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The company as an essential context of engineers' professional training process. Its educational potentials

La empresa, contexto esencial del proceso de formación profesional del ingeniero. Sus potencialidades educativas

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ABSTRACT

The formation of integral professionals, essential main characters of the necessary national socioeconomic transformation and local continues to be part of social responsibility of the university; however, the execution of this mission at the present time demands

the approach and integration with the remaining actors of each territory that possess enough potentialities to participate in the pedagogic process of superior level. In correspondence with the above-mentioned the authors intended as essential objective the one of meditating about the educational potentialities that it presents the company like essential context in the process of the students' of engineers professional formation. He went possible to give execution to the purpose traced starting from a bibliographical review of the work of national and international investigators that, in the last years they have approached the thematic one. As a result, it is conceptualized and it defines the term educational potentialities; also, an analysis of some of the main educational potentialities identified in the managerial scenarios that convert them, next to the university, in contexts pedagogic essentials for the process of the engineering students' integral formation is carried out.

Keywords: Company; engineering student; professional formation; educational potentiality.

RESUMEN

La formación de profesionales integrales, protagonistas esenciales de la necesaria transformación socioeconómica nacional y local sigue siendo parte de encargo social de la universidad. Sin embargo, el cumplimiento de esta misión en la actualidad exige el acercamiento e integración con los restantes actores de cada territorio que poseen potencialidades suficientes para participar en el proceso pedagógico de nivel superior. En correspondencia con lo anterior los autores se propusieron como objetivo esencial el de reflexionar sobre las potencialidades educativas que presenta la empresa como contexto esencial en el proceso de formación profesional de los estudiantes de ingeniería. Fue posible dar cumplimiento

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al propósito trazado a partir de una revisión bibliográfica de la obra de investigadores nacionales e internacionales que, en los últimos años han abordado la temática. Como resultado, se conceptualiza y define el término potencialidades educativas; además, se realiza un análisis de algunas de las principales potencialidades educativas identificadas en los escenarios empresariales que los convierten, junto a la universidad, en contextos pedagógicos esenciales para el proceso de formación integral de los estudiantes de ingeniería.

Palabras claves: Empresa; estudiante de ingeniería; formación profesional; potencialidad educativa.

INTRODUCTION

Accelerated globalization on the planet, causes scientific-technological knowledge to pull socioeconomic development worldwide, as it becomes the essential basis of productive processes and therefore the main exponent of development of any country.

Specialists such as Appleberry, as cited in Brunner (2001), consider that although disciplinary and internationally registered knowledge took 1750 years to double for the first time in the first 18 centuries (DNE), they are now doubling less frequently at 100 days.

The university has traditionally been the institution par excellence in the generation of knowledge and the development of technologies, associated with the process of training professionals (Castillo Sánchez & Reyes Díaz, 2015); that is, the university, through its own pedagogical-research process, has been a protagonist in the technological and economic growth of the countries.

However, this situation is changing; during the last 20 to 30 years, since important transformations are taking place in the forms and sources of knowledge generation and production. Today, largely the management of research results and the production of knowledge is on the side of companies, scientific poles, and technology parks, among others. (Mena Lorenzo, JA, Aguilar Blanco, & Mena Lorenzo, JL, 2019)

On the other hand, the social order of the university, aimed at the training of integral professionals, essential protagonists of the necessary socio-economic transformation, requires that the knowledge of academic orders, systematized and produced through research, be put at the service of the solution of social and labor problems of local order. This potentially innovative and collective process, favors the creation of opportunities for assimilation and building productive technologies and knowledge with social meaning, currently requires the link with the other actors in each territory.

It is undeniable that the Cuban university in recent years has been growing in its relationship with society, expressed in better preparation of graduates and higher intervention in the economic and social problems. (Núñez Jover, Montalvo, & Pérez Ones, 2007)

Despite this, different Cuban specialists currently Echevarría León & Tejuca Martínez (2015); Capote León, Rizo Rabelo, & Bravo López (2016); Infante Caballero (2017), among others, recognize the weaknesses that the training process of university professionals still presents. For Capote León et al. (2016), the aforementioned process "[...] requires changes in its conception [...] that allow an engineer with the aforementioned skills to be trained to perform properly

[...] in the work environment in which it operates" (p. 8).

For the university, moving from the country that we are to the country that we want to be Díaz-Canel Bermúdez (2019), implies permanently exceeding and reorienting its objectives, leaving behind any approach that prevents its full and active participation in the development of the nation.

