional y nacional. Una revisión documental," Jun. 2018, [Online]. Available:

- <https://repositorio.fucsalud.edu.co/handle/001/671> Last visited: June 2021.
- [17] F. Segrera, "Tendencias de la educación superior en el mundo y en América Latina y el Caribe," *Avaliação: Revista da Avaliação da Educação Superior (Campinas)*, vol. 13, no. 2, pp. 267–291, Jun. 2008, doi: 10.1590/S1414-40772008000200003.
- [18] D. C. Cáceres, "Competencias del docente universitario en el siglo XXI," *Espacios*, vol. 39, no. 20, p. 17, 2018.
- [19] E. M. Rivadeneira Rodríguez, "Educational-pedagogical skills in teachers, in the transformation of the university student," *ORBIS*, vol. 13, no. 37, pp. 41–55., 2017.
- [20] UNESCO, "Marco de Competencias de los Docentes en materia de TIC," Jan. 2018. Available: <https://es.unesco.org/themes/tic-educacion/marco-competencias-docentes>. Last visited: June 2021.
- [21] C. Redecker and Y. Punie, "European Framework for the Digital Competence of Educators: DigCompEdu," EUR 28775 EN, Publications Office of the European Union, Luxembourg, 2017, EU Science Hub - European Commission, 2017. <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/european-framework-digital-competence-educators-digcompedu>. Last visited: June 2021.
- [22] P. Kamylyis, Y. Punie, and J. Devine, "Promoting Effective Digital-Age Learning: A European Framework for Digitally-Competent Educational Organisations," EUR 27599. Luxembourg (Luxembourg): Publications Office of the European Union; 2015. JRC98209. <https://ec.europa.eu/jrc/en/digcomporg/framework>. Last visited: June 2021.
- [23] S. Palmer, D. Holt, and D. Challis, "Strategic leadership of Teaching and Learning Centres: From reality to ideal," *Higher education research & development*, vol. 30, no. 6, pp. 807–821, 2011.
- [24] S. Palmer, D. Holt, and D. Challis, "Australian teaching and learning centres through the eyes of their directors: Characteristics, capacities and constraints," *Journal of higher education policy and management*, vol. 32, no. 2, pp. 159–172, 2010.
- [25] D. Challis, D. Holt, and S. Palmer, "Teaching and learning centres: Towards maturation," *Higher education research & development*, vol. 28, no. 4, pp. 371–383, 2009.
- [26] B. Moya, H. Turra, and D. Chalmers, "Developing and implementing a robust and flexible framework for the evaluation and impact of educational development in higher education in Chile," *International Journal for Academic Development*, vol. 24, no. 2, pp. 163–177, 2019.
- [27] F. Hénard and D. Roseveare, "Fostering Quality Teaching in Higher Education: Policies and Practices," *An IMHE Guide for Higher Education Institutions*, pp. 7–11, 2012.
- [28] C. Kreber, "Conceptualizing the scholarship of teaching and identifying unresolved issues: The framework for this volume," *New directions for teaching and learning*, vol. 2001, no. 86, pp. 1–18, 2001.
- [29] E. C. De Luis, Á. S. Morras, and C. González-Torres, "Scholarship of Teaching and Learning: un modelo de desarrollo profesional de los profesores universitarios Scholarship of Teaching and Learning: a model of university teaching development," *Revista Electrónica Interuniversitaria de Formación del Profesorado*, vol. 16, no. 1, pp. 5–14, 2013.
- [30] J. M. Sancho Gil, "Docencia e investigación en la universidad," *Educar*, no. 28, pp. 041–60, 2001.
- [31] O. Jerez, S. Rittershausen, O. Cisternas, "Investigación y docencia desde SoTL," Working paper, Santiago de Chile, 2019.