Online Engineering Education:

A Proposal for Specialization of the Teacher Training in Engineering

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Abstract—The context of the COVID-19 pandemic produced new immediate needs in the field of university teaching related to distance learning and forces the universities to transform their "traditional" face-to-face teaching methods, particularly with the implementation of online education. This situation represented a challenge not only for the universities but also for the teachers because they need to transform their teaching work in the classroom to online strategies for online learning environments. To meet these needs for effective online education an online pilot training course in Engineering Education based on the IGIP Curriculum of the TU Dresden was designed and implemented. The course "Introduction to online teaching and learning in engineering" (in Spanish: "Introducción a la Enseñanza-Aprendizaje Online en Ingeniería") consisted of 4 modules implemented on a mix of online communication strategy of synchronous activities carried out on the Zoom platform, together with asynchronous work on a Moodle-based LMS platform. The course was offered between May and June 2020 for a group of academics of the Faculty of Engineering of a public Chilean University. This paper describes the designed online pilot training course in Engineering Pedagogy and presents the results of the evaluation of its implementation. For this a survey was applied and filled by the participants to evaluate the course and to know their perceptions about their competencies development to improve online learning in engineering.

Keywords—University Teacher Training, Online Engineering Pedagogy, Distance Learning, IGIP Curricula

1 Introduction

1.1 Teaching in higher education

Normally, the training of university teachers plays an important role in ensuring the quality of university teaching programmes. However, the quality of teaching competencies in higher education has been underestimated compared to the quality of research

competencies. One explanation for this is that for a long time it was believed that teaching competencies were strongly linked to the research competence of academics and their expertise in each research area. Nevertheless, many studies have shown that this link between research and teaching quality is very weak or non-existent [1, 2, 3]. However, due to the importance of research performance for career progression in higher education institutions, most academics have prioritized research over teaching [4, 5, 6, 7].

Regarding the form of university teaching, an interesting point of view was offered by Ventura [8]. The author presented in a study with Latin American academics that university professors teach as they learned in their university training phase. Regarding the relationship between learning preferences (particularly their own history as a student) and the teaching preferences of the professors themselves, they indicated that most professors taught according to their teaching preferences, attending to the disciplinary structure of the scientific field and to a lesser extent to the characteristics of their students. In this sense, evidence was found to support the idea that learning styles operate in teachers' preferred ways of teaching [9].

Psychology teachers, for example, say they prefer to teach and learn by reading texts on theories and concepts, underlining the central ideas, establishing relationships with other texts and repeating the concepts aloud [10]. Likewise, in terms of teaching preferences in Engineering, the teachers expressed that they preferred to interpret the theory of the subject by solving concrete problems and to represent it graphically through tables, graphs and drawings. Related to this, problem and project-based learning and laboratory work are some of the most applied and effectiveness methodologies in engineering education, because they allow not only to increase the motivation of the students, but also solving real-life problems in an organized, interdisciplinary and social learning environment [31].

In order to strengthen teaching work and the development of competences in students in modern societies in different fields, and to update methodological and technical tools in the teaching-learning process, there are proposals from different parts of the world that attempt to train university teachers in pedagogical competences [11, 12, 13, 14]. But in what specific aspects should a university teacher be trained? Taking into account the different tasks of academic staff in higher education institutions, a profile for university teachers was proposed in 2014, with the following eight dimensions being mastered [15]:

1. *Scientific competence* (being specialised in a scientific field).
2. *Teaching competence* (knowledge of learning strategies at university level, effective performance of teaching functions and responsibilities).
3. *Transdisciplinary competences* (having transversal skills: communication and teamwork skills, linguistic skills, IT skills, etc.).
4. *Relational skills* (to facilitate dialogue and relationships with students, to perform appropriate tutoring activities).
5. *Vocation and dedication to teaching* (to have motivation for teaching-learning activities; commitment to the teaching profession and interest in stimulating the learning process of students).

6. *Experience in the university context* (knowledge of the reality of higher education institutions and of the teaching profession at university level).
7. *Self-evaluation and professional development* (ability to improve the teaching practice and activity through the development of the capacity for self-reflection and self-criticism and through continuous professional training).
8. *Research competence* (having the skills to carry out research activities concerning to the educational process, to the own scientific field, or both to improve the teaching-learning process).

