Teacher Qualification Demands in Costa Rican TVET: First Results of the Project CoRiVET

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Technical Vocational Education and Training (TVET) in Costa Rica has received great attention due to the growing need for skilled labor in different sectors to diversify the economy and reduce social inequalities. In addition, the current level of unemployment, especially among young people, shows the importance of initial vocational training and draws attention not only to the political agenda but also to the ongoing discussion about the importance and role of teachers who train future professionals in Costa Rican TVET. Among other things, there is a need for qualified teachers who know the characteristics and specificities of TVET and can respond with pedagogical and didactic competencies. In this context, this article examines the role and importance of TVET for Costa Rica and its TVET teachers, taking as an example the bilateral project between Costa Rica and Germany entitled: Vocational Education and Training in Costa Rica (CoRiVET). Among the main conclusions is that the Costa Rican qualification for TVET teachers shows weaknesses in pedagogy and didactics to achieve system strengthening.

Keywords: technical vocational education and training, teacher qualification, curriculum, pedagogy, didactics for TVET

INTRODUCTION

Technical Vocational Education and Training Systems (TVET) presents a diversity of legal, regulatory and qualification-specific aspects that pose a scenario that is difficult to describe and understand (Rommel, 2021). For a better explanation of this issue in Costa Rica, it is possible to cite different national and international definitions that point to the objective and character of a TVET system.

In particular, Costa Rica adopts the definition used by the United Nations Educational, Scientific and Cultural Organization (UNESCO) which indicates that:

> Technical and vocational education and training is that part of education that is concerned with imparting knowledge and skills or abilities for the field of work. Throughout history, different countries and education systems have used various terms to refer to various constituent elements of what we now collectively call TVET, including: apprenticeship training, vocational education or training, technical education, technical-vocational education (TVE), occupational training (OT), vocational education and training (VET),

> vocational and trade education, career and technical education (CTE), workforce training, on-the-job training or education, etc. Some of these terms are commonly used in specific geographic areas. (UNESCO, n.d.).

In Costa Rica, the State of the Nation Program (Programa Estado de la Nación (PEN), in Spanish) (PEN, 2011) presents a national definition and objective of technical education:

> The main objective of technical education is to train people with experience and knowledge that will enable them to engage in specialized work activities where the professional levels also support or enhance higher education. It is a strategic educational modality for the country and those who have access to it. For the country, it allows it to increase its competitiveness by generating the trained human resources that the economy needs. For individuals, it offers young people a study option that expands their future opportunities for employment and better income, as well as their chances of successfully continuing their education. (p. 236).

Concerning the above, it is worth noting that the Costa Rican education system provides TVET through three primary modalities:

- Middle education: technical schools that offer the intermediate technical degree under the responsibility of the Ministry of Public Education (MPE).
- Non-formal education: various diploma and technical career options offered by the National Apprenticeship Institute (INA), and public and private para-university institutes, such as the University College of Limón (UCLIMÓN) or the University College of Cartago (UCC).
- Higher education: universities such as the National Technical University (Universidad Técnica Nacional (UTN)) and the Technological Institute of Costa Rica (TEC) (UTN, 2020).

The previous TVET descriptions show, that the labor market with its respective needs is an essential prerequisite for its characterization. Hence the importance and demand to illustrate TVET in its context, in particular by the relationship between the need for qualifications and the skills actually offered is of importance. In other words, TVET is a key factor for increasing and maintaining the competitiveness of enterprises and the economy (Rauner 2006, p. 9).

A recurring theme in public and private discussions refers to the low supply of graduates in technical disciplines, while at the same time the demand for a skilled workforce is increasing (Álvarez-Galván, 2015, p. 9). For this reason, the poorly developed level of education proves to be an obstacle to development, limiting the modernization of productive activities as well as access to higher quality jobs, which makes it difficult to systematically reduce inequalities, such as those related to poverty and social exclusion (PEN, 2021). Therefore, TVET has become a strategic proposal in the Central American region, especially in Costa Rica, to improve the low level of education of most of the working population and to respond with an adequate labour force to the productive changes that entail a high demand for technological knowledge (PEN, 2021).

Given this, it has been identified that, despite the significant progress made in this area, many programs in Costa Rica, such as those of the Ministry of Public Education (MPE) and the National Apprenticeship Institute (INA), "are not flexible enough to meet the specific needs of the different regions of the country and are not sufficiently adapted to the needs of the labor market." (Frommberger, 2021, p. 4).

Concerning these needs, it is inevitable to ask about the importance and role of the academic personnel responsible for the training qualification of the teaching staff teachers of TVET institutions who, in turn, are responsible for the qualification of the workforce in Costa Rica. So, what is the significance of capacity building for teacher training and the development of competences in specialized pedagogy and subject didactics in TVET in Costa Rica? ?

In the context of the academic debate, central questions are raised about the form and level of qualification or the necessary didactic and professional competencies of teachers. For TVET, mainly because "not all teachers of technical subjects (in the sense of professionals) in schools also have

professional pedagogical and didactic subject competencies." (Alvarez-Galvan, 2015, p. 10 cited by Frommberger, 2021, p. 5).

