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A methodological proposal for assessing competences of project managers in rural Mexico and its application to providers of farming professionals services (PSP) as a case study

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Abstract

In this paper we propose a methodology to assess competences of project managers in rural Mexico. We therefore performed an exhausted international literature review on the concept of competence, its origins and evolution, in order to design their evaluation methodology and also identified the different approaches, tools and techniques currently used for the assessment of competences.

Once we understand the concept of competence, have noticed that there are implicit knowledge in it, and having identified the competences needed by the project managers in rural Mexico, for the achievement of a integrated rural development within their territories, and integrated them into the design of the methodology, we have made a methodology considering the tools available in Mexico and framed in the current legislation, which could provide evidence of performance of this subjects. Also as part of the methodology we designed and validated a psychometric questionnaire to assess behavioral competences of the project managers in rural Mexico.

The empirical application of the proposed methodology was performed at a case study in Mexico, particularly to providers of farming professionals services (PSP), students from a technological master designed under a competence approach by the Colegio de Postgraduados, an Institution of teaching, research and service in Agricultural Sciences. The results show that the proposed methodology is meaningful to assess competences in rural Mexico.

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1. Introduction

Due of the constant changes in our society, resulting from a world globalization in all their aspect: social, politic, economic, environmental, cultural and educative; society is demanding new requirements and skills for professionals and for general public also

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(Figueroa-Rodríguez & De los Ríos, 2012). Under the Competence-Based Approach introduced in higher education, it seeks to interactive training and higher education with the world of labor (Figueroa-Rodríguez & De los Ríos, 2012); so that by incorporating the concept of competence in the design of programs in higher education and vocational training and labor, it is intended that trained subjects acquire knowledge and develop a series of specific skills and abilities to provide better performance in different and new professional and occupational contexts.

There is an increase of pressure by the industry to provide higher education graduates who are immediately employable and effective in the business and industry (Moerkerke, 1996), example of this is a study in the UK where employment organizations have reported poor agreement between the results of the curriculum and the needs of work (Harvey & Green, 1994). Then it is required that the education systems train professionals who immediately join the labor market, and that will imply a real and urgent need to assess properly their skills and competences (Figueroa-Rodríguez & De los Ríos, 2012).

1.1. The concept of competence

The concept of competence refers to a phenomenon that has multiple dimensions: epistemological, ontological, sociological, political (Escudero, 2008), of which there is no single use of the concept nor a widely accepted definition (Weinert, 2001), because it is a term with different meanings, complex in nature and constantly changing, to the point that Tardif (2006) insists that each person clarify their conception of competition, while Shippmann *et al.* (2000) notes that competition has the meaning you want to give with whom are talking about this. Bunk (1994) affirms that the concept of competition today appears in many different fields and it is not used consistently and correctly always applied. Grootings (1994) refers that there remains the problem of finding an agreement on: a) what is exactly mean competence, and b) how they can be presented with clarity and simplicity. What is important is to have a conception of it, because today, the meaning of competence is key to the character of policies and initiatives in education and employment, which has the competence in the center of their objectives and guidelines (Climént, 2009).

But what does the term competence means? Mulder *et al.* (2007) affirms that the first contributions of the term of competence in the field of academia are recorded in the 70's, but that is no way the beginning of the concept, throughout the history of mankind, the early origins of the concept that is recorded, was found in the Code of Hamurabi (1792-1750 BC), in the work "the Republic" by Platoon (427-347 BC) and the work "Metaphysics" of Aristotle (384-322 BC). But who first introduced the concept of competence associated with superior performance was R.H. White in 1959, following Chomsky in 1965, proposed isolate the competence and consider the object descriptive of linguistics; Another source in the construction of the concept emerged in the workplace, where the psychologist David McClelland of Harvard University in 1973 published an article in which he affirm that traditional tests and questionnaires used to predict job performance, educational and professional success, which are based on the measurement of knowledge and skills did not predict successful performance in concrete situations of life, or occupational and, therefore, sought and established a new variable that he called competence. In this way it recognizes two specific leverage points for use of the term competence, one from the field of linguistics and the other the world of work, where most development has taken the concept of competence.