Different authors show how difficult it can be to fulfil all or some of these aspects effectively. In many universities it is known that academics are inadequately prepared for their teaching tasks [11, 12, 13, 14]. For this reason, higher education institutions develop and implement various strategies and activities for the professional development of their academics. However, the emergence of the COVID-19 pandemic forced many lecturers to confront their own teaching competencies and their competencies to face distance learning to be able to use online platforms and educational technologies appropriately (with pedagogical foundations) and to ensure and to evaluate their students' learning in this new context [32, 38, 39]. But what happened when teachers have no experience with online learning? What kind of teaching way could they follow or use in this case? Although online learning has been a trend in some universities for many years, these dimensions have been defined with a preference for traditional forms of university teaching, such as face-to-face lectures. However, many of these competences can be applied (and updated) in online learning environments, considering the special requirements of the discipline taught.

1.2 Teaching in engineering

A key concept for teaching in engineering is Engineering Pedagogy (EP). EP can be defined as an interdisciplinary scientific subject that includes and combines the "needs" and "demands" of engineering and technical sciences, pedagogy and didactics, and the educational system, with the goal to design implement and evaluate quality teaching-learning process in engineering fields [16, 17, 18, 19]. The tradition of EP was established through the development of three European "schools of Engineering Pedagogy": Dresden, Prague, and Klagenfurt [20]. The experiences and work of these European schools of EP became the basis for the founding of IGIP (International Society of Engineering Pedagogy) in 1972 in Klagenfurt, Austria. The main work lines and research initiatives in the field of EP of the first three EP schools and the "most recent" schools (e.g. in Russia and Estonia) have significantly influenced and contributed the formation of the international movement in Engineering Education (EE), which is concretized by the worldwide activities of IGIP and IFEES (International Federation of Engineering Education Societies) and other organizations. An important contribution of IGIP to the international scenario of the EE is its curriculum for engineering teacher training. Table 1 presents an overview of the training program of the Estonian School of EP [20] and the Dresden School of EP [21].

Table 1. Overview of the training programs of the Dresden and the Estonian School of EP.

IGIP training program of the Technische Universität Dresden (Germany) [21]	
Module I: Engineering didactics fundamentals (10,5 CP)	
Units	***Qualification goals***
I.1. Design of teaching-learning processes	Designing teaching and learning processes in engineering education according to the target group on the basis of pedagogical scientific foundations.
I.2. Didactic media for teaching in Engineering	Acquiring and expanding knowledge of the conceptualization of didactic media, the functions of didactic media in teaching and learning processes, the areas of action of didactic media and basic design approaches.
I.3. Communication	Designing and implementing appropriate communicative processes for the own teaching practice on the basis of pedagogical scientific foundations and considering the characteristics of the communication partners.
I.4. Evaluation of the learning outcomes in Engineering	Designing of appropriate learning evaluation processes (qualifications, competences) based on scientific results.
Module II: Structuring of teaching-learning processes in a university context (4,5 CP)	
Units	***Qualification goals***
II.5. Lectures (theoretical courses)	Planning, implementing and executing courses of lectures/seminars/ according to the expected qualification objectives.
II.6. Laboratory practical training/ self-study	Designing teaching and learning processes in laboratory work, in exercises as well as in self-study based on purposeful scientific results.
II.7. Engineering internships, written reports, research colloquium	Planning, implementing and executing academic courses of the type Engineering Internship/Documentation/Research Colloquium in accordance with the expected qualification objectives.
Module III: Determination of objectives and contents in engineering study programmes (3 CP)	
Units	***Qualification goals***
III.8. Determination of the study programme objectives	Determining the course and study module objectives for engineering curricula in the own engineering specialization field.
III.9. Defining the engineering study programme contents	Selecting, structuring and presenting appropriate study program or study module contents based on the established study program objectives.
Module IV: Practical module (2 CP)	
Units	***Qualification goals***
IV.10. Case discussion	Applying schemas for documenting, reflecting and evaluating exemplary teaching situations.
IV.11. Classes observation	Documenting, analyzing, evaluating and reflecting a lecture to achieve a continuous professionalization of the own teaching practice.
IV.12 Final Colloquium	Planning a final colloquium with the help of a planning scheme, then implementing and finally evaluating it.
IGIP training program of the Tallinn University of Technology (Estonia) [20]	
Modules	***Qualification goals***
1. Engineering Pedagogy in Theory and Practice	Designing of learning units using concrete technical subject matters, considering the specific standards and components that regulate and determinate this process (objectives, teaching resources and media, psychological and social structure, and teaching methods, among others).
2. Laboratory Didactics	Structuring of the teaching work in the laboratory, controlled experiments and experimental technical work and research, considering different components