This growing need for qualified teaching staff for TVET, including elements of didactic pedagogy and research, is closely related to the capacities and corresponding curricula of the universities. For example, there is still a demand for "systematic qualification of young scientists and teachers in the field of pedagogy and vocational didactics, so that the supply of teaching staff for teacher training is also ensured in the long term". (Frommberger, 2021, p. 5).

In Costa Rica, only the National Technical University (UTN), through the Center for Pedagogical Training and Educational Technology (CPTET), offers a career in Technical Specialty Education, Enseñanza de Especialidad Técnica in spanish (EET) with an academic level of the profesorado (1 year duration) and a bachelor degree (2 years duration, in total), which specifically contributes to the training of future teachers in public and private schools in the country for TVET.

The target group for this career are professionals with university degrees in technical areas at the diploma, bachelor's, or graduate level, who wish to take it to the profesorado or bachelor level to become teachers, advisors, instructors, trainers, among others, within the TVET system. Since graduates develop a series of competencies in TSE, they can effectively work as teachers in TVET in their specialty and/or advisors in public or private secondary institutions, para-university, university colleges and other organizations.

The educational model used in this EET program is that of the National Technical University, which "integrates the institution's specificities for the implementation of pertinent, relevant and quality education in the national and international context" (educational model p.1), its approach is bio-pedagogy and eco-training from a humanistic philosophy, which understands the world as a "network of relationships between the different parts of a global whole and in which learning is permanent". (UTN, 2018, p. 3).

On the other hand, the qualification granted in the context of the EET is as follows:

- **Profesorado:** in the discipline indicated by the diploma with which each student enters the degree program.
- **Bachelor:** in the discipline indicated by the diploma with which each student enters the program.

The objective of the *profesorado degree* is "to train teachers who integrate the knowledge, skills and attitudes of the technical specialty with pedagogy, in such a way that they transform educational practices in pursuit of the improvement of teaching and learning processes." (CONARE, 2016, pp. 3-4). The curricular mesh of the *profesorado* is composed of six courses: foundations of education, general didactics, educational planning, resources for learning I, educational evaluation and teaching practice. As for the bachelor degree (profesorado and bachelor of the EET), its purpose is to:

> (…) to qualify teachers with a bachelor's degree, with knowledge, skills and attitudes for the curricular development of programs in Technical Education, adhering to fundamental aspects centered on humanism, social responsibility and ethics, in order to meet the requirements of the education sector and the expectations of society". (CONARE, 2016, pp. 7-8).

For this purpose, the curriculum includes the six courses of the profesorado and twelve additional courses of the bachelor, as shown in Table 1 below:

TABLE 1
CYCLES AND COURSES OF THE TEACHING AND BACCALAUREATE OF THE TEACHING CAREER IN THE TECHNICAL SPECIALTY OF THE NATIONAL TECHNICAL UNIVERSITY OF COSTA RICA

Profesorado		Bachelor	
(Cycles I, II and III)	**Cycle IV**	**Cycle V**	**Cycle VI**
• Fundamentals of Education • General Didactics. • Educational Planning. • Learning Resources I. • Educational Evaluation. • Teaching Practice.	• Physical Activity. • Humanistic Education. • Research Methods and Techniques. • Specific Didactics	• Humanistic Education • Educational Psychology I • Learning Resources II. • Introduction to the Curriculum	• Cultural Activity • Humanistic Education. • Humanistic Education. • Educational Psychology II.

Note: Information from CONARE (2016).

This EET curriculum was subjected to an analysis in 2016 to evaluate the course profiles, from which it was determined the need for a better systematization of the curriculum to avoid overlaps in the contents and ensure points of connection between them. In addition, it was found that up to that time, no specific didactics courses had been taught for the technical subjects, which are considered essential for the heterogeneous group of students' characteristic of this program, who typically have already completed a technical degree with two years of study (i.e., their technical major) (Castro, Láscarez and Porras, 2016).

In addition, the diagnosis of teacher education and further education needs of the Professional Technical Colleges of the Technical Education, Subsystem of the Ministry of Public Education, identified deficits in the courses on vocational pedagogical contents due to a mismatch between the contents of study (which teachers for technical education have as part of their training) and the competencies required for teaching practice, so it was determined that there is a high interest on the part of teachers of Technical Colleges in pedagogical and technical refresher courses. (CFPTE, 2017).

These studies have shown that the TVET system in Costa Rica has weaknesses around pedagogy, subject didactics and qualification of the teachers, which raises the question of how teacher training is positioned in the Costa Rican education system and how the qualification of TVET teachers can be strengthened.

In this sense, the Costa Rica Vocational Education and Training Project (CoRiVET), funded by the German Ministry of Education and Research with a duration of four years (2021-2025), aims to strengthen the Technical Vocational Education and Training System in Costa Rica by updating the curriculum of the Career in Technical Specialty Education (EET) of the UTN. All this by strengthening the field of pedagogy, specific didactics, and the area of research at national and international level of TVET, both through the updating of the EET program and the training of teaching staff involved in the qualification of future teachers for TVET. Its specific objectives seek to:

- Analyze the curriculum of the Technical Specialty Teaching (EET) career of the Center for Pedagogical Training and Educational Technology (CFPTE) of the UTN, through a participatory diagnosis to actualize the EET career in specific didactics, TVET pedagogy and knowledge of the TVET system.
- Strengthen the field of TVET research through the development of institutional and professional processes of UTN personnel, as well as other strategic actors of the TVET system in Costa Rica.

