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Proposal for an assessment model of the congruence between people and work skills

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Abstract

Rapid changes in the skill set needed in a profession make it easier to differentiate jobs and employment opportunities by the skills required. From this point of view, people's point of contact with organisations is their skills, not professions. Therefore, what matters is people's skills, competencies needed to get the job done, and people's potential in terms of skills development. In this sense, the present proposal aims to establish a framework to identify congruences between the skills mastered by people and the necessary skills in the work context and how to bridge the gap between them. For this purpose, a set of propositions are made: i) competences are the people's point of contact with the organisation; ii) skills do not shape people, people shape their skills, iii) professions can be defined through associated skills, iv) people more easily acquire skills that are closer to those they already possess. Based on these premises, a skills model is postulated, which can be named Person-delivery Environment-work Context (PEC). This model is interested in the fluidity of a person's skills and the autonomy over the development of these skills. To put it into practice, this model needs the following five steps: i) identify the most common skills in the labour market, ii) classify the skills identified to make exploration possible, iii) identify the representation and frequency of a given skill in each profession and the labour market, iv) create a methodology for identifying and measuring personal skills, v) create a way to calculate proximity between the person's competences (P) and the work context (C). In the proposed model, there are two observable data: the existence of competence in the universe of the work context and the presence of competence in a person. It is expected that this model will make possible the identification of congruences between people and organisations and the skill development possibilities for a person. Some limitations can be listed, but the main one is that people and work are reduced to skills in this model. However, its applications can only be thought of as part of a broader career development process that considers people and their potential and the means of developing them, obtaining satisfaction, and having decent living and working conditions.

Keywords: skills assessment, model, skills gaps, career development, upskilling, reskilling

1. Introduction

In the last few decades, the labour market has dramatically changed driven by a demand for new skills (ILO, 2020). However, in The Second Machine Age, training does not evolve quickly enough to follow new skill demands (Brynjolfsson & McAffe, 2014). In this sense, there is a need for skills training, but at the same time, there is a need to identify what skills are needed in the labour market and what skills people should acquire or develop (ILO, 2020). Many efforts have been made, and many more are necessary (Andersen et al., 2021). This proposal aims to help these efforts by establishing a framework to identify congruences between the skills mastered by people and the necessary skills in the work context, and how to fill the gap between them. The text is organised into two parts. The first part is centred on the theoretical foundations of skills definition and development. The second part presents the model and a methodology proposal.

The modern debate over job skills began with McClelland (1973). The author does not directly define skills but makes references to "superior on-the-job performance" (McClelland, 1973, p.2). A skill, in this text, is a personal characteristic related to superior performance in performing a task or in a given situation. This inaugural text differentiated skills from aptitude, something more associated with a person's natural talents but that can be improved. It also differs from abilities, which would demonstrate a particular talent in practice, and knowledge, which refers to what people need to know to perform a task (Fleury & Fleury, 2001). In the following decade, Boyatzis (1982) analysed data from studies on managerial skills and identified a set of characteristics and traits that he believed to define superior performance. This notion of performance or superior performance permeates many models in the area and has imbued the idea of quality of performance per specified quality criteria (Spencer & Spencer, 1993).

Following these initial studies, skills can be thought of as a set of knowledge, skills, and attitudes (Fleury & Fleury, 2001). Skills refer to using one's knowledge effectively and readily in execution or performance (Merriam-Webster, n.d.), while competence, on the other hand, is a quality or state (Fleury & Fleury, 2001). In the original work, McClelland (1973) uses the word skill to point to competence in a specific domain (e.g., job skill, academic skill). A skill can then be seen as a stock of resources that people have to perform their tasks (Spencer & Spencer, 1993). However, most studies, especially in the 1990s and in some contexts, such as the American, aligned competencies with the needs established by the position or existing positions in organisations (Fleury & Fleury, 2001). Rankin (2002) describes competencies as the skills and behaviours that organisations expect their employees to practice in their work. In the world of work context, skill is frequently presented in the language of performance and is more associated with organisations than with people. It is argued that this form of understanding provides a common and universally understood way of describing the expected performance in many different contexts (Armstrong, 2006). Here, the concept of skill is still considered in relation to the task and the set of tasks that are relevant and belong to a job in the official descriptions adopted in many countries (ILO, 2012). However, these definitions are still based on the principles of Taylorism-Fordism and would not be the best definition for twenty-first-century competencies (Fleury & Fleury, 2001).

