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Analysis of research literature of professional competency models with a cognitive-motivational approach

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Abstract

Prior studies determined the importance of study of professional competencies under eight approaches: 1)workplace; 2)behavioral theory; 3)business strategy; 4)holistic approach; 5)engineering and technological context; 6)higher education; 7)organizational psychology; and 8)cognitive and motivational approach. The aim to delve deeper the cognitive-motivational aspect is to determine the relationship between these aspects. Thereupon we use techniques of scientific domain analysis as scientific analysis of the patterns of co-occurrence and co-citation in the research literature indexed in Scopus, bibliographic records are analyzed for relating the theories of the most representative authors and key terms found grouped in clusters research to prove that An individual's learning is proportional to the motivation provided to him or her, which means that it is necessary to know the personal aspects of each individual in the formation of professional competencies. Other factors affected by motivation are goals and achievements.

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Keywords: scientific domain analysis; cognitive-motivational

1. Introduction

Professional competencies have been marking initiatives and change processes in different contexts and countries. Eight models based competence have been found so far based on: 1) workplace; 2) behavioral theory; 3) business strategy; 4) cognitive and motivational approach; 5) holistic approach; 6) higher education; 7) industrial psychology; and 8) engineering and technology context. (Guerrero & La Rosa, Scientific Domain Analysis of Professional Competences, 2013)

The authors have been coinciding in their theoretical and philosophical approaches to the study of professional competencies, generating streams of study from different perspectives such as the study of the skills from the cognitive to the motivational approach. They suggest that to fully understand learning we must study motivation,

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highlighting the importance of internal motivation as a necessary condition to learn and develop skills, whether they are labor or management competencies.

In order to have a global landscape of the present study, the indexed articles in the Scopus database were analyzed from 1984 through 2014.

Therefore, this article attempts analyze the group of authors who study competencies from the cognitive-motivational perspective addressing its historical context, the processes that characterize these models and research thematic fronts. This group of authors is studied using scientific domain analysis and research literature network analysis, identifying, analyzing and visualizing the relationships between authors that allow base establishment and research fronts focused on cognitive-motivational professional competences.

2. Methodology

In order to perform the analysis of the group of authors who take on the study of professional competencies from a cognitive-motivational approach, a type of scientific research will be used through scientific or bibliometric maps, which use co-occurrence patterns and co citation clusters within a body of bibliographic records to identify relationships between actors in a given domain which allow for a better analysis and understanding of the domain studied.

In the search for a better understanding of the methodology, we define the following terms:

- Cluster: grouping or clustering of data or information based on certain characteristics that are related or linked.
- Co-citation: the frequency in which two units of analysis are cited by other papers published after them (Garfield, 1998).
- Co-occurrence: The simultaneous appearance of two or more words in a document (Ortega & Aguillo, 2006).

The object of study is the research literature of professional skills from the cognitive-motivational approach and can be considered as a representative element to visualize this domain's structure.

The data to be analyzed within a bibliographic record will be:

- Author.
- Title of publication.
- Year of publication.
- Summary or abstract of the publication.
- Cited references.
- Keywords.

The software chosen for the creation of the scientific map is VosViewer, developed by Van Eck and Waltman (2010). This software allows you to create two-dimensional maps using mapping and VOS clustering techniques. The maps obtained can be displayed in different ways as, "label view", "cluster density view", "cloud density view" and "dispersion view".

For the correct approach to the development of a scientific map, it was necessary to carry out the following preliminary steps:

1) Traditional bibliographic review: in which the main research related to professional competencies is reviewed, especially from the cognitive-motivational approach and a timeline indicating the age of the publications of the most representative authors according to professional competencies is established.

2) Selection of sources: the source of information selected for research is SCOPUS since it is the largest base of multidisciplinary scientific data, comprising over 5,400 publications in chemistry, physics, mathematics and engineering and 1,975 publications in social sciences, psychology and economics . In addition, its exportable data supports the visualization software we use.

3) Search criteria: using a traditional bibliographic search, the necessary keywords are defined to search and extract data from SCOPUS. It is important to include some terms to avoid extracting document that could decrease relevance or could dull the articles of interest for the study in the scientific map study to be generated.

4) Setting the search: the search range covers all records of global scientific production published in SCOPUS until early 2014 (February). The search configuration words are grouped to include relevant documents. For example "cognitiv * and motiv *" were searched to ensure the removal of items that relate the two.