For the above reasons, this article is proposed to respond to the objective of analyzing and actualizing EET by presenting the results of the analysis of data collected through semi-structured interviews conducted with different key actors of the TVET system in Costa Rica within the framework of the CoRiVET project. With a focus to obtaining a holistic view of the current state and the needs, challenges, and future actions for EET in relation to structure, content and pedagogical qualification. The results of the diagnoses are mainly based on a hermeneutic analysis.

MATERIALS AND METHODS

This article is based on a qualitative analysis of the structures, contents, and challenges of the pedagogical qualification of future TVET teachers in the Technical Specialty Education program at the National Technical University (UTN) of Costa Rica. This program is the focus of the CoRiVET project, which is carried out through bilateral cooperation between the University of Osnabrück (Germany) and the UTN, Costa Rica. The aim of the study are the indispensable requirements to be identified in order to actualize the EET curriculum with regard to - among others - the pedagogical and technical-didactical aspects of teacher qualification for TVET in Costa Rica. In this way, the CoRiVET project is taken as a basis because one of its main focuses is the revision of the EET curriculum and the related needs, experiences and challenges. To do this comprehensively, the project uses qualitative research methods and procedures, such as semi-structured interviews of expert, which play an important role in the needs analysis to gain information at the macro, meso and micro levels of the EET curriculum. The individual steps of the qualitative surveys and the evaluation process are described below.

In this case, interviews were conducted with different strategic actors of the study program of the profesorado and bachelor of Technical Specialty Education of the UTN utilizing a non-probabilistic sampling. Since the spectrum of actors involved in the TVET system is broad, the delimitation of a sample is proposed to collect information. It is worth mentioning that, in the qualitative methodology, although the examples are not statistically significant, they seek to represent the object of study. In this sense, a mixed sampling strategy is proposed, which combines the three types of sample and allows triangulating information and corroborating the results at different levels, as described in Table 2; in addition, the choice of data collection techniques and instruments was made taking into consideration the health crisis caused by the pandemic due to the SARS-CoV-2 virus (COVID-19), declared on March 11, 2020, by the World Health Organization (WHO, 2019); facing this situation, the information phase was 100% virtual.

These samplings were based on the relationship with the research process, according to the following classification:

- *Developers*: Decision makers throughout the history of the EET.
- *Executors*: Teachers who teach the EET curriculum.
- *Main TVET Schools in Costa Rica*: Teachers of the National National Apprenticeship Institute (INA) and the Ministry of Public Education (MEP).
- *Companies*: Employers in the area of Human Resources and Management who have experience in hiring people with a professional qualification level.
- *Politicians*: Relevant actors in the historical context of TVET.

TABLE 2
TYPES OF SAMPLING TO BE USED IN THE APPLICATION OF INTERVIEWS

Type	Description	Application
Sample of experts	They are frequently used in qualitative and exploratory studies to generate more precise hypotheses.	Persons with a high level of knowledge in an area and who can provide specialized criteria on the study problem are sought.
Diverse or maximum variation samples	They are used to show different perspectives and represent the complexity of the phenomenon under study, or to document diversity to locate differences and coincidences, patterns and particularities.	Subgroups are selected to document differences and commonalities in diversity.
Convenience samples	They are made up of the available cases to which access is available due to various factors such as time, resources, distance, willingness to participate in the process, among others.	Ease of access, availability of people to participate in a given time in a virtual way are taken into account.

Resource: own elaboration according to Hernández et al., 2014, pp. 387-390

In the application, this classification made it possible to learn about the macro, meso, and micro levels of structure, concepts, specifications, state regulations, qualification levels and competencies of teachers and students, application of the curriculum, teaching practice, competencies among students and teachers, content and methods of application in the units, among other topics. Specifically, it also facilitated the positioning of TSE needs in the context of the Costa Rican TVET system and the realization of the curriculum in terms of the theoretical profile of the courses and implementation related to the students' skills and competences.

To the analysis, the sociological hermeneutics of knowledge was used. The following was considered: hermeneutics belongs to the theoretical foundations of the sociology of knowledge and, specifically, to the methodological foundations of qualitative social research. It aims to interpret and understand (Villarreal Valera et al. 2018) the analysis of data, the analysis of structures and the construction of models that reconstruct the social meanings of all forms of interaction (subject-subject/institution) that allow the "explanation, interpretation and understanding of these social texts conceived relationally" (Villarreal Valera et al. 2018).

In this sense, hermeneutics captures the meaning of the symbols of the actions of subjects and organizations through interpretation. It examines how issues (in this case, expert persons) are situated and socialized into routines and interpretations that have developed historically and socially in a particular pattern of action (patterns, types, orders, structures).