A different concept of skill emerged in the French literature of the 1990s and tried to go beyond concepts associated with organisations and formal qualifications. Zarifian (1999) argues that

the main changes in the world of work justify the emergence of a new model of understanding for skills. These changes, which occurred in the transition from an industrial to a postmodern society, brought instability in the paradigms and studies on careers and work (Duarte, 2013). In industrial society, there were few points of decision (Patton, 2005), but the changes that occurred in the work environment at the end of the twentieth century have permanently shaken the notion of stable and linear careers and skills (Watts, 1996). People would have a more active role in their trajectories (Patton, 2005). Work is no longer the set of tasks associated descriptively with the job, but it is associated with the individuals and the skills they must have when facing professional situations, which are increasingly changing and complex (Fleury & Fleury, 2001). Skill is not limited to a stock of theoretical and empirical knowledge held by the individual, nor is it derived from the task and the job (Fleury & Fleury, 2001). Skill can also be seen as practical intelligence applied to the work context, based on acquired knowledge and experiences (Zarifian, 1999).

1.1. Skills as a point of contact between the person and organisation

The Theory of Work Adjustment (TWA) reflects a long history of investigation and strong links with the psychology of individual differences with its emphasis on psychometry (Dawis & Lofquist, 1984). Considered a person-environment adjustment model, the TWA evolved from trait and factors models, but, although it is still described as a model of correspondences between a person and work, it also highlights personal processes (Pattom & McMahon, 2014). That is, the TWA does not only focus on matches between people and their jobs but includes personal input, like personality, cognition, and behaviour.

The TWA proposes that people look for organisations and work environments that adapt to their needs. The organisation, in turn, looks for people who can fulfil the organisation's objectives. The term 'satisfaction' is used to indicate the degree that the person (P) feels satisfied in the work/organisation context (E), and satisfaction is used to designate the degree that E is satisfied with P. The most central need for P is discovering in E the needs (or reinforcers), which can be further divided into categories of psychological and physical needs that are called values. For E, however, the most central requirements are competencies, which are operationalised as dimensions that P has, and which are considered necessary in a given E (Leung, 2008).

As an adjustment theory, the TWA focuses on the process of people adapting to their work contexts, but it actually consists of two models: a predictive model and a process model (Dawis, 2005). The predictive model focuses on the variables that explain people's satisfaction within their work environments and people's capacity to have satisfactory performance or satisfactoriness (Hesketh & Griffin, 2006). This relationship, in turn, predicts the permanence of people in work contexts. The process model focuses on how the fit between people and their contexts is achieved and maintained (Swanson & Schneider, 2013). The TWA process model postulates that a person has a set of needs and values that can (or cannot) be met by rewards available in the workplace. The work environment has a set of requirements that can (or cannot) be met by the competencies and abilities that the individual has. Each of these crossings between individuals and their environments is described by the correspondence or absence of these characteristics (Swanson & Schneider, 2013).

Thus, the point of contact between people and their work, for the TWA, is, on the one hand, skills, and on the other hand, personal values and the work context (Dawis & Lofquist, 1984).

The models proposed in this theory, to some extent, move away from the trait-factor perspective, which roughly deals with the correspondence between the person and the work (Leung, 2008). Although it is still a theory focused on content and is based on the notion of correspondence and congruence (Patton & McMahon, 2014), it does not fail to consider the person's self-determination concerning their careers (Swanson & Schneider, 2013). People are not the focus of correspondence, but their skills, and these skills are formed in the interaction of their stories, contexts, personal characteristics, and behaviours (Lent, 2013).

1.2. Developing skills and approximate skills

Underlying the ideas of the TWA, there is the notion that some degree of assimilation of the person to the work context is necessary. As soon as the person is assimilated into this context and at the same time assimilates to it, in many aspects, there is no differentiation but interaction (Harren, 1979). Taking as a starting point that there is a process of assimilation in this adjustment, the definition comes close to the processes described by Piaget's Genetic Epistemology (1971). The approach is merely illustrative, but in this example, the interaction between people and the work context can be conceived as a dialectical process of assimilation, accommodation, and balance in mutual and progressive development. There are successive phases of balance and imbalance, rebalancing that aim to incorporate new content into pre-existing structures. Another fundamental concept is that adaptation occurs when the organism changes to dynamically integrate new information (Abreu et al., 2010). Therefore, the assimilation, accommodation, and balance of a new skill can be conceived as the learning process itself, through which skills become part of the person's cognitive structure based on pre-existing structures. Previous knowledge structures around specific abilities interact with new demands and the work context to generate new structures to be incorporated by people.