	such as stating the problem or research questions, hypothesis formulation and testing, design of experiments, results and conclusions.
3. Psychological and Sociological Aspects	Acquiring knowledge about the bases and conditions of learning, the learning process, motivation, talent and educability (know-how, understanding and intelligence), the functioning and (inter-)dependence of social groups.
4. Ethical Aspects and Intercultural Competencies	Obtaining general information on European thinking advancement in the cultural-historical framework from the beginning of continental philosophy to the present. Another goal is providing knowledge about socio-pedagogical issues focusing on the multicultural Education.
5. Rhetoric, Communication and Scientific Writing	Acquiring basic knowledge and developing skills in fields such as history of rhetoric, speech technique, and vocal hygiene. In addition, meeting the requirements of research work.
6. Working with Projects: Curriculum Analysis	Providing a clear link to a teaching experience through the teaching project. As teaching project can be considered, for example, a textbook or a (small-scale) research study on the selected topic.
7. Media (Teaching Technology) and E-Learning	Acquiring knowledge about the applications and integration of technical devices, equipment and systems to support learning activities and e-learning.
8. Multicultural Learning Environment	Providing knowledge of socio-educational issues, focusing on multicultural education, to promote tolerance and to avoid prejudice, racism and xenophobia resulting from a lack of knowledge about other cultures.
9. Electives	Working at the following elective subjects: Portfolio Assessment; Coaching and Mentoring in Engineering Education; Creative and Critical Thinking; Teamwork and PBL; Standards and Quality in Engineering Education; etc.

1.3 A proposal for teacher training in online Engineering Pedagogy

Based on the IGIP Curriculum developed by the TU Dresden [21] and the demands for effective online education [22, 23, 24, 25, 26, 38, 39] (also caused by the COVID 19 Pandemic) a pilot training course for the teaching staff of the Engineering Faculty at the Universidad de Talca (UTALCA) was developed. The course was called "Introduction to the online teaching and learning in engineering" and was offered in e-learning modality between May and June 2020 with the participation of a group of 35 teachers of UTALCA. Most of the participants are part of the career of Industrial Engineering, Mechanical Engineering, Electrical Engineering, Mining Engineering, and Computer Engineering.

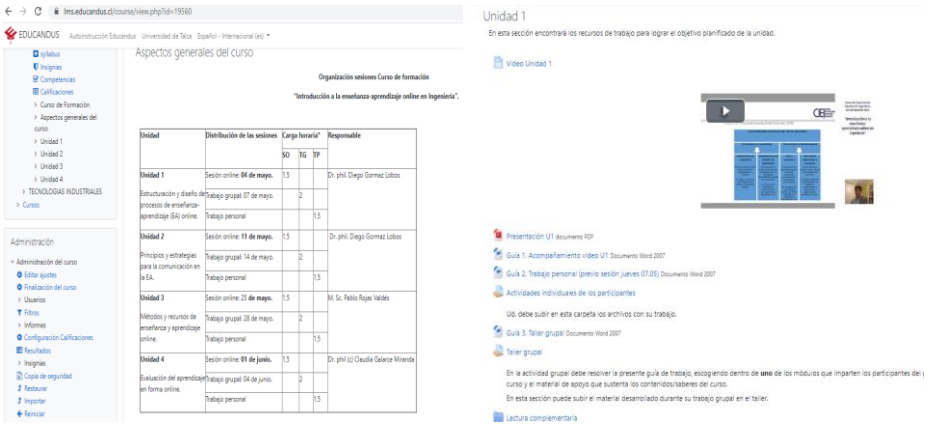

Fig. 1. Overview of the main page of the pilot course in EP at EDUCANDUS. https://lms.educandus.cl/course/view.php?id=19560