The hermeneutics of sociological knowledge works in a structural-analytical way because the behavior of actors can only be understood if it is put concerning certain models of action. Therefore, for the analysis of the interviews, the following points are pursued:

- The "reconstruction of individual and social structures of meaning" (Kurt/Hebrik 2014, p. 477). Sociological hermeneutics of knowledge interprets texts concerning the respective social context and attempts to understand them more closely employing theory (Schröer, 1997).
- The research perspective is the description of the production processes of social orders. In this sense, the EET curriculum, for example, was created based on the National Council of Rectors (CONARE) specifications. In this context, the negotiation process and the design order of individual actors are relevant: How and why did the program develop the way it did and what factors were relevant to it?

- Comparison between the induced intention and the practiced reality. “The understanding of a text is only possible from a pre-understanding or prejudice that the researcher [sic] projects on that object, a prejudice modified by the text, giving rise to a new understanding of it, and so on." (Briones, 2002, p. 36).

Likewise, it is considered that in contemporary social research, revisions three key considerations are required (Sotolongo and Delgado, 2010, p. 48-58 cited in González, 2018, p. 914): 1. the mutation of the status of the knowing subject, 2. the resizing of the objects of knowledge, and 3. the location of subjects and objects of knowledge in a creative practice that responds to their own constitutive operations. For this reason, hermeneutics is concerned with the real perspective of actors in relation to the reconstruction of structural problems (regardless of whether the actors are aware of these problems) and the reconstruction of the possibilities of action to solve the problem and, therefore, the need to adapt scientific interpretation to the interpretation of social actors so that a criterion of hermeneutic validity emerges from this recognition. On the other hand, for the application of hermeneutics in the social research processes, a basic evaluation procedure is used through the hermeneutic circle (sequential analysis), which requires the following:

- The focus is not on the text, but on the context to be represented - context of the world of life, e.g. rules, norms, structures, a certain system (Knassmüller and Vettori 2007, p. 304).
- For each interpretation, conditions are formulated based on the analyses, which must be verified in a sequence; this involves justifying the thesis or refuting it (Knassmüller and Vettori 2007, p. 309).
- The above aspects are at the core of the socio-analytical intervention for this case of institutional analysis (Hess and Savoye, 1998 cited in Gonzalez, 2018).
- The hermeneutic circle deals with expanding knowledge in understanding through the relationship between the particular and the general (abduction and induction). In this context, the relationship between theory and practice can be recognized as a crucial aspect of understanding (Lamnek 2005, p. 65). This means that reflection on social contexts (theory) involves a social reality or its perception (practice) and attempts to bring it into a context of understanding. In the process, specific ordering schemes become visible, contributing to a better understanding of practice (Lamnek 2005, p. 65)

The hermeneutic circle thus shows that the parts can only be understood concerning the whole, and there is feedback from the whole to the individual parts (sequences). The path to understanding social reality using the example of the Costa Rican TVET system leads from the whole (theory) to the parts (practice) and vice versa; this can be described as understanding in “concentric circles” (Gadamer, quoted from Betti 1962, p. 42). In that sense, hermeneutic circles can be used to understand the relationship between theory (laws, orders, methods, formal objectives…) and practice (lived reality).

A hermeneutic analysis of the interviews conducted in the CoRiVET project is proposed below. These semi-structured interviews respond to questions posed at different levels, such as: among others, the emergence and development of the EET program, its implementation and objectives, the link with the TVET context, and the socio-political perspectives of teacher education for TVET.

To create the questionnaires for the experts and to holistically identify the relevant EET factors, a matrix containing categories at macro, meso and micro levels was previously created. These categories are presented in Table 3 as follows:

TABLE 3
CONNECTION BETWEEN MACRO-, MESO- AND MICRO-LEVEL CATEGORIES OF ANALYSIS FOR THE ANALYSIS OF THE INTERVIEWS AND TO HOLISTICALLY IDENTIFY RELEVANT EET FACTORS

Levels of analysis categories		
Macro	**Meso**	**Micro**
• Financing. • Responsibilities • Laws/Rules/Regulations • Stratification • Requirements • Objectives/approachess: Competencies and skills	• Structure • Curriculum • Pedagogy/Didactics • Requirements for students and teachers etc. • Actors involved • Standardization/Recognition.	• Linking theory and practice to curriculum and teaching • Course development and design/ teaching process design • Structuring the learning phases • Evaluation of the learning process.
Some examples • Development, design and control of the EET • Graduate profile and institutional objectives • Educational objectives of the UTN and the career (TSE) • EET legitimization	• EET Structure • Individual module objectives • Structure and content of the modules • Definition and application of didactic concepts and models	• Design of individual teaching-learning processes by teachers • Linking theoretical and practical contents in the teaching-learning process (application tools). • Evaluation of performance, competencies and objectives achieved