Piaget's ideas proved to be valid in adults (Long et al., 1979), although his work was notable for the study of children, as it encompasses the acquisition of knowledge by all people, from birth to adulthood (Abreu et al., 2010; Padua, 2009). The model corresponds to the notion of scaffolding, with origins in Vygotsky, and is associated with hints or clues for problem solving that allows the individual to better approach similar situations in the future (Bruner, 1983). The tutors, commonly cited in the field, are these scaffolds that help in building knowledge and developing new skills. In the case of adults, the role of external tutors changes and allows space for autonomy (Botti & Rego, 2008). People move in the environment towards the acquisition of those competencies that they consider relevant. This differentiation is important to understand the notion that people exercise their capacity of agency in the skills they consider relevant (Bandura, 2006).

The interaction between a person and the environment is the driver of Holland's theory (1959). The secondary constructs of the theory (i.e., congruence, identity, consistency, and differentiation) are good references in the process of vocational decision-making and interventions (Reardon & Lenz, 1999). However, the central postulate of the theory is the classification of people according to occupational characteristics, generating a typological model with six divisions: Realistic (R), Investigative (I), Artistic (A), Social (S), Entrepreneur (E), and Conventional (C)—(RIASEC). The model can be spatially represented in a circle, and the similarity among types is given by proximity within the circle. That is, R is adjacent (similar) to I, but opposite to S. The model is still considered influential (Ishitani, 2010), and the typology is widely used (e.g., Etzel et al., 2021).

Environmental models like RIASEC arise from the assumption that, just as it is possible to classify people by comparing them with personality types, it is also possible to classify environments by comparing them with environmental models (Holland, 1975). The occupational environments proposed by Holland are both real environments in which the person is located and a typology of personality. They are a style and an environment. The theory assumes that the family, social groups, school, university, and work are environments subject to classification according to career preferences. The characteristics of an environment depend on the characteristics of its members. Knowing the type of people that form a group, it is possible to deduce the environment that this group sets up (Holland, 1975). People (each with a specific type) will seek environments or environmental types that enable them to exercise their skills and abilities, express their attitudes and values, and assume roles that are consistent with their personalities (Teixeira et al., 2008). The behaviour, therefore, is determined in the interaction of personalities and environments. The proximity between these personalities and environments is called congruence and is based on the hypothesis that the types (Realistic, Investigative, Artistic, Social, Entrepreneur, Conventional) are arranged in a circle. Some works within this field of investigation have evaluated congruence through direct correspondence between types (Grandy & Stahman, 1974; Dewinne et al., 1980) or with proximity formulas (e.g., Orent et al., 2013). The study of Oren and colleagues is an example of the RIASEC circular hypothesis. More recent works (e.g., Etzel et al., 2021) are based on the circumflex model of interests, with its underlying axes—People, Things, and Data Ideas (Prediger, 1982). These works use more complex calculations with a vectorial structure but maintain the idea of circular distribution (Nagy, 2017).

The two presented theoretical premises, Piaget's genetic epistemology (1971) and Holland's model (1959, 1992), are relevant to thinking about a person's skills, above all because of the possibility of a spatial representation. The notion of assimilation, accommodation, and balance of a skill translates movement; the notion of the types of RIASEC represented spatially translates representation in a space of action. In this sense, Holland's proposal has some relation to the representation of the living space proposed by Lewin (1936, 1973). Translated adequately into the study of work skills, the combination of these forces that are set in motion can be a valid alternative to think about the set of possibilities that people have in terms of their skills.