5) Data processing: after extracting bibliographic records from the SCOPUS database, a series of tasks related to quality control of bibliographic records are completed with the hopes of normalizing the documents, avoiding repetitions and adapt the data that will eventually be entered into the chosen software.

3. Results

3.1. Traditional literature review

For the first part of the research is part of the traditional literature review based on a previous study of Guerrero, D. (2011), called "Learning model and certification in project management of sustainable development competences"; which allows the establishing of the historical context of the study of professional skills from a cognitive-motivational approach.

Figure 1 (2011) represents a timeline with the most representative authors performing a traditional bibliographical review. At the end of the paper we present the complete timeline with the authors identified during scientific domain analysis.

This timeline makes a reference to Benjamin Bloom, who was a pioneer in research elaborating specifications through which educational objectives could be organized according to their cognitive complexity, developing an organization or hierarchy that allowed the university examiners to have a reliable procedure to assess students and the results of educational practice Eisener (2000). In a later study Broder (1958) determined what happened in the minds of students through memory stimulation process and thinking-aloud skills.

However, it was not until White (1959) that the close relationship between cognitive competence and motivational action tendencies was discovered.

In this regard, Pinilla (1999) mentions that "competence like intelligence is not an innate ability, but instead it is susceptible to be developed and built from each person's internal motivations, motivations which must be communicated to the work group."

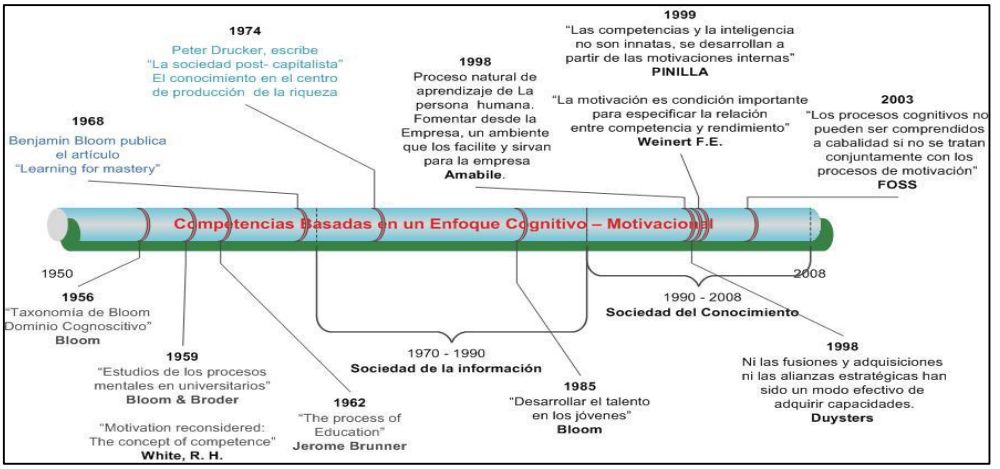

Figure 1 - Timeline of the professional skills with a cognitive-motivational focus

An analysis and interpretation of the obtained scientific maps are presented next. Two maps have been created. One in which an author's co-citation is made to determine what are the most important or most representative in the topics covered. The second map is of co-occurrence of terms, where the relationship between words that are within the same cluster are analyzed and to determine which terms are the used most or have the most relevance in each subject studied.

3.2. Authors' co-citation analysis

The results allowed us to identify 4 term groups or clusters, which can be displayed in the figure 2:

3.2.1. Motivation in people (blue cluster)

The authors who make up this cluster study some aspects (the perception of each, the environment, etc.) influenced by motivation and this improves the development of people, for example the development of social skills and self-regulation, feedback and the ability to care for others, the ability to be happy and the ability to engage in productive and creative work, the unity of a multidisciplinary perspective, motivation also improves people's behavior.

The basic components to produce changes in motivation and behavior, according to Bandura (1997) are: information, the development of social skills and self-regulation, guided practice and corrective feedback with knowledge application and the development of social support for desired personal changes. It also highlights that the social model should be used to develop and strengthen the beliefs in the ability to use the described skills.