However, it would not be fair to see the previous budgets as the salvation table of the educational institution when the opposite is true. Although the university has to transform, this change must occur without leaving aside its essential condition as a producer of knowledge through research, which means the conception of teaching-research processes that, although producing necessary knowledge, respond in intentional way to the socio-labor needs and priorities of the territories. The university, therefore, continues to be a strategic pillar in the socioeconomic development of any nation; So "Strengthening the link between universities and companies is essential to promote the development of the country [...]". (Díaz-Canel Bermúdez, 2019, p.4)

So the Cuban university faces the great challenge of managing a pedagogical process (academic, research, labor and extension) in which, while achieving the training of integral professionals, continue to produce the necessary knowledge for socio-economic transformation, but in an environment in which your relationship with companies is increasingly narrow.

In this regard, the efficiency of the university, as a training entity professional and producer of knowledge, must be seen not so much in their ability to discern and recognize the need to work in an integrated manner with companies, but, as in their capacity

to translate this statement into a harmonic, systemic and integral pedagogical conception. This conception, permeated with ideas, measures, initiatives, procedures and concrete facts, must contribute to the management of a professional pedagogical process that assumes, in a comprehensive manner, university academic scenarios and business scenarios as essential contexts of professional training, including all its components: academic, labor, research and extension. (Mena Lorenzo, JL & Mena Lorenzo, J. A., 2019)

This new vision of university education is only possible based on shared professional training models, in which the university and the company constitute the two essential contexts throughout the professional training cycle.

Because of the theoretical study from different sources, in addition to empirical inquiries made with business specialists and university professors of engineering careers, it has been identified that in recent years there has been a tendency to consider, increasingly, the importance of the company as part of the training process of the higher level professional.

The subject reaches such magnitude that several specialists of the national and international scope Bueno Campos (2007); Bermudez et al. (2014); Abreu Regueiro & Soller Calderius (2015); Mjelde (2016); Castillo Sánchez & Reyes Díaz (2015); Shulman (2005); Infante Caballero (2017); Hernández Martín, Reinoso Castillo, & Alonso Echevarría (2017); Estellés (2018); Fernández Barrios, Jerez González, & Rodríguez Delgado (2019); Mena Lorenzo et al. (2019) and Rodríguez Fuentes, Breijo Worosz, & Gato Armas (2019), among others, come to place the company as one of the two

essential contexts, essential to achieve the integrality of engineers in training.

Under this view, the article is proposed as an essential objective: to reflect on the educational potential of the company as an essential context in the process of professional training of engineers.

DEVELOPMENT

The company as a context of the process of higher education of the engineer

Castillo Sánchez & Reyes Díaz (2015), as well as Bueno Campos (2007), consider that the initial conception of the university, oriented to the training of professionals and the creation of new knowledge, both in close relationship depending on the development of societies and of the labor market, today it is enriched and, with this, the substantive functions of this institution are new: academic (teaching), research and extension. Within them, the extension allows to establish a link with society by containing all those activities through which the university relates to society, business and the State.

To some extent, it is consistent with this criterion; however, tacitly assuming the budget is to see the company as an educational agency in the community. It also implies ignoring the powerful link with the company that the academic or teaching function can provide. Understanding this last reflection requires recognizing the company; more than an educational agency, as a *pedagogical context* that is part of the training process of the higher level professional and shares the engineering student's modeling during the entire initial pedagogical process.

By context in general, we can consider that physical and material scenario where, not only does the change occur, it also includes the co-participant subjects next to the changing subject. According to the above, an educational context represents each of the environments or scenarios formed by personal components, the spaces where students are formed, that frame the progressive interrelation with the developing subject, the subjects that influence it and the space in what learning occurs.

Sánchez, as he was cited in Hernandez Martin et al. (2017), synthesizes the educational context as the forms of organization and socio-cultural spaces where educators and students interact through communication and the realization of activities of individual and collective interest that contribute to the integral formation in various stages of the educational process.

In response to this, we must not forget that the engineer's training takes place both in the university (school context) and in the company (work context) through the professional pedagogical process. Assuming this assumption forces us to recognize that, in the process of professional training of the engineer, the company in addition to the work context represents an educational context; for what is defined as such:

Those scenarios or environments in the production and services entities, state or self-employed, where there is a close interrelation between university professors, instructor specialists, tutors and students of a particular career and of these with the medium, through individual and collective pedagogical activities of a theoretical-practical and / or practical nature that facilitate education, training and the integral development of the professional future. (Mena Lorenzo, JL & Mena Lorenzo, JA, 2019, p.9)

To develop the process of professional training of a higher level from an integrated conception in the educational contexts that represent the university and the company, allows combining the academic and the labor (together with the rest of the substantive functions) during the entire training cycle of the engineer. It facilitates the integration of content by the student, while learning (in the university and / or in the company) occurs based on real and interdisciplinary professional situations and problems.