2. The Person-delivery Environment-Context Model (PEC Model)

Until now, the ideas have briefly focused on skills in the work context, their conceptualisation, relationship with professions and the work context, and the learning process. But the underlying reasons for acquiring this or that competency involve complex reasons in a complex process. Certainly, proposals that integrate the person to their contexts, such as the socio-cognitive theory of career (Lent, 2013; Lent et al., 1994), can answer these questions. In this sense, the theories of self-concept and career development formulated by Super, and more recently by Savickas (2002), and content and process derived from the socio-cognitive perspective, such as the social learning theory of Mitchell and Krumboltz (1996), are an adequate response to the process.

However, the objectives of this proposal are to propose a framework capable of illustrating how personal skills can be associated with skills existing (or required) in the work context. This association will help people to: develop new skills in the same work context (e.g., new possibilities within the same job or a new position in the same workplace); apply their skills to

a work context (e.g., looking for a job); and apply new skills to new work contexts (e.g., changing jobs). Based on these objectives and the train of thought elaborated, it is possible to trace some lines of action which, in turn, can be converted into a set of propositions:

a) Skills are the person's point of contact with the organisation.

A skill is a set of abilities (knowledge, skills, attitudes, and values) that people mobilise to deliver something that adds value to the person and to the work context in which it is inserted (Fernandes, 2013). Skills, in this sense, are the point of contact between people and the organisation (Dawis, 2005; Fleury & Fleury; 2002).

b) Skills do not shape people; people shape their skills.

People's skills are formed by personal characteristics (values, aptitudes, needs, etc.) during the interaction and contact with a certain task. If we think about a profession without this entity, it is possible to observe with more relevance the skills that compose it and that are mobilised to create something, be it a product, service, or process. Every work activity to be done needs a series of skills. People approach every work activity through their skills. Thus, people actively use their skills, which are not traits, but malleable characteristics (Dawis, 2005).

c) Professions can be defined through associated skills.

Skills are ultimately the factor that creates clusters that allow for a more accurate differentiation of professions (Gotfredson, 2005; ILO, 2012). A similar idea is adopted in professional classifications, where the differentiation between professions in smaller groups is based on identifiable skills (ILO, 2012).

d) People more easily acquire skills that are closer to those they already possess.

People assimilate new skills to pre-existing cognitive schemes (skills already acquired), so it can be assumed that workers have an interest in skills that are familiar to them (Abreu et al., 2010; Piaget, 1971). In the work context, whether in a new task or a new job, it can be hypothesised that people act according to this same logic. Thus, there is something like a skill development process in quantity and complexity. This proposition is in part associated with theories of learning transfer, which can be understood as the productive application of previous learning and experiences to new contexts (Hajian, 2019). This approach to context must be extrapolated from the simple change of environment to flexibility in applying a skill to different situations, which will lead to the alteration of that initial skill (Perkins & Salomon, 1989). In concrete terms, a person who knows a certain programming language receives a project to develop a new application, and in addition to deepening the knowledge of this language, should also be seeking to learn new ones (Hajian, 2019). This will create new connections with other languages, which will help them to acquire future skills in new languages.

2.1. Model proposal

Based on these premises, it is possible to postulate a skill development model, which, by the units involved, can be called Person-delivery Environment-Context (PEC) (Figure 1). This model is interested in the fluidity of a person's skills and in their autonomy over the development of these skills; therefore, the notion that people exercise the capacity of agency over their skills is implicit, as proposed in the socio-cognitive theory (Bandura, 2006). In other

words, people deliberately act on their skills because they are interested in a certain effect, that is, these skills are directed within the person's potential to obtain the desired effect.