After an exhausted literature review of the concepts of competence, we can say that the competences are an underlying characteristic of a subject, are defined in terms of a set of observable behaviors they are linked to an activity manifesting themselves when it runs such action and have a causal relationship with the performance of a subject that is not only associated with success, but it is assumed that actually cause it. So that competence is the ability of a person to achieve favorable or desired results in the performance of an activity in a given context, that context may be academic, professional or labor, and that capacity involves the integration of knowledge's: know-know (body of knowledge), know-how (ability to apply the knowledge they have to perform some activity, referring to the skills and abilities of the subjects), the know-being (which are the attitudes of subjects) and know-be (being the motivations and personal performances of subjects), to get to know-act (which is the integration of prior knowledge, the result) and at the end is when a subject demonstrates competence.

2. Methodology

The proposed methodology for assessing the competence of project managers is based from the concept of competence and their implicit knowledge's: know-know (knowledge), know-how (skills and abilities), know-being (attitudes), and know-be (motivation) to get to know-act (performance), this leads to evidence each of them, and considering the use of several instruments that provide evidence of performance or learning in order to make an value judgments and a best decisions about of how competent a person is, that, because the competences of a subject can't be evidenced by a single instrument or a single activity. Besides competence can only be assessed in the action, and inferred from performances, so that more evidence of performance we have in sufficient quality and quantity, to demonstrate his action in a period of time, more elements will have for make a judgment about the competences than a subject is. In addition in the design of the proposal methodology we considered the necessary tools that were stipulated in the Sustainable Rural Development Law of México (Ley de Desarrollo Rural Sostenible, Cámara de Diputados, 2012). The proposed

methodology is presented in Figure 1, divided into three sequential phases not temporary: (I) knowledge, which are the evidence of technical knowledge, (II) Abilities and Skills, where competences are demonstrated through the tasks performed; and (III) Attitudes and Motivations where competences are evident in terms of personal attributes.

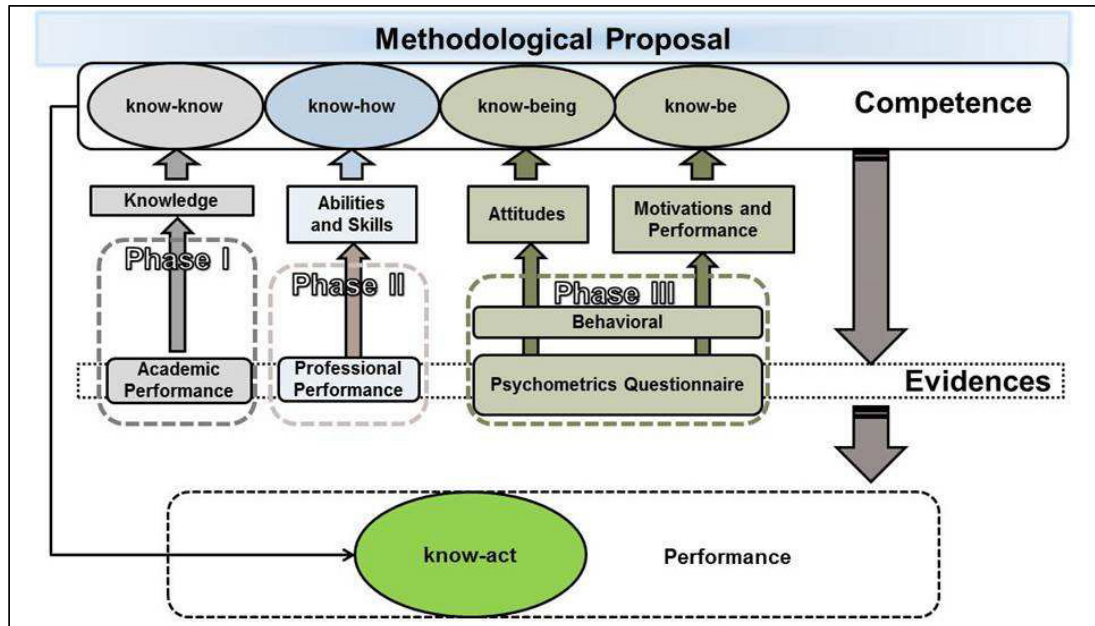


Fig. 1. Methodological proposal for assessing the competence of project managers in rural Mexico.