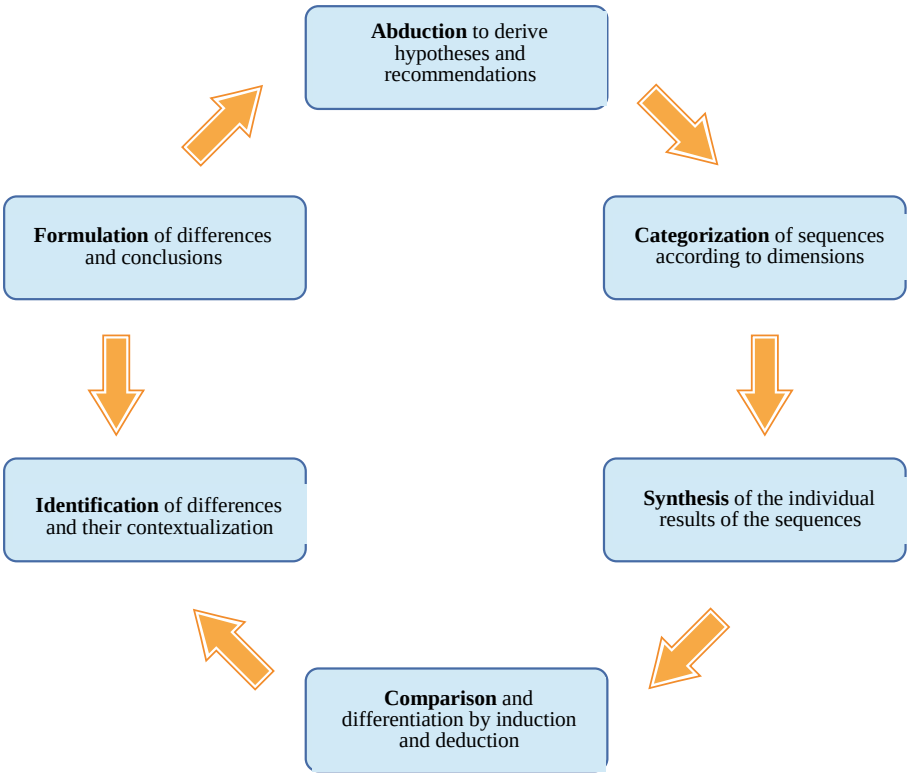
Through the categories of analysis in Table 3, the information obtained in the semi-structured interviews was assigned to the corresponding levels (macro, meso and micro) to implement the hermeneutics and its associated process. With this application, it was possible to demonstrate various sequences on topics from the EET curriculum and on the application of specific didactics or pedagogy for TVET. In addition, the individual sequences of the levels were synthesized concerning their central statements to capture a complete picture of how they relate to each other.

Subsequently, the results obtained from these interviews were compared with theory, legal bases, normative materials (such as CONARE guidelines), scientific debates and institutional regulations of the UTN.

This step accommodates the deduction and induction, with the objective of identifying differences and similarities and the possibility of developing reasoning contexts for certain findings from theory and practice. In general, this deductive and inductive analysis step aims at formulating differences and conclusions in order to translate them, through theoretical analysis and iterative stages of contextualization, into a derivation of hypotheses and recommendations for action for actualizing the content, structure or didactic adaptations of EET; the formulation of hypotheses or conclusions is an essential step of the hermeneutic analysis.

According to this concept, a problem must first be recognized, and understood and its significance recorded (Tischer 2009, p. 2). With this approach, important phenomena of a system can be identified and the procedure can show how the various vertical interrelationships are put into practice, which problem situations result from this and to what extent what is intended in theory can also be found in practice (Rommel, 2021, p. 109). Figure 1 summarizes the explanations of the individual application steps in the framework of the analysis through the individual categories in Table 3.

FIGURE 1
STAGES OF HERMENEUTIC ANALYSIS



The results obtained in this process and the associated recommendations for action are described in the following chapter as examples based on three levels of categories, including elements such as curriculum, pedagogy, and the legitimization and importance of EET. In general, a discussion is presented between the scientific and formal-theoretical explorations of EET with the sequences and synthesized results of the interviews.

DISCUSSION OF RESULTS

The discussion of the results is established around three identified focal points that were to be essential in the context of the hermeneutic analysis. The first result is related to the structural and content integration of the TVET subject in the EET curriculum. The EET curriculum shifts the focus from learning to teaching, establishing new roles and responsibilities for the faculty as mediator. The student body becomes an active participant and constructor of their own learning while the teacher assumes the role of facilitator, varying the way they interact with their students, the way they plan and design the learning environment (*Plan de Estudio EET, Conare,* 2016, p. 13). At the same time, the EET study plan points out that the design of teaching and learning processes should be oriented to the professional field of TVET, so that EET graduates can be more easily inserted into the world of work. Specifically, it shows that EET specializes in technical and vocational training (Plan de Estudio EET, Conare, 2016, p. 13). Therefore, the objective of the curriculum should be interpreted about a corresponding linkage to the TVET system.

The analysis shows that no module addresses structural, content, or other issues of Costa Rican TVET. Therefore, no module of the EET program is intended for introducing and discussing the future field of work of its graduates. Nor is it intended to determine what the TVET system is and what prerequisites are necessary to, for example, design teaching-learning processes in technical schools in the specific field of training future professionals for the labor market. This is confirmed by a study on EET conducted by a

group of female researchers in 2016 at the Center for Pedagogical Training and Educational Technology (CFPTE) of the UTN (Castro et al. 2016). The aim of the study was to evaluate course profiles, whereby it became apparent that not only a better systematization of the curriculum is needed to avoid overlaps in content, but also to ensure points of connection between the curriculum content and the requirements of the TVET context itself.