FIGURE 1. PERSON-DELIVERY ENVIRONMENT-CONTEXT MODEL (PEC)
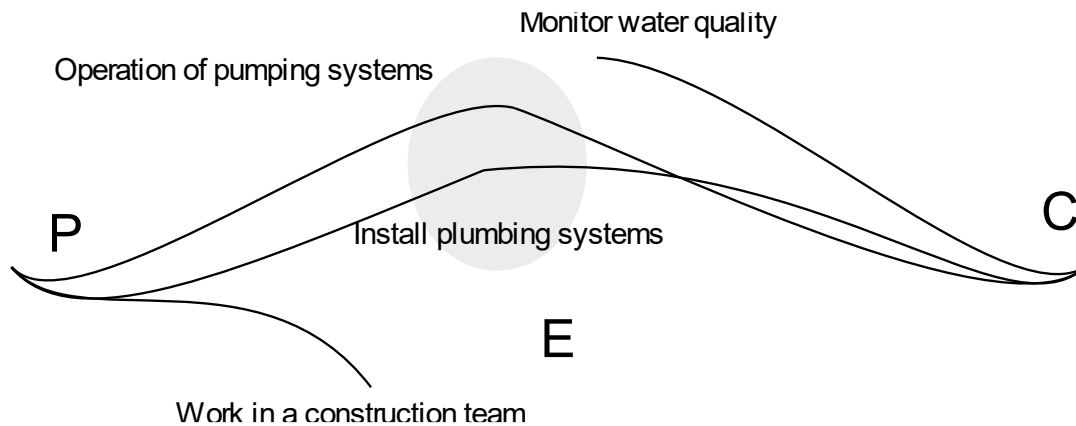
In this model, skills are thought of as lines that connect people to the work context, which in turn has its own lines, or skills that are inherent to it. The point of contact is called delivery, since the lines (or skills) present in the work context (C) are not the skills themselves, but places to be filled by human action. The meeting point is the delivery environment (E), both of the set of knowledge, skills, and attitudes that involve a competency, as well as of the delivery of something that the same competency produces (products, services, processes,). The delivery environment (E) of something is the place of interaction between the person (P) and the work context (C). A specific skill is a line that joins the work context to generate a unique delivery. A new delivery needs to have a corresponding line; a line can come from the subject, as it can branch from another already existing in the person. The context is a matrix of endless lines, and each line represents a skill present in the labour market. People act in a small part of this multiplicity, and the lines (skills) that they manage are limited due to this complexity. But they are fruitful, malleable, and can be reordered and reconfigured by people depending on their orientation.

The work context does not need to have all the lines tied to the person. These remaining lines are necessary skills, but ones that the person can develop. They may develop because the very specific cluster of skills for that job demands it. For example, a worker, with skills in pumping systems, represented in Figure 1, can develop skills with some similarities, such as monitoring water quality systems. The dotted line in Figure 2 represents this new skill, that can bring the worker closer to other lines, such as operating water purifying equipment. The delivery points are diversified, and these points determine the set of skills that the person sees as possible.

FIGURE 2. DETAIL OF THE FORMATION OF A NEW LINE OF SKILL
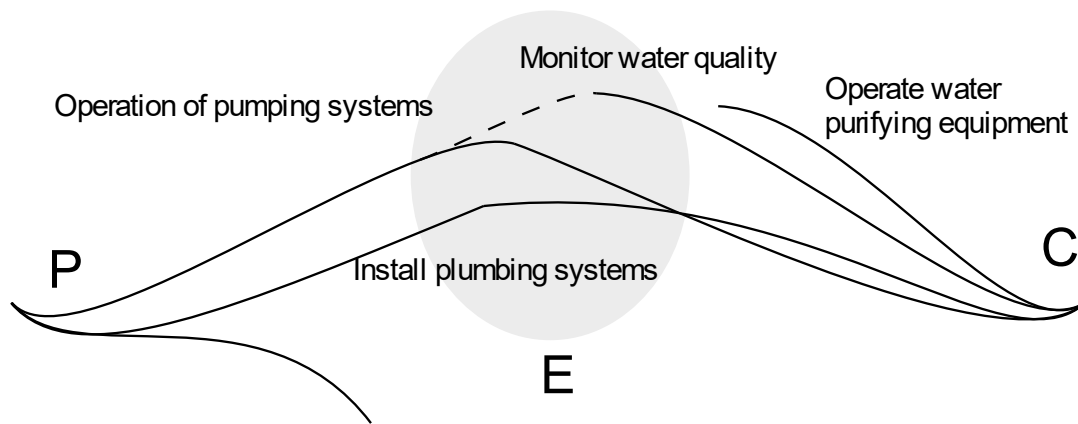
Note: The dotted line represents skills that form from the left, the person's field (P), towards the right, where the work context (C) is.

Thus, if it is possible to keep in mind the set of skills of an individual and the set of job skills available in the work context (C), it is possible to indicate a scope of possibilities for this individual. These possibilities are a function of the peoples' potential, and they are not static. What used to be considered fixed traits can be understood as skills that can be developed through guidance and instruction (Kautz et al., 2014).