The course contemplated a minimum work of 1,5 Credit Points (also 45 hours of training according to the SCT-Chile system). The course consists of four modules according to the objectives and contents of the IGIP Curriculum (see Table 1) and deepen aspects of the effective online training of university students. The choice of content considered the areas in which teachers urgently needed support to transform and effectively adapt their traditional classroom methods to be applied in online education, such as structuring teaching and learning processes, designing and using educational technologies, structuring communicative processes, and assessing student learning in online learning environments. An overview of the modules and units are presented in Table 2. The design was based on a mix of online communication strategy of synchronous activities carried out on the Zoom platform (20 hours), together with asynchronous work on a Moodle-based LMS platform (EDUCANDUS platform) for asynchronous independently and collaborative work (25 hours approximately). The pedagogical design was formed for expository, practice, and collaborative teaching-learning strategies.

The student role contemplated listen and text read activities, to solve problems individual activities or in collaboration with peers. The course evaluation was formative and based on the independent work materials at LMS. At the end of the course, each participant presented a final product to demonstrate the developed competencies along the course (planning of online teaching activities, development of online learning, and evaluation material, among others).

At the last stage of the implementation, the research group implemented an evaluation survey with the goal to obtain feedback about the course.

Table 2. Description of the modular structure of the online training course for the UTALCA-Pilot Project.

Description of the modular structure of the online training course for the UTALCA-Pilot Project.* (* abbreviated version for this journal)	
M1	***Design of Teaching and Learning Process in Engineering Education***
	Unit 1 – Principal and fundamental aspects of Engineering Education. Fundamental concepts associated with teaching and learning in Engineering. Unit 2 - Teaching and Learning Processes in Engineering: Organization and Structuring Structuring the teaching and learning process to meet the requirements of the professional profile of engineering graduates.
M2	***Design of didactic media in online Engineering Education***
	Unit 1 – Function and applications of the didactic media. Concepts associated to didactic media design and some criteria to select didactic media for the own teaching practice. Unit 2 – Basic principles for the elaboration of didactic media. Fundamental educational principles for the development of didactic media in engineering.
M3	***Communicative processes design in online Engineering Education***
	Unit 1 – Introduction to online communicative processes design. Different communicative intentions in online teaching and learning process and their applications in synchronous and asynchronous learning situations. Unit 2 - Organization of the Communicative Processes in the online Engineering Education. Structuring synchronous and asynchronous communicative procedures for teaching and learning situation in Engineering.
M4	***Evaluation of the learning results in Engineering Education***
	Unit 1 –Operationalization of the learning objectives and outcomes. Components that characterize a quality evaluative process, considering these to operationalize the learning objectives and the expected learning outcomes of the learning processes, to make them evaluable according to the learning objectives. Unit 2 – Online evaluation methodologies and strategies, and register of learning outcomes. Different methodologies, strategies, and procedures to design online evaluation processes and registers of the learning outcomes.

2 Evaluation Results of the Teacher Training Course in EP

2.1 Methodology

The research was designed under the quantitative-descriptive method [29, 30]. The main research question was to know how the participants evaluate the course regarding the didactic design, the teaching competencies of the instructors, the usefulness of the achieved learning, and their own learning process. The main objective of the research was to identify the perceptions of the participants of the pilot training course (academic staff) at the Universidad de Talca about their experiences and valuation of the competencies developed during the online course. Based on [22, 24, 27, 28] and their previous experience in engineering pedagogy research projects in Germany and Chile [19, 21], the authors defined categories and developed indicators for the instrument design. The instrument applied was a questionnaire with closed questions organized in five main categories with their respective items. Thus, the five categories assessed were:

1. The course development (in general) [13,19], with 4 items
2. The didactic design of the online course [19, 21], with 9 items
3. The (online) teaching competencies [21, 24, 28, 38], with 5 items
4. The utility of the achieved learning for the online teaching practice in engineering [24, 28, 33], with 12 items
5. Self-assessment of the own performance and learning process [21, 24, 28], with 4 items

Due to the location of the participants (Chile) and the conditions derived by the COVID pandemic, the questionnaire was developed in Spanish with use of the Google questionnaire tool and consisted of 34 items on a five-point Likert scale grouped into the five categories (see Table 3).