Some characteristic of normal human thought, by Taylor and Brown (1988) are the overly positive self assessment, exaggerated perceptions of control or mastery, and unrealistic optimism. Moreover, these illusions promote mental health that is important in cognitive, for example worry and care for others, be happy and transmit these happiness, and the ability to participate in productive, creative and efficient work. the success of those strategies is because the social world and cognitive processing mechanisms impose filters on incoming information that distort in a positive direction; negative information can be isolated and represented in a non-threatening way.

By a perspective of student motivation in learning and teaching contexts, Pintrich (2003) stand out three general themes for motivational research: the importance of a general scientific approach to research student motivation, the usefulness of a multidisciplinary perspective and the importance of using basic inspiration research on motivation.

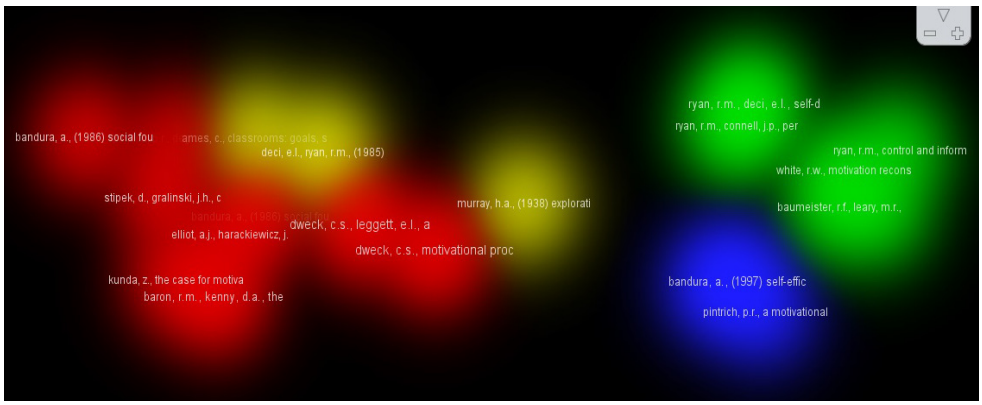

Figure 2 Clusters grouping author´s co-citation analysis, density view.

3.2.2. Influential aspects of motivation (yellow cluster)

Authors who make up this cluster agree that there are aspects that influence motivation, for example, socio-contextual conditions, learning environments, etc.; this is due to motivation being an important part in the learning process of students and the human personality.

In examining the learning environment in a classroom in relation to the theory of achievement goals, Ames (1992) stated that the tasks, evaluation and recognition, and dimensions of the classrooms authority are presented as examples of structures that can influence the direction of children toward different achievement goals.

In some researches guided by the self-determination theory, Deci (1985) focused on the socio-contextual conditions that facilitate the prevention of natural self-motivation processes and healthy psychological development. Factors that improve as opposed to those that undermine intrinsic motivation have been concretely examined.

By exposing a complete human personality theory, Murray (1938) illustrates personality assessment with a group of creative methods.

3.2.3. Positive and negative factors that influence motivation (green cluster)

The factors that influence both positively and negatively on motivation, self-regulation and well-being and are related to individual performance in areas such as health, education, work and sports, are compared. The authors of this cluster conclude that human beings have important needs which are: autonomy or self-determination, competence and interpersonal relationships, which were described by two or more authors in different publications.

The most representative author is this cluster is Ryan because he has the greatest number of co-citations and delves into the issue as follows:

- In "Perceived locus of causality and internalization: examining Reasons for acting in two domains." (1989) he proposes and conceptualizes a PLOC model (Model of Perceived Locus of Causality) in which the interpersonal relationship is discussed against interpersonal perception, reasonable causes, distinctions, and the importance of perceived autonomy in human behavior. This is based on a study which shows the types of behavioral reason I children related to performance to adjust in a simple structure: external, introjected, identified, and intrinsic. These reason categories are then related to existing PLOC measures and motivation.
- "Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being" (2000) examines factors that enhance intrinsic motivation against those that debilitate self-regulation, well-being and motivation. The results have led to the three innate psychological needs (competence, autonomy and relationship), which improve the performance, self-motivation, mental health and eliminate lack of motivation, increasing well-being. Furthermore these needs are considered to be of great importance in psychological processes in health, education, work, sports, religion and psychotherapy.
- "Control and information in the intrapersonal sphere: an extension of cognitive evaluation theory" (1982) confirms that the feedback control (whether by oneself or by someone else) decreases intrinsic motivation related to task-Involvement. The results are discussed in terms of the application of cognitive evaluation theory of intrapersonal processes and self-control theories.