In this sense, the present proposal aims to establish a minimum framework to create a system to identify congruences between the skills mastered by people and the skills necessary for a given work context. Identifying these congruences (and discrepancies) would help in at least four situations:

i) developing skills: making new deliverables (e.g., new products and services) in the same context (e.g., same organisation).

ii) looking for a new job: making the same deliverables (e.g., new products and services) in different contexts (e.g., another job).

iii) looking for a new job that employs new skills: making different deliverables (e.g., new products and services) in different contexts (e.g., another job).

iv) looking for a new position: making different deliverables (e.g., new products and services) in the same context (creating new things, a new role).

2.2. Methodology Proposal

For the presented model to be put into practice, it is necessary to complete five steps: 1) identify the most common skills in the labour market, 2) identify the representation and frequency of a certain skill in each profession and in the labour market, 3) identify a classification for the identified skills that makes exploration possible, 4) create a methodology for identifying and measuring personal skills, and 5) create a way to calculate proximity between the skills of the person (P) and the work context.

2.2.1. Listing skills

Identify the most common skills in the labour market.

Despite the differences among the several classifications, there is a need to identify, as accurately as possible, the universe of skills in the labour market, even if this identification will not be stable. An interesting example to be cited is the European Classification of Skills/Competences, Qualification and Occupation (ESCO), which is an official job classification promoted by the European Commission to be adopted in the near future by employment services in European countries. The European Commission launched the project in 2010, as part of the Europe 2020 Strategy, with an open consultation with member countries who are intimately involved in the development and dissemination of the ESCO. The framework was primarily developed to help bridge the gap between the world of education and training and the labour market. Thus, it would be possible to detect incompatibilities between the skills of unemployed workers and the needs of companies (Fernández-Sanz et al., 2017).

The ESCO framework provides a rich description of essential and optional knowledge/skills related to each included profession. It identifies and categorises skills, competences, qualifications, and occupations in a standard way, using standards and terminology in all of the languages. The database is also interesting because it is based on official classifications (ISCO). There is correspondence in the Large Groups, Sub-Large Groups, Sub-Groups, and Base Groups, but not in the professions (ESCO, 2020; ILO, 2012).

Similar jobs such as development by the US Department of Labor (National Center for O*NET Development, 2021) are a sampling of the variability that can exist in job descriptions and associated skills. International classifications like the International Standard Classification of Occupations (ISCO-08) guide studies in several countries; however, due to regional specificities, many countries have their own classifications. The top rankings, such as the top 10 groups in ISCO08, have relative stability across several countries (ILO, 2012). But the complexity and speed of the job market is possibly not covered by these descriptions; just look at the set of more than thirteen thousand skills listed by ESCO.

2.2.2. Quantifying skills

Identify the representation and frequency of a certain skill in each profession and in the labour market.

Most countries do not have comprehensive instruments to assess and quantify skills. Assessments usually involve only a few skills, even though they are extremely comprehensive and significant from the point of view of directing public policies, such as the international assessment program of adult skills (PIACC) led by the OECDE (Wilson, Tarjáni & Rihova, 2016). This project uses assessments of cognitive, social, and physical skills (OECDE, 2106).

In addition to traditional techniques, such as interviews and questionnaires aimed at workers and managers, the ILO, in a recent publication, has highlighted work using big data and machine learning techniques (ILO, 2020). In the last twenty years, the labour market has seen the exponential growth of job offers with the help of portals that greatly facilitated the process of disseminating information (Giabelli, et al., 2020). For some time now, this information has been considered valuable in understanding the labour market and guiding workers (CEDEFOP, 2018; Giabelli, et al., 2020; Zhang et al., 2019). Projects like the Real-time Labor Market Information on Skill Requirements: Setting up the EU System for Online Vacancy Analysis,

CEDEFOP explores online job vacancies (OJVs) as a new source of information about the job market in real-time.

2.2.3. Classifying skills

Identify a classification for the identified skills that make exploration possible.

From the thousands of divisible skills (ESCO, 2020; Linkedin, 2020), several classifications can be distinguished, but a review of these classifications reveals that they are often confused (Javed et al., 2019). Even when new skills are identified, they may not be new skills but just renamed (Javed et al., 2019). The finding indicates that there is an overlap of skills and a lack of consensus on definitions (Burrus et al., 2013; Jang, 2016; Su et al., 2015). However, apparently, four schemes show greater coherence (Javed et al., 2019): enGauge (Cheryl, 2002), P21 (Greenhill, 2009), SCANS (1991), and the ONet* report (National Center for O* NET Development, 2021). The other commonly used systems are derived from these main ones (e.g., Ananiadou & Claro, 2009; Binkley et al., 2012; Finegold & Notabartolo, 2010).