2.2 Population, available sample, procedure and reliability.

The study sample was composed of 22 participants at the training course for UTALCA of the Faculty of Engineering. Because two questionnaires were not fully completed, only 20 questionnaires were considered valid for the analysis. The instrument was applied online through the Google questionnaire tool, considering ethical aspects according to the criteria of the Chilean social sciences research and ensuring the anonymity of the participants. In the first part (P1), general information about the participants (gender, subject matter, fields and years of teaching experience, previous teacher training, etc.) was collected. The second part (P2) corresponds to the information collection of the closed questions [29]. The statistical analysis applied was exploratory-descriptive [30] with the use of the software SPSS24. For the total number of questionnaire items (34) included in P2, the total reliability was assessed through Cronbach's alpha and the correlation. The calculated values of Cronbach's alpha for all items was = 0.939 sowings a high internal consistency of the designed research collection tool [29].

2.3 Sample Characterisation

In total, 20 academics answered fully the questionnaire: 25% are women (5) and 75% men (15). Regarding the distribution by age group, 85% (17) of the participants of the survey are between 30-39 years old, 10% (2) are between 40-49 years old and 5% are older than 50 years (1). With regard to the distribution of the participants by engineering school, most of them work in mechanical engineering (35%) and industrial engineering (25%). The same number of participants work in the fields of computer engineering (15%) and electrical engineering (15%), and two participants work in mining engineering.

Concerning the years of teaching experience, 50% have between 0-5 years (10), 35% have between 6-10 years (5) and 15% more than 10 years (3). Of the total number of participants, 100% have already participated in university teaching training course.

2.4 Results of UTALCA´s survey.

The results about the perception and opinion of the survey respondents regarding the evaluation of the training course according the designed five categories are presented in this section. Table 3 exposes the results for the 34 considered items.

Table 3. Survey results by categories

Category 1: Evaluation of the course development (in general)						
ITEMS	**x̄**	**S.D**	**IT-Cr**	**Average**		
				Low	***Med***	***High***
				[1][2]	***[3]***	***[4][5]***
Satisfaction with the information about course objectives.	4,65	0,49	0,4	0%	0%	100%
Satisfaction with the development of the course.	3,85	0,75	0,731	0%	35%	65%
Satisfaction with the duration of the course.	3,25	1,12	0,133	20%	35%	45%
Satisfaction with course progress and achievements.	3,5	1,32	0,848	20%	30%	50%
Category 2: Evaluation of the didactic design of the online course						
Satisfaction with course modality (online) for the learning process.	3,95	1,05	0,671	10%	25%	65%
Satisfaction with the use of the online platform and learning resources.	4,35	0,81	0,212	0%	20%	80%
Satisfaction with units and learning materials on the platform.	4,5	1	0,543	10%	5%	85%
Satisfaction with learning activities for autonomous professional development.	4,1	0,97	0,343	10%	10%	80%
Satisfaction with synchronous learning activities.	4	1,21	0,619	20%	10%	70%
Satisfaction with learning materials and instruments for the online competencies development.	4,15	0,88	0,825	10%	0%	90%
Satisfaction with planning and time of each module.	3,95	1,15	0,324	10%	5%	85%
Satisfaction with learning activities for the online teaching reality.	4,05	1,15	0,813	20%	0%	80%
Satisfaction with the applicability of contents for the own teaching reality.	3,5	1,39	0,773	15%	45%	40%
Category 3: Evaluation of (online) teaching competencies						
Satisfaction with different teacher competencies.	4,3	0,92	0,52	10%	0%	90%
Evaluation of the motivation and teaching organization of teachers.	3,95	0,99	0,622	10%	20%	70%
Clarity of teachers to guide the teaching-learning process.	4,05	1,05	0,765	10%	20%	70%
Evaluation of teacher´s attitude for monitoring the learning process and assessment.	4,2	0,77	0,519	5%	5%	90%
Satisfaction with teacher´s attitude for monitoring the learning process and assessment.	4,2	0,95	0,522	5%	5%	90%
Category 4: Evaluation about the utility of the achieved learning for the online teaching practice in engineering						
Utility of contents and methods for the own online teaching practice.	4,3	0,87	0,599	0%	25%	75%
Satisfaction with the applicability of the contents on real teaching context.	4,25	0,98	0,513	10%	5%	85%