For (Morin, 1999), "[...] if the twentieth century was the century of the search for scientific certainties and the precipitous development of the different areas of human knowledge, the twenty-first century is considered as one of uncertainty and interdisciplinarity". (p.18)

No doubt take this approach means recognizing the stages of production and services as interdisciplinary contexts par excellence that fleeing school simulations.

Although, the academic university context can lead the engineering student to the reproductive assimilation of the contents of the profession, when the learning situations take place (because it was projected methodologically from the career) in real productive contexts, the student can experience each phenomenon or process derived from it, use tools to obtain a product, make decisions, get it right, make mistakes and estimate the consequences forhimself, for the collective and for society; in essence, to achieve the integration of knowledge (Acosta Iglesias, Mena Lorenzo & Martínez Castillo, 2012) . The student arrives, as Martí Pérez (1975) would say, to "[...] find the essential unit, where [...] everything seems to be collected and condensed [...]". (p. 164)

These reasons, among others, make every day more students of higher-level professional training who think of the company as part of the pedagogical process. It is no secret that the company, by definition, does not constitute an educational institution, while its corporate purpose is aimed at the production of goods and services for the satisfaction of social needs (Bermúdez et al., 2014).

However, the detailed analysis of the essential functions that it fulfills: economic and educational leads to think differently. The first one, the economic one (which is not the object of this analysis) is materialized in the characteristics of the productive process and of services in which its mission or social object is specified.

The second function, the educational essential object of this article, is part of the different sub processes related to the initial and permanent training of the people involved in the productive process and, which makes the company's corporate purpose effective, that is, the generation of goods and services (Onstenk, 1995; Acosta Iglesias, A. et al., 2012; Aguilar Hernández & Mena Lorenzo, 2014 ; Bermúdez et al., 2014; Abreu Regueiro & Soler Calderius, 2015; Mena Lorenzo et al., 2019; Rodríguez Fuentes et al., 2019 and Fernández Barrios et al., 2019) . Among these sub processes are:

- Training of workers in general as an essential component to ensure the development of practicing professionals
- The permanent training of workers, typical of the acquisition of work and professional culture from the workplace (standards, ethics of the profession, work discipline, behavior, etc.)
- The formation of students of general education (study-work principle) in which the company

acts as an educational agency of the community and its workers as educational agents that support the schools of its community.

- The training of university students and technical and professional education, related to the preparation in and for the field of professional performance.
- The education emanated from the political and mass organizations of the entity aimed at the political and ideological culture of the worker.

Note how three of them (1st, 2nd and 4th) may, due to the possibility of being involved, have a direct relationship with the pedagogical and academic functions of the university, related to initial, continuous or permanent professional training.

Reinforcing this previous criterion, some scholars of the Onstenk Professional Pedagogy (1995); Shulman (2005); Acosta Iglesias, et al. (2012); Bermudez et al. (2014); Abreu Regueiro & Soler Calderius (2015); Mjelde (2016); Mena Lorenzo et al. (2019) and Rodriguez Fuentes et al. (2019), are sure that companies can become educational institutions, if part of the whole *educational potential* existing in production processes and services, given the real possibilities real that they have for the direction of the process of internalization and externalization of knowledge, abilities, capacities, norms, values and attitudes through the productive process or offer of services.

Educational potentialities of the company

In the theoretical order, authors such as Onstenk (1995); Bermudez et al. (2014); León (2014); Abreu Regueiro & Soler Calderius (2015) just to mention some, conceptualize the

possibilities of the company to be part of the process of formation professional of the engineer as *educational or didactic potential*. Onstenk defines it as the didactic probability that in a given work situation-learning processes are carried out, because of the interaction between the characteristics of the apprentices, the facilitating work of the specialists and the learning possibilities offered by the place of work.

León (2014), is more explicit to synthesize *educative potential* those real, concrete and rational possibilities exist for managing the process of personality development and collective, as well as for the organization of the conditions in the company, those that through the conscious activity of teachers, specialists, workers in general and managers pass from possibility to educational reality.

As you can see, the scientific community is gaining more and more strength considering the company and its workers as part of a high educational potential that, well managed by the university, can contribute significantly to the integral education of the engineering student.

If one considers that education as a pedagogical category is given in the system of educational influences that act on the student, then during the initial training of university professionals, which takes place in business settings, there is a group of broad areas *educational influence*.