In Phase I (knowledge) they are the evidences of knowledge through academic performance in a training program under the competence approach, this because it is necessary to show that they acquired and developed competences through the learning process. Rodríguez (2006) affirms that knowledge (knowledge-knowledge) are also evaluated. This phase is also gathering evidence of knowledge through education and training process and its respective accreditation to governmental agencies, which in this case is the National Institute for Capacity Development in Rural Sector (INCA Rural) through the National Training and Technical Assistance System (SINACATRI) which is stipulated in the LDRS. The formation and training are instruments that allow the project manager and rural stakeholders obtain knowledge, technical and operational knowledge areas.

In Phase II they are the evidences of job and professional performance of the project managers in rural Mexico. Gil (2007) affirms that the assessment of people will not have to support exclusively on tests and psychometric tests, characteristic of the traditional approach, but requires the use of techniques that take into account the work experiences and behaviors exhibited in the performance of a job. The instrument to demonstrate it is by the accreditation and evaluation of their performance by the government bodies in charge, which in this case is the CECADER (Centers of Excellence for Rural Development), which is the agency responsible for ensuring the quality of professional services in rural services in Mexico. In this sense Rodríguez (2006) affirms that from the moment we define competence as know-how, it really needed a third party to monitor, watch, record and validate the presence of the competences of a person.

In Phase III are the evidence of the development of personal competences, which will be through a psychometric questionnaire, where are included inter-and intra-personal competences, which are mainly the attitudes of a subject, and in general, are the competences more difficult to measure, because they are difficult to quantify constructs; attitudes have not always been easy to identify, build, measure and evaluate. The construction of this type of assessment tool (psychometric questionnaire) is common in research in the social sciences and in education, this in order to provide information about an attribute of a subject assessed. For more information on how it was design the psychometric questionnaire you can read the doctoral thesis of Figueroa-Rodríguez (2013).

With these phases we fully cover the assessment of competences, not only as a student in a training program, but those developed as a professional in rural sector in Mexico as a Professional Service Provider (PSP) and also as a project manager in rural Mexico, thus seeking to observe their personal behaviors and their performance. Besides the instruments in this methodological proposal include evidence of knowledge, process (running an activity) and product (results demonstrating that an activity was performed) for a period of time, thus making a subject to evidence their competences.

3. Results

The application of the proposed methodology was a case study, which were project managers who were trained under a competency approach in a Technological Master, specifically the Master Technology for Professional Services Providers (MTPSP) from the Colegio de Postgraduados. From a census of 739 students we obtained a participation of $n=129$ subjects, of whom 31.8% are women, while 68.2% of the participants are men. With regard to their training, 48.1% have a bachelor's degree, 38% have a background in agricultural engineering, 13.2% in engineering several and 0.8% have a technical background; from such participants the 86.8% had their education at a public university, while 13.2% at a private university. With regard to current education level, 17.1% are trainees (without a titulation), 38.0% have a college degree, 7.0%, and Master of Science degree, 33.3% have completed the MTPSP and obtained the grade of Technological Master, while 4.7% have a Master of Science and has completed the MTPSP. Finally 30.2% have an average of 5 years of experience as PSP, 27.9% have on average 10 years of experience, 19.4% have on average 15 years of experience, 12.4% have 20 years of experience and 10.1% have an average of 25 years of experience as a PSP.

The validation of the proposed instruments in the methodology will be based on the know-act, i.e. the performance of the PSP for Financiera Rural (FR), because the origin of Technological Master, which participants are students, emanates of functional requirements and training of this government institution in charge of providing rural credit as a third level bank in México.

After obtaining the results for the three sequential phases through the use of the various tools described above, we determine whether such instruments for each phase are related to the performances of the PSP at FR, implying with this action validate each instrument. The results obtained for each phase in addition to some socio-demographic variables of interest are presented in Table 1.

Table 1. Results obtained in each phase.