Thus, only an informal orientation to the TVET system and/or a non-systematized integration of the curricular work from the MEP was identified. However, they do not address and extend the orientations and understanding of the system to other TVET educational institutions, such as INA, which represent future fields of work for graduates (based on the EET 2016 Study Plan). This can be illustrated to some extent by the history of the founding of the university (UTN) and the CFPTE where EET is offered.

Ultimately, the events surrounding the founding of UTN, which was based on an alliance of various institutions, eventually led to the development of the EET curriculum both internally and externally. This is based on the fact that the central parts dealt with in this curriculum originated from the former institution, the Research Centre for the Improvement of Technical Education (Centro de Investigación del Perfeccionamiento de la Educación Técnica, in Spanish (CIPET)), which was attached to the MEP as a decentralised institution. In addition to teaching for TVET, it's also functioned as an institution for research and consultancy to attract teachers to TVET. In view of this, the EET still tends to focus on offers from TVET institutions, here from the MEP, which is not linked to an integration of an overall focus. This situation exposes the importance of strategically linking variables of the TVET system in the EET, which can provide new conditions for the role of EET in the TVET system now and in the future.

This is also viewed critically by the various experts in the TVET system, teachers, and other stakeholders, as they point out that graduates are in *"a kind of shock"* when they are in TVET schools for the first time because students who become teachers in the system have little knowledge of the dynamics of TVET educational institutions:

> *E9: "when I talk to them about TVET, they are shocked. They don't know that there is a technical coordinator, they don't know that there is a coordinator with the company, they don't know that there is a link between the schools (…)."*

> *E6: "(…) So, if the curricula can be contextualized to the reality, not only to know something from the MEP, where precisely technical education within the MEP is discussed, to talk, for example, about TVET processes within the National* Apprenticeship Institute *or other institutions, I think it would be very useful for our student population."*

Statements indicate that this topic should be of high relevance in TSE: the history of TVET, the specific introduction to the respective curriculum, functions, and structures, among others, of the system. Therefore, the CoRiVET project will meet the demand for a specific module on the subject of TVET.

> *E18: "Include the history of TVET in the introduction to the curriculum. It is necessary to consider the possibility of creating a course on TVET in Costa Rica. The new course should contemplate the functioning of the TVET system, structure, and financing: since it is not clear in the current program."*

From the analyses and the steps of induction and deduction, it can be affirmed that there are no curricular guidelines for the thematic integration of the TVET system in EET. At the same time, one of the objectives of EET is for graduates to structure and apply the teaching-learning processes in terms of the future field of work in TVET. The curriculum is very general in content and structure and does not include any TVET-specific modules. This is considered critical in the context of the curriculum and TVET stakeholders because the curriculum currently has little or no link to TVET, and graduates have little or no significant knowledge of the stakeholders, structures, and other aspects of Costa Rican TVET when they leave the program and enter TVET schools.

The second outcome addresses the TSE EET curriculum's methodology and didactics for TVET. The UTN promotes comprehensive training that combines technical knowledge with pedagogical skills. This is done through an emphasis that, in pedagogical practice, links the knowledge acquired in the technical specialty with the pedagogy taught in the program. The pedagogical discourse and the application of pedagogical practice at the UTN are based on the concept of biopedagogy (Plan de Estudio EET, Conare, 2016, p. 13).

Biopedagogy is an epistemological position that proposes humanization in the teaching-learning processes by considering the complexity and holistic vision that permeates them. As learning is a "natural and indispensable condition of life" it focuses the learner in its totality, considering the multidimensionality of its essence and the interaction that it establishes with its environment (UTN, 2018). It is assumed that in the course of its (biological) growth, the individual acquires learning content from its personal experiences as well as from the relationships it maintains with other individuals and with its environment, transforms it and organizes it to sustain life. Therefore, it can be conceived as learning from, through and for life. In this sense, from the educational model of the UTN (2018), they project ecoformation as an educational strategy to materialize the principles established by biopedagogy, which conceive that learning is articulated with the entire surrounding system. Therefore, it is essential to understand that ecoformation "assumes the existence of ecosystemic interdependence between "human beings, the environment and thought; between human beings and their development processes, between the subject and the context, between who educates and who is educated; between the subject and the object: between being, knowing, doing and living/coexisting" (Badilla 2012, quoted in UTN 2018, p. 9).

The methodology for implementing the teaching-learning processes is described through critical case analysis, problem-solving, field research, simulations, etc. For these reasons, EET works with educational processes that promote innovation, entrepreneurship, ecological responsibility, good lifestyle and interdisciplinarity at work (Plan de Estudio EET, Conare, 2016, p. 16f.).