Applicability of the achieved learning in the online teaching.	3,85	0,88	0,345	0%	45%	55%
Usefulness of contents for the development of different teacher competencies.	4,35	0,59	0,59	0%	5%	95%
Usefulness of workshops for learning process and competencies development.	4,2	1,2	0,406	10%	0%	90%
Usefulness of asynchronous learning activities for competencies development.	3,95	1,15	0,441	20%	5%	75%
Usefulness of synchronous learning activities for the online competencies development.	4,2	0,83	0,665	0%	25%	75%
Usefulness of each module for the online professional development.	3,35	0,99	0,37	10%	55%	35%
Usefulness of each module for the online teaching reality in engineering.	3,25	1,07	0,695	35%	15%	50%
Utility of the achieved learning for the teaching practice.	4,25	1,07	0,753	10%	15%	75%
Utility of the achieved learning for the work with other colleges.	3,85	1,35	0,802	20%	5%	75%
Usefulness of the achieved learning for professional development.	3,75	0,91	0,769	0%	55%	45%
Category 5: Self-assessment of the own performance and learning process						
Own commitment and motivation with the course.	4	0,8	0,448	0%	30%	70%
Motivation for a new training in EP.	4,1	1,12	0,606	10%	25%	65%
Satisfaction with the participation in the course.	3,75	1,12	0,837	20%	15%	65%
Dissatisfaction with the participation in the course.	2,65	1,5	0,102	55%	10%	35%

$\bar{x}$ = Mean; S.D. = Standard Deviation; IT-Cr= Corrected item-total correlations.

In general, 19 aspects were as high (4 points) or very high (5 points) valuated (more than 4.0 of average). The high-valuated aspects are related to the category "Evaluation of teaching competencies" and "Evaluation of the didactic design of the online course" (average of 4.14 and 4.06 respectively in all items). Specifically, 13 indicators of the categories were valuated with more than 80% of the preferences as high (4 points) or very high (5 points). An example for this is the items: "Satisfaction with the applicability of the contents on real teaching context", "Usefulness of contents for the development of different teacher competencies", "Satisfaction with learning activities for autonomous professional development", "Usefulness of workshops for the learning process and competencies development", "Satisfaction with learning materials and instruments for the online competencies development" and "Satisfaction with learning activities for the online teaching reality". The lowest category was "Self-assessment of the own performance and learning process", where the item "Dissatisfaction with the participation in the course" was evaluated as very low or low with 55% of the preferences. Other lowest-rated (low and very low: average lower than 3.75) items are "Satisfaction with the duration of the course", "Satisfaction with course progress and achievements" and "Usefulness of each module for the online teaching reality in engineering".

Another important aspect is the perception of the participants about the relevance of the different items by gender. Figure 2 shows the differences between the participants related to the relevance of the indicators. In general, men gave a high average of preferences in the valuation of all items than women (93.06% and 87.45 respectively). For

the female participants of the teacher training course, most of the items were low valued, except for example the items “Satisfaction with different teacher competencies”, "Usefulness of the workshops for the learning process and competence development", "Satisfaction with synchronous learning activities" and "Usefulness of asynchronous learning activities for competence development". In particular, "Dissatisfaction with course participation" was rated higher than men, showing more dissatisfaction with the course.