It is necessary to make an important distinction: the classifications of professions, such as ISCO-08 (ILO, 2012), are based on the profession, its tasks, and activities. These classifications only include skills needed in the workplace and do not tie into associated skills from one profession to another. Alternatively, approaches that see the professional through the skills, not the skills through the professional, can achieve a more integrated and real view. The ESCO Platform (European Skills, Competences, Qualifications and Occupations, 2021) lists 12,000 work skills. The curriculum portal and the Social LinkedIn network lists 36,000 skills (LinkedIn, 2020). These examples show that a skill represents a real need from the labour market; making it perhaps more important than described professions. Based on this information, it is observed that there is a need to adopt classification structures in order to make possible a certain universalisation (Armstrong, 2006), or at least to provide some guidance to workers, recruiters, and organisations (Javed et al., 2019). Considering that the use of a given skill is not uniform, each profession has a quantum of use (ONET, 2021) or relevance of that skill (CEDEFOP, 2020).

2.2.4. Measuring individual skills

Create a methodology for identifying and measuring personal skills.

Professions' classifications do not represent the real skills needed, nor do they effectively recognise that professions are typically sets of skills. Thus, the skills used in any job position cannot be captured by a one-dimensional indicator (Dickerson & Wilson, 2012). In this sense, the advantages of approaches such as job requirements to measure skills is noted. These approaches measure the competencies that are used by individuals in their jobs, with information obtained from their (self-reported) responses to questions about the degree (and sometimes intensity) to which their jobs require them to perform certain tasks (Wilson, Tarjáni & Rihova, 2016).

An instrument to assess a person's mastered skills must be a bit more diversified than those commonly used in national or transnational studies such as those cited (Wilson et al., 2016). The development of such a tool, in addition to using a narrowing strategy in a certain area, should make it simple to choose several areas. Possibly, it should be an interactive tool, only

possible to be simply presented, in digital format. This would create obstacles depending on the users' skills in technology, but which can be overcome with support or supervision.

2.2.5. Calculating proximities

Create a way to calculate proximity between the skills of the person (P) and the work context.

The image selected to represent the model (Figure 1) is an attempt to reflect the dynamics of the system formed by people (P) and work contexts (C). These lines are thought about within the idea that there is a dynamic interaction, and in this sense, static inferences might not be applicable at all (Saito et al., 2014). In the proposed model there are two observable data: the probability of finding a skill in the work context and the probability of finding a skill in a person, which makes room for analysis based on Bayesian inference or interpretation. In the Bayesian interpretation, probability measures the degree of belief. Bayes' theorem links the degree of belief in a position before and after considering the evidence. For example, it is believed with 50% certainty that a coin is twice as likely to come down heads. If the coin is tossed several times, the degree of belief can increase, decrease, or remain the same depending on the observed results (Maioli, 2014).

Figure 2 is a topological representation of skills, close to conceptions such as Lewin's Gestalt, considered the founder of social psychology and organisations (Doreian, 2017). Lewin (1936, 1973) proposes that the whole situation can be divided between person (P) and environment (E), and behaviour (B), in this case, acquisition or development of skills. Thus, B = f(S) = f(P, E), where behaviour is a function of the person and the environment. But the main point to highlight in Lewin's proposal is the notion of Life Space, defined as the totality of possible events (Lewin, 1936, 1973). It is a vast concept, but the notion is interesting to bring here because, as a representation, it is able to indicate the position of people and objectives in certain regions, considering the location of events, relationship between neighbourhoods, limits, approaches, and setbacks, and movements of forces in certain directions (Lewin, 1973). It is precisely this notion of space that approximates Bayes' idea. In classical inference, all observed data form just one of many possible outcomes under the same circumstances. But the space of decisions (parametric space or space of states of nature) is taken as something mutable, that is, with each new repetition the probability changes. In a simple way, the presence of a certain skill ends up influencing the ones that come next. If competencies are considered spatially, it is possible to identify future contact points. In other words, it is possible to identify a space where a skill is most likely to develop. This space includes the area represented by the set of skills that an individual (P) has and the area represented by the work context (C). The contact area was called the delivery environment (E). Predicting E allows for the possibility to help the person think about their possibilities. It will not give the correspondences between the person and a profession, but the profession gives possibilities that a person has based on his skill possibilities.