Phase	Instrument	Variable	Statistic	Results	Signification	Force size
Sociodemographics		Gender	t-Student H=1.61 M=1.20	Leneve test Sig.=0.055; t sig.=0.349	No significant	0.083
		Age	Pearson correlation	r=0.198 p=0.025	Significant	0.198
		Birthplace	t-Student rural=1.16 urban=1.64	Leneve test Sig.=0.051; t sig.=0.280	No significant	0.096
		Type of university	t-Student Public=1.41 Private=1.94	Leneve test Sig.=0.825; t sig.=0.389	No significant	0.076
		Years of graduate	Pearson correlation	r=0.169 p=0.056	No significant	0.169
		Years of titled	Pearson correlation	r=0.170 p=0.055	No significant	0.170
		Years of experience ass PSP	Pearson correlation	r=0.287 p=0.001	Significant	0.287
		Phase I	Academic performance	Actual grade	ANOVA	Leneve test Sig.=0.000 F Sig.=.000
Last curse	ANOVA			Leneve test Sig.=0.000 F Sig.=.000	Significant	0.516
Completed training	t-Student			Leneve test Sig.=0.000 t sig.=0.000	Significant	0.564
MT degree	t-Student			Leneve test Sig.=0.000 t sig.=0.000	Significant	0.652
INCA Rural	Grade average		Pearson correlation	r=0.299 p=0.001	Significant	0.299
	Accreditation		Pearson correlation	r=0.254 p=0.004	Significant	0.254
	Number of accreditations		Pearson correlation	r=0.248 p=0.005	Significant	0.248
	Situation INCA		t-Student	Leneve test Sig.=0.000 t sig.=0.000	Significant	0.428
Phase II	Professional Performance (CECADER)	Accreditation	Pearson correlation	r=0.296 p=0.001	Significant	0.296
		Number of accreditations	Pearson correlation	r=0.322 p=0.000	Significant	0.322
		Acceptable	t-Student	Leneve test Sig.=0.049 t sig.=0.004	Significant	0.094
Phase III	Psychometric Questionnaire	Total questionnaire	Pearson correlation	r=0.431 p=0.000	Significant	0.431

As seen in the table above, the instruments used to demonstrate the competence of a subject in the different phases were significant to evidence that a subject is a competence in the performance of its activities, mainly for the activities for FR. We can also say that Technological Master meets its objective of being competent subjects for Financiera Rural; INCA-Rural fulfills its purpose of demonstrating their knowledge through test-interview process; and CECADER meets its objective of ensuring the quality of services of the PSP.

4. Conclusion

Once identified the knowledge implicit in the concept of competence, instruments proposed to demonstrate each of the phases, which were significant to demonstrate how competent is a subject in the development of their activities, especially their performance for FR.

We can say that all knowledge implicit in the concept of competence are important to demonstrate the competence of a subject, as we observe the knowledge acquired through training or experience (experiential knowledge) is the basis for developing and acquiring competences and if such training is designed with a focus on competences, this training is also evidence of a subject skills, because in this approach must demonstrate knowledge through performances. We also note that personal behaviors play an important role in developing and acquiring skills.

On the other hand the instruments used in the methodology encompass evidence of knowledge, process (running a activity) and product (results demonstrating that an activity was developed) for a period of time, thus demonstrate the competence of PSP, becoming valid instruments for assessing the competences of a subject.

With this proposed methodology is able to cover in full the competence assessment covering all knowledge, not just those acquired as a student of a training program, but those developed as a professional rural as a PSP and also as a project manager in rural sector in México, thus seeking personal behaviors observed (behaviors) and their performance (actions), allowing to obtain relevant information from the potential of people and the development of competences acquired through training. This methodology is intended not as a comparison between individuals, but as a process of collecting evidence and making judgments about the nature of progress towards the performance required for an activity, in this case in rural Mexico.

Finally the methodology proposed and validated through its application MTPSP is a reliable and valid methodology and can be replicated in any context, in addition to being used to identify other performances of the PSP and project managers for other institutions in rural Mexico, without forget that can serve as a tool to certify and accredit competences of PSP and project managers for different institutions in rural Mexico.

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