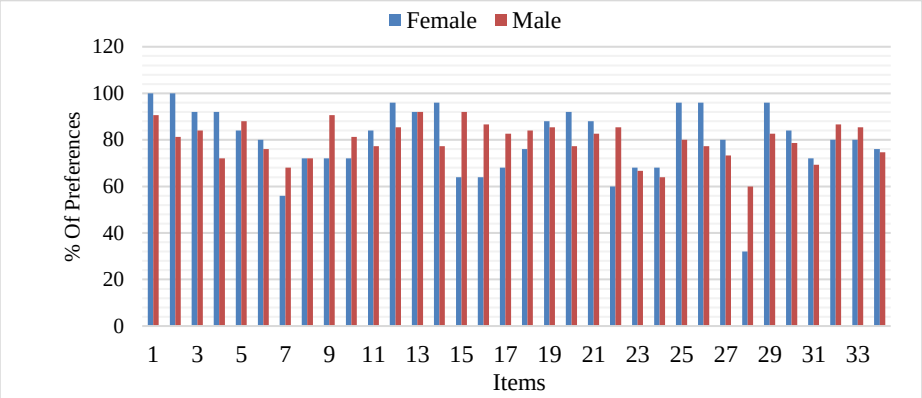

Fig. 2. Preferences of the different items related to the evaluation of the online training course in online EP by gender.

By grouping the survey respondents by engineering fields (Figure 3), the participants from Computer engineering and Mining engineering had the highest average of preferences in the valuation of all items (89.41% and 88.43 respectively), the participants from Industrial engineering had the lowest average with 71.88% (Mechanical engineering with 78.24% and Electrical engineering with 81.37%).

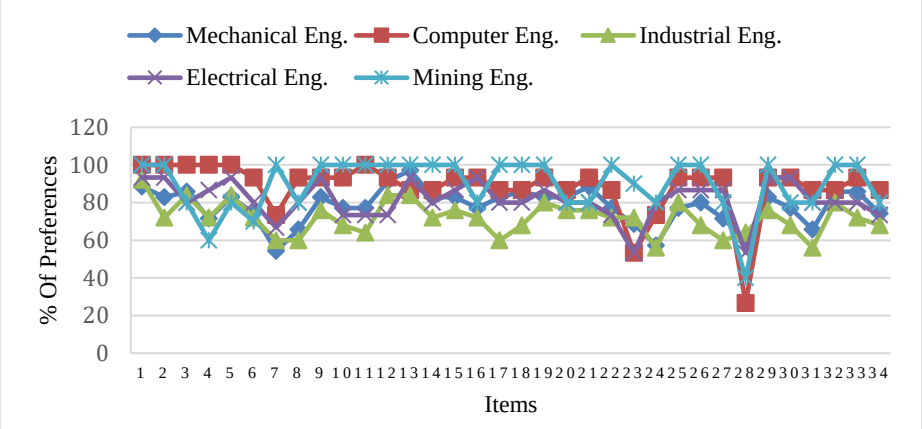

Fig. 3. Preferences of the different items related to the evaluation of the online training course in online EP by engineering fields.

The relevance of the items for the participants by years of teaching experience is presented in Figure 4. For the participants with up to 5 years of teaching experience, the average value of preferences in all items was 83.82% and for participants with up to 10 years was 78.32%. For participants with between 10 and 20 years of teaching experience, most of the "indicators" were low valued (average of 66.18% in all items). With more than 20 years of teaching experience, the average of the value of all items was 76.47%.

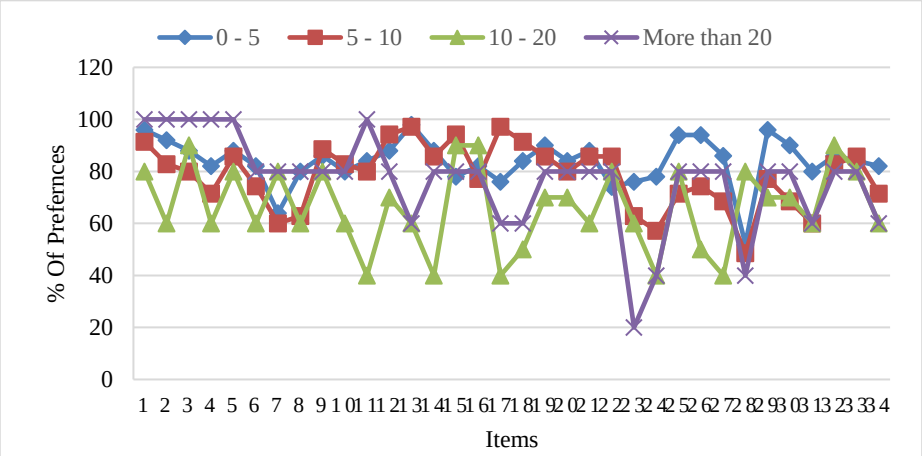

Fig. 4. Preferences of the different items related to the evaluation of the training course in online EP by years of teaching experience.