Based on the assumption that human beings have the need to interact within a related link, Baumeister and Leary (1995) support the hypothesis of belonging, where people easily form social links, being a member of these social ties seem to have multiple and strong effects on emotional patterns and cognitive processes. Other tests, such as the one relating to satiation, substitution, and behavioral consequences are also consistent with the motivation hypothesis. Several apparent counterexamples ended up accepting the hypothesis that the need to belong is a powerful, fundamental, and very pervasive motivation.

Motivation theories built on primary impulses cannot explain playful and exploratory behavior. So White (1959) introduces the new concept of motivation as "competition", indicating the biological significance of such behavior. It is suitable for the learning process from effective interaction with the environment.

According to previous publications to conclude that much of human motivation is not based on nervous system

needs, Deci and Ryan (1985) argue that instead it is a set of innate psychological needs. These needs lean more toward psychological rather than physiological theorizing, suggesting that there are three of these needs: self-determination, competence, and interpersonal relationship. It is primarily about free determination and competence, the processes and structures related to these needs.

3.2.4. Relationship between cognitive and motivation (red cluster)

It is the most representative cluster due to the amount of existing research on these subjects and that the most cited authors that capture the existing interaction between motivation and cognition.

The interaction that exists between motivation and cognition and orientation toward objectives is captured, it also studies how the transfer and use of knowledge and abilities of a person also affect the reasoning of people; in addition, the authors conclude that motivation self-regulates learning and academic performance. Thus it shows that there is a strong relationship between cognition, motivation and academic performance.

Among the most cited we have Bandura (1986), who in one of his most important publications states that the general theory of human motivation and action from a social cognitive perspective has to do with the prominent roles with cognitive processes, self reflection and self-regulation in psychosocial functioning. It also highlights cause through the interaction of cognitive, behavioral and environmental factors; and systematically applies social cognitive theory for personal and social change and covers a wide range of topics related to human thought, motivation and behavior.

Another author with a little more representation than Bandura is Dweck, who:

- "A social-cognitive approach to motivation and personality psychological review" (1988) presents a model based on research that accounts for these patterns in terms of underlying psychological processes. The model specifies how to guide implicit individual theories toward specific objectives and how these objectives establish different patterns; it demonstrates how each characteristic (cognitive, affective and behavioral) of adaptive and non-adaptive patterns can directly head toward different objectives. Finally, it places the model in its broader context and examines its implications to understand motivational and personality processes.
- "Motivational Processes Affecting learning" (1986) describes how motivational processes influence the acquisition, transfer and use of knowledge and skills in a child. The research takes place in the social-cognitive framework and illustrates adaptive and non-adaptive motivational patterns, and a research based on the investigation of motivational process is presented to show how performance or the learning of individual children pursue their goals in cognitive tasks and how they mold their reactions toward success and failure and how these influence the quality of their cognitive performance.

In study that examined the relationship between motivational orientation, self-regulated learning and academic performance of a class of 173 students, Pintrinch and de Groot (1990) conducted measurements on: self-efficacy, test anxiety, self-regulation and the use of learning strategies. Regression analyzes revealed that self-regulation, self-efficacy and test anxiety emerged as the best predictors of performance. However, they did not have a direct influence on performance. But they were strongly related to the use of cognitive strategies regardless of the level of prior performance.

In another study designed to explore beliefs about the relationship between children and intelligence, effort, goal orientations, learning strategies, self-reports, and academic performance, Stipek and Gralinski (1996) found that the belief that the relatively high intelligence is associated with stable performance. This set of beliefs strayed away from the belief that effort has positive effects on intelligence and performance.

The presentation of an experimental literature meta-analysis conducted by Elliot and Harackiewicz (1996) examines the effect of performance objectives and achieving control over intrinsic motivation. It analyzes providing support for the hypothesis that achieving objectives has the effect of undermining intrinsic motivation in relation to the pursuit of goals to master. The results indicated that the undermining effect related to the mastery of the objectives depended on whether participants received confirmation or not of the feedback competence, and whether the experimental procedures led to a performance-focus or performance-avoidance direction.