One of CONARE's specifications for EET is the training of teachers who combine the knowledge, skills, and attitudes of a technical discipline with pedagogy and transform pedagogical practices to improve teaching and learning processes (Consejo Nacional de Rectores 2016, p. 3f). In this way, it is intended to train teachers who implement knowledge and skills in the management of new technologies and the use of specific didactics to control learning processes that respond to the socio-educational requirements of the new millennium (Consejo Nacional de Rectores 2016). That said, the EET program teaches many theoretical concepts of pedagogy and learning processes; however, an exact definition of what these processes mean for teaching practice and the configuration of teaching-learning processes can only be presented in general terms at this point. The people interviewed state that biopedagogy is a crucial pedagogical concept, although it cannot necessarily be transferred to TVET.

The descriptions in the interviews are diverse. For example, some people believe that the specific course on didactics is aimed at vocational training. Still, if one compares and expands on the statements about didactics and pedagogy in EET, it becomes clear that many interviewees criticize this. Thus, most say that although there is a course on specific didactics, the content and methods are very general. In this sense, no teaching of didactics or pedagogy specific to TVET is part of the course, which is considered an important action in the context of actualize the EET.

> *E1: "(...) "an improvement that we would have to make in the bachelor is specifically to give a didactic called specific didactics, but it has not been achieved that it is a real specific didactic".*

In the context of the surveys, it was noted that teachers claim to demand specific didactics for TVET pedagogy. Among other things, to strengthen the missing connection between pedagogical mediation and the graduates' future field of work.

> *E18: "The topic of didactics has been addressed in the EET program courses in a general way. It is important to create a new course focused on the discussion of didactics in the*

field of TVET. One problem is that it is left to the free (experience of each teacher) to include or not to include these topics in the different courses."

The justifications for the pedagogical and didactic orientation of teacher training in TVET are based on the theoretical analysis of the educational model and the scientific discourses on didactics and pedagogy in Costa Rica. In the end, the interviewees stated that the general concepts are good and pertinent in the context of humanistic education. It is worth noting, however, that bio-pedagogy should be understood more as a philosophy than a set of didactic and pedagogical tools. In general, it can be synthesized from the discussion of the individual sequences that a national discourse on concepts, models of pedagogy and didactics for TVET is missing. At the same time, the analyses reveal that there is no uniform understanding of the conceptual differences in relation to a specific didactics and pedagogy for TVET and that, in fact, they are often used as synonyms.

This is thematized at the individual level not only by maintaining that the pedagogical implementation of pedagogy and didactics oriented to TVET remains in the hands of teachers responsible for EET, but also that the lack of a scientific discourse is an indication that there is a shortage of a characterisation of pedagogy and didactics for TVET and that the corresponding concepts and instruments cannot be transferred in a standardised and systematised way, nor are sufficiently characterized.

An essential thesis that can be deduced from this is the following: Neither at the national or institutional level are conceptual and scientific research on the specificities of TVET pedagogy and didactics, but by actors they are seen as essential to design teaching-learning processes specifically adapted to TVET. In this sense, the various actors mentioned that the main strengths of EET are the contribution it has made in the country in terms of teacher training and its high linkage with comprehensive and humanistic training. However, the interviewees agree that research on new ways of learning and teaching in the world is volatile, so it is necessary to strengthen research and evaluation. It was also determined that EET teachers should have practical approaches to the world of work, in order to gain practical experience in their technical specializations, with the aim of strengthening specific didactics. However, in this regard, there are no clear and precise long-term strategies for building competences or qualifications through the link of the study program to the labor market in context of actualizing the EET.

Consequently, the linkage, articulation and participation among actors is key to homologate concepts, indicators and generate communication processes that allow the establishment of the objectives, structure and reason for being of the Costa Rican TVET system; also, the implementation of vocational learning processes at different levels. This fact provides a decisive framework for action within the CoRiVET project. This is reflected on the one hand in the promotion of the national scientific discussion on a Costa Rican vocational pedagogy and on the other hand in the institutional promotion of this topic for EET.

As a last point of discussion, the legitimacy of the curriculum and its need and function for Costa Rica is addressed. The justification of the curriculum refers in particular to the following aspects: in the proposals for the development of the country's education system, great emphasis is placed on the requirements of TVET in terms of the training of teachers who must have adequate competencies to meet the growing demand of the new technical colleges, academic colleges and universities (para-university institutions and university colleges), as they require trained and updated teachers in technical and pedagogical aspects (CONARE, 2016, p. 5). From the theoretical and empirical explanations, it can be affirmed that the EET program at UTN is unique in Costa Rica in offering its curriculum and approach to teachers through the university bachelor level. This course is a response to the policies and the increase of vocational schools established by the last governments in power in Costa Rica (PEN, 2008).

The various EET stakeholders are aware of the importance and role of the program and constantly refer to its contribution to Costa Rica and TVET.

E13: "So I tell them that rather they are the agents of change and that is the main objective that the training center has from the bachelor in the teaching profession, the bachelor and the bachelor's degree."

E10: "It is essential because it is a practically unique offer in the country (EET) and because it is an offer that positions this teacher profile, (...) from being a teacher trained for academic courses to a teacher trained for technical education (...) it is a way to position more TVET in the country and create a culture that this training, this education, this educational offer is significant because it gives a comprehensive training and also a labor insertion (...)"