3 Discussion and conclusion

Based on the IGIP Curriculum developed by the TU Dresden [21] and the immediate needs and demands for effective online education during the COVID-19 pandemic [22, 23, 24, 25, 26] the pilot training course in e-learning modality "Introduction to the Online Teaching and Learning in Engineering" for the teaching staff of the Engineering Faculty at a Chilean university was implemented.

The main goal of the study was to identify the perception of the participants of this online course (teaching staff) about their valuation of the competencies developed during a course specifically oriented in online EP. Concerning the categories "Evaluation of the course development (in general)", "Evaluation of the didactic design of the course", "Evaluation of the teaching competencies" and "Evaluation of the teaching competencies" - in line with previous studies [26, 33, 34] - all aspects related were as high valuated. The item "Dissatisfaction with the participation in the course" was valuated as low with 55% of the preferences. These results coincide with the comments of the participants during the teaching-learning activities. The findings confirm the relationship between the average of evaluations with the years of teaching experience of the participants [33, 34]: participants with up to 5 years of experience evaluated the

course better, and participants with over 10 years of teaching experience tend to evaluate the course lower; something that has already been demonstrated in the literature [33]. Other relevant findings are the perception of the participants about the relevance of the different items by gender. In general, men gave a high average of preferences in the valuation of all items than women. These results coincide with the findings of previous studies [34-36]. The item with the lowest relevance ("Dissatisfaction with the participation in the course") is related to the category "Self-assessment of the own learning process". This can be explained by the fact that most participants experienced an increase in the amount of new "tasks", especially caused by the COVID-19 pandemic, such as the adaptation to online learning and assessment, development and application of educational technologies, and ICTs. For this reason, they expressed their interest and need to dedicate more work hours to the course. However, for many of them, this was not possible, as they also had to respond to other urgent "tasks", e.g. in the field of research.

The literature specialized in online learning showed that in the Chilean context (before the pandemic) the e-learning modality already existed in few universities (the whole teaching and learning process and assessments were carried out through virtual platforms, ICTs, software among others). Only 14 universities of a total of more than 60 offer online training programs. Currently, only 6 universities offer undergraduate programs, but in a special form of continuity of previous studies [37]. During the COVID-19 pandemic, this reality changed radically, and therefore, the teaching competencies of the teachers had to be rapidly updated. The results and findings of the present research show the evaluations of this Chilean university teaching staff about an online training course and reveal several aspects that should be considered and improved for future university training programs for academic staff, thus serving to analyze (case study) the teachers' experience of a training course specifically oriented to EP. On the other hand, these results are also a (scientific) record of teachers' experiences at a time of major adaptations when their teaching competencies are still being tested. It is important to mention that in the Chilean context the number of research studies focusing on teachers' experiences in university training courses and online teacher training is quite small. Despite the limited time spent working on the pilot training course, the results of the evaluation carried out by the participating academics show the positive effects that this type of pilot course specializing in PE can have.

However, due to the "pilot nature" of this project and the small sample of participants (22 at the course and 20 at the survey), the authors consider that the findings cannot be generalized, therefore some questions remain open about the impact and valuation that this type of training course can have on others academics (for instance from other universities). On the other hand, the participants recognize that a course like this should have more time to deepen the contents and the development of online teaching and learning resources for their courses. For this reason and as future work, a more complete online EP course will be implemented during 2021 based on the same modules, but with more working time and new participants. In addition, and to incorporate consistency in the research results, the authors will implement qualitative and quantitative methods for the evaluation of the new online training course in EP.

4 References

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