These five steps are preparatory for model implementation and validation. More precisely, the PEC model would create ways to recommend which skills can be developed by calculating the proximity between the skills of the person (P) and the work context (C). Essentially, it is a formula with three variables: People skills (skills people already have), Deliver environment (skill to develop), and Context skills (skills needed in the work context). This model would enable accurate recommender systems for a flexible learning process and provide a base calculation for algorithms developed within this purpose (Horváth & Molnár, 2021).

3. Conclusion and main limitations of the model

The PEC model brings up some ideas about how people can improve or change their careers and what can be translated for upskilling or reskilling. It is possible to summarise the model's main ideas with three simple considerations: i) people tend to develop competences that are near to previous competences they already have, ii) the competences to develop are a function of people's previous competences and the context of work, iii) the potential of an individual can be measured in the environment where people will deliver their competences, by the distance among their own competences and the work context needed competences. Hypothetically, it would be possible to measure in which work context, be it a job, a profession, or an enterprise, people would develop a larger number of competences branches, or new competences. In other words, it could be possible to measure in which context people will better develop their potential.

3.1. Practical implications

It is commonplace to say that people will need to find learning opportunities throughout their lives to develop the skills needed in the work context continuously. However, lifelong learning pathways are unique for everyone, since people's career paths, including skills development, is a product of personal and contextual variables (Lent & Brown, 2013). This notion implies flexible systems for skills development. Proposals like the modular learning system or micro-credentials are possible solutions (Andersen et al., 2020), even though they are focused on certification. However, there is a trend toward extreme modularity, as seen in massive online open courses (MOOCs), and people will need some guiding strategies for skill development (Horváth & Molnár, 2021). The PEC model can be useful within these challenges through the use of tailored learning paths. Specifically, such paths indicate which skills can be developed, how, and when. A company could use a recommender system based on the PEC model to identify the upskilling gaps of a specific worker or an entire team. Workers could use the same system to identify upskilling and reskilling possibilities.

3.2. Limitations

The final idea of the proposal is very close to the ideas of John Holland, who assumes that if it is possible to classify people by comparing them to personality types, it is also possible to classify environments by comparing them to environmental models (Holland, 1975). As initially conceived, congruence refers to the notion that different types require different environments so that a type being in the right environment would find fertile ground for development (Holland, 1992, p. 5). Holland's assumption has strong empirical evidence over the 60s (Nauta, 2010), which is still in use with reformulations and adaptations (e.g., Etze et al., 2021). However, some criticisms can be made, such as Mitchell and Krumboltz (1996), who criticise the notion of congruence, pointing out the difficulties in correctly framing the person-environment. Others question the timeliness of the model, which excludes all career development experience (Miller-Tiedeman & Tiedeman, 1985; Savickas et al. 2009). Even if the congruence as proposed by the PEC model is not between the person and the environment, but between competences, the same criticisms and limitations made to Holland's model regarding the concept of congruence can be assumed. The same limitations can be extended to the presented model. People and work are reduced to competences, and it would be about seeing only the necessary tasks and not the work of art that these tasks produce, nor the artist. Additionally, skills development is a complicated learning process and the PEC model is just

illustrative, however, recent proposals, like the 6-level skill development model from Shtaltovna (2021), can shed some light on this process.

This limitation is undoubtedly not the only one but the main one. The most suitable solution for the criticism to be overcome is mainly the model's complementarity. The PEC can only be thought of and used by people who can act on their potential and develop it to obtain satisfaction and have decent living and working conditions. But it does not indicate how to reach this degree of autonomy and development, although obtaining new skills helps in this regard. The proposal must be complemented by theories that strive to understand people from their top trajectories, potentials, difficulties, and goals. Theories from career development psychology can fill these significant gaps, such as those proposed by Life Design (Savickas, et al., 2002) and by socio-cognitive career theories in their different models (Lent, 2013; Lent & Brown, 2013; Lent et. al., 1994).

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