It is proposed that motivation may affect people's reasoning through reliance on a partial set of cognitive

processes. Kunda (1990) suggests that there is considerable evidence that people are more likely to reach the conclusions they want to reach, but their ability to do so is limited by their capability to construct seemingly reasonable justifications for these conclusions.

Offering a specific summary of analytic procedures appropriate to make the distinction from the moderator and the distinction mediator, both separately and in terms of a broader causal system that includes both moderators and mediators. Baron and Kenny (1986) distinguish between the properties of moderating variable and mediating variable to clarify how conceptual variables explain differences in the conduct and behavior of people.

With the group of identified authors in this final analysis we present the complete time line in Figure 3.

The authors who have been placed as a "cylindrical landmark" are those that were identified during the traditional bibliographical review and those that have been located within the timeline as "landmark triangles" are the new authors identified during the present study.

3.3. Analysis of co-occurrence of terms

The result of this analysis allows us to identify four groups of terms or a cluster, which can be seen in Figure 4.

3.3.1. Motivation and student (yellow cluster)

Can be viewed the important relationship between the model's motivational part and the student, meaning, the influence between how a student is motivated and how it affects their development and knowledge. The most frequently found terms are: education, student, competence, knowledge, development, practice, motivation, model, ability, and goal.

3.3.2. Cognition and student (green cluster)

Can be viewed the relationship between the model's cognitive part and how it's deepening strongly influences the results, analysis and the students' findings. The most frequently found terms are: law, discovery, analysis, result, study, effect, level, group, theory, cognitive, performance, perception.

3.3.3. Cognitive and motivational aspects (red cluster)

Can be viewed the interplay between cognitive and motivational aspect of the model and results in applying cognitive motivation. The elements that were found were: concept, research, performance, use, role, process, view, change, information, evidence, approach.

3.3.4. Motivation and cognition in the student (blue cluster)

Can be viewed how cognition and motivation influences student development. The elements of this cluster have a low of co-citation level, however ones most found are: I, strategy, factor, belief, result, participant, context, impact, self-regulation, motivation factor.