In summary, both academic and stakeholder debate address the importance of having future teachers in TVET. Interviewees describe the EET curriculum at UTN as very relevant and valuable. In this context, combining degrees in technical subjects with a pedagogical qualification at the academic level stands out. In addition, the creation of the center (CFPTE) is highlighted within the scientific discourse as a response to the need for teachers in TVET and as a possible link between the different educational systems, as well as the employment system (Ramírez Alfaro, 2011, p. 4)

At the same time, the interviewees point out that the curriculum and the center can play an essential role in recognition of TVET. Thus, in the context of legitimizing the establishment of the curriculum, a coherence and no differentiation can be distinguished between the scientific discourses, the political processes and the argumentation of the interviewees. The coherence is evident in the view that the CFPTE and the curriculum can link the individual subsystems, accentuate and satisfy the need for qualified teachers who develop, apply and implement specific pedagogical knowledge and teaching-learning scenarios for TVET schools.

However, within the TSE EET access requirements framework, the diploma in technical disciplines (specialties with which students come to continue their studies in pedagogy and didactics) have been identified as insufficient. The people consulted in the interviews maintain that it is essential to train technical experts with suitable qualifications and pedagogical skills for teaching. In this context, it was discussed whether access to EET should not only require a diploma in a technical specialty. This, in turn, would be contrary to the objective of allowing the fastest possible access for teachers to EET and thus respond to the quantitative needs of teachers of the system.

E3: "(...) I was saying that if we took away the idea that they could enter the EET with only a diploma, in some area or technical specialty, what would happen is that employability opportunities would be weakened. As much as we explained to them that yes, you can limit employability opportunities, but the other impact is the quality of technical education."

E15: "If you want a quality education system, you must have people in the technical area who are very well prepared. That the entry level be raised maybe not, but the graduation level should be raised so that the person can take both (the technical bachelor and the EET bachelor)."

These statements show that although the importance and relevance of TVET and the need for rapid access to the labor market and therefore to TVET teaching are considered significant and important, some actors reflect critically on the minimum admission and graduation requirements. This marks new academic and political debates on quality and quantity in teacher qualification for Costa Rica in a double sense. On the one hand, it raises the question of pedagogical qualification, but on the other hand, it raises the question of the technical qualification.

CONCLUSIONS

People who decide to become TVET teachers have a job and knowledge demand that is in many ways more challenging than that of general education teachers since they must not only have technical knowledge and experience in the full range of a technical subject, but also know how to transfer these skills and

knowledge to their students and, at the same time, link it to the labor market. In many countries, this teacher training is very general and does not distinguish between general education and technical staff. Thus, programs designed to teach the transfer of practical and vocational skills are less common, and the approach of building skills through practical time in the workplace is less prevalent (Àlvarez-Galván 2015, p. 67). Thus, Àlvarez-Galvan has formulated the need to improve the professional development of teachers in TVET in Costa Rica, considering the updating of knowledge and experience in the sector, as well as pedagogical training (p. 68).

These demands and observations are in line with the results of the analysis carried out for EET within the CoRiVET project. The challenge and need for pedagogical qualification of TVET teachers was also identified as an important factor for actualization. At the same time, the need for in-depth knowledge in the technical field is confirmed in the interviews. This is reflected in the surveys with the demand for a higher entry level in the technical discipline as a prerequisite for the pedagogical qualification in EET.

Thus, the results of this data collection and analysis process serve to actualize the curriculum and to sustainably promote professional pedagogical competencies that foster and support teaching and learning processes for/and in the Costa Rican TVET system through EET. Furthermore, the results obtained and the measures that will be derived from them within the framework of the CoRiVET project correspond to the scientific requirements and needs in the context of the Costa Rican TVET system and teacher training oriented to it.

Furthermore, the further development of TVET didactics aims at enabling different (job-oriented) concepts for the different technical subjects and thus linking this theoretical (technical) knowledge with practical, e.g., vocational training-oriented learning processes, as well as the elaboration and integration of a teaching-learning unit on the topic of the TVET system in Costa Rica with its structures, goals, contents, functions and its history.

The above considers that the qualification of teachers for TVET through the EET curriculum becomes a field that can be used to promote educational systems relevant to the needs of TVET that transcends to productive activities and access to higher quality jobs. Therefore, EET faces the challenges of training in pedagogy and specific didactics that is adaptable to the TVET system and assures a supply for teacher training in the long term, offering to professionals who graduate from TVET programs a possibility of continuing education. Above all, there is currently little supply of careers suitable for the qualification of teachers in the TVET system. In this sense, there is an opportunity to reduce the gap between what is taught in EET and the reality that teachers face when they work in the classrooms of different entities of the TVET system.

In summary, it can be seen that the TVET system in Costa Rica has weaknesses in the field of pedagogy, professional didactics and teacher training, which is why teacher training is one of the most urgent challenges to be resolved to strengthen the system, as well as the development of competencies for TVET research through training programs, in continuous adaptation to the technical, economic and social evolution of the country.

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