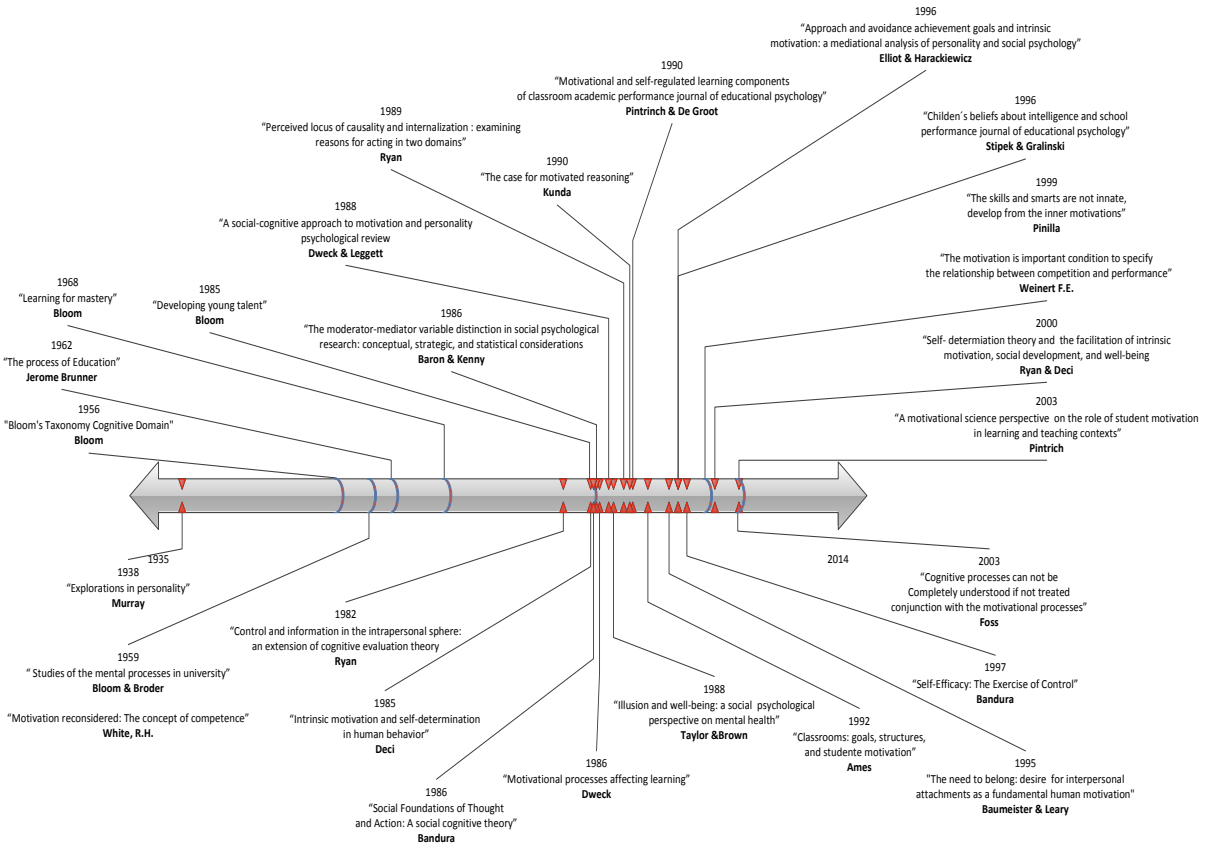

Figure 3: Timeline of representative authors on the professional skills research from a cognitive-motivational focus

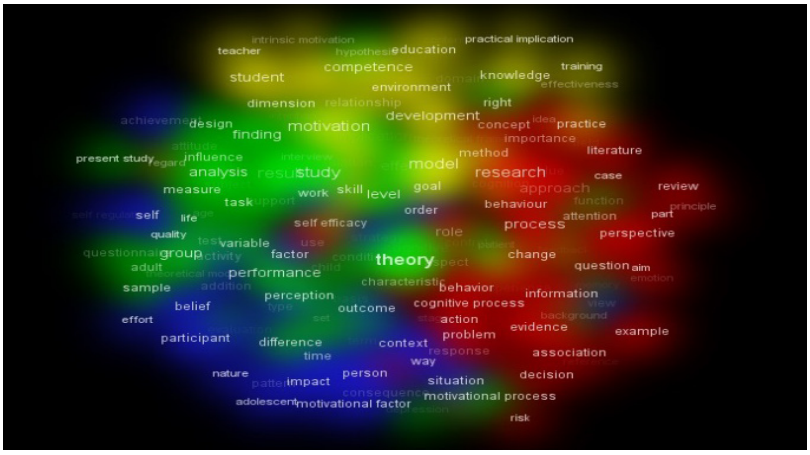

Figure 4 Clusters grouping in co-occurrence of terms analysis, density view.

4. Conclusions

- Through a traditional bibliographical review, it has been determined that for many decades there has been great interest in the study of the motivational and cognitive aspect in the formation of a person but both terms were not related. However, today we have seen the importance of linking the two aspects to improve their professional performance.
- In the co-occurrence study we have been able to identify different research topics, for example the yellow cluster was studied from a motivational aspect, the green cluster was studied from a cognitive aspect, both were studied separately. In a third cluster (the red cluster) the interaction between both aspects were studied and on the blue cluster the influence of both aspects individuals was studied.
- The most representative and most cited authors are in the co-citation study in the red cluster, which proves to be the most important cluster of the research studying the relationship between the two factors: cognitive and motivational and demonstrating the importance of relating both aspects to improve the skills of an individual.
- This study supports the idea that efforts should focus on generating motivation on the individual during the formation of a person, as there is a profound relationship between provided motivation, the ease with which motivated individuals learn, and results obtained by these individuals.
- It is very important to know the personal attributes, be they skills, personality traits, self-concept, skills, values, personality, and more. Since each person has different character traits, the way to motivate them varies from one person to another. Therefore, to make learning more effective, it is important to know the personal aspects of each individual.
- The cognitive aspect happens over a lifetime, so the formation of the person, besides what individuals can learn, it is important to achieve a transcendent motivation because they drive the welfare of people, who with their motivation and learning linked, reflect this in effective performances.
- Both the motivation and the motivation of others positively influence people's set and achieved goals. These goals set are often closely linked to the pursuit of knowledge or learning.
- Transcendent motivation is that which is linked more to the cognitive aspect, because it is in the beliefs, values and principles of the individual, which leads to a total wellness and an increased desire to learn.

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