The first of them (without the spirit of organizing them by degree of hierarchy), is *organized by collective workers*. Largely, workers are the expression of the profession. When the student is inserted into a company with a group prepared in the technical and technological order and, to this is added a labor discipline consistent with the

corresponding corporate purpose, the system of educational influences that leads to training is positively reinforced and development, in the student, of the love to work, the profession and the company itself. These qualities are incorporated into his personality and can be recognized as part of his integral training, while responding to what is expected of him as a professional.

During teacher-productive activities has place in the company, in which the student must achieve prominence, it is significant recognition of their work and timely criticism, always encouraging him to errors and contradictions of the production-teaching process. Constructive criticism and the educational orientation made by the most experienced specialists, becomes support levels offered confidence and constitutes a strong incentive to improve their performance, gaining greater achievements in their professional training (Leon, 2014). Hence, these forms of influence must be well identified by university professors, specialists, and take advantage of them in a convenient way in favor of the integral technical and professional development of the student.

Within the group of workers of the company is one of the essential personal components of the process of higher-level professional training: the specialist and / or the tutor (Abreu Regueiro & Soler Calderius, 2015). This professional represents the profession the student aspires to; its essential function is to make the object of the profession and the work method affordable. So, together with the university professor, he is directly responsible for the engineer's modeling. Teachers and specialists must form a dialectical pair of the higher-level professional training process.

Another of the potentialities of the company that make it an excellent

pedagogical context is represented by the *permanent theory-practice relationship*. The company constitutes the real and most complete means, within the community, for the familiarization of the student with his future working life. When the vocational training process takes place in an integrated university-business manner (governed by the first), the student's insertion into the work context is gradually taking place from the first year of study; as a consequence, the student assimilates and endorses the work scenarios and appropriating the culture of his profession contained in them.

In this context of development, the professional in training visualizes the relationship of the academic knowledge received in the university and contrasts them with the reality represented in the real professional problems of the practice, in a process of permanent learning, in the action-reflection that it allows the integration of knowledge and accelerates the appropriation of professional content. (Mena JL & Mena, JA, 2019)

Practically conditioned by this previous need, old student claims resurface in the educational arena. The students demand that the formation and development of practical skills greater importance in college (García Montalvo, s. F.); that is, the engineers in training demand the preparation for the exercise of professional activities that require the application of scientific knowledge and methods related to the career and business needs. Consequently, while recognizing the necessary academic training that has characterized the university, today a greater development of "know-how" is needed as a condition, among other factors, of greater employability and social recognition of students once graduated.

It is not enough to have studied for many years acquiring specific knowledge on a specific subject, but, in addition, companies require that these acquired knowledge be more practical, which is not currently achieved in universities and study centers.

The previous reflection leads to another potential existing in business contexts that make them excellent pedagogical scenarios for the professional training process of engineers. *Learning occurs in specific sociocultural conditions* because the company carries experiences, traditions and experiences of work and profession are not obtained if not in the workplace, while it is very difficult to learn, even, with the more complete explanations of teachers in the school context..

According to the criteria of Acosta Iglesias, et al. (2012) and Aguilar Hernández & Mena Lorenzo (2014), the academic conception of content affects productivity in the formation of skills associated with student learning. It is necessary, then, to create or conceive learning situations as close as possible to the scenarios in which students will perform once they have graduated. These are precisely the stages of production and services that students are linked to the process s productive and organizational forms. (Mena Lorenzo et al., 2019)

On the other hand, business scenarios flee from school simulations, they also require to know how to do and know how to behave between professional career situations, manifested in tangible, urgent problems of solution. That is, the student during the productive-pedagogical process in the company has to learn to act on his surroundings. To do this, he must fully develop his interest in what he does and assume a valid attitude to face the continual and unpredictable changes that require in turn: teamwork,

intelligence development, sensitivity, aesthetic sense and personal responsibility between other qualities .It also requires to live and interact with the classmates , who are no longer just those in the classroom; You must look for other colleagues and establish common goals from the assumption of personal positions that characterize your personality as a professional . (León, 2014)

Following the same level of analysis and reflection, it also constitutes an educational potential of the engineer's professional training process, the organization of the productive process and the influence of the means of production on learning.

The process of professional training in the company is conditioned by the logic of the work activity and the production process. The learning actions lead to changes in reality the object of work (development of a part, developing software under a cell phone, food production, provision of a service, participation in a investigative process, among many others). However, that transformation of reality is what causes the changes in the student, as the subject that is carrying out the transformation and learning actions; it is this in essence that allows achieving the objectives in the training of the professional.

On the other hand, the professional training process itself and its activities contribute to the development of consciousness as a producer worker "[...] produce satisfies, even if it is a donut [...]". (Martí Pérez, 2015), that is, the student is aware of his / her performance and active and participant contribution in a leading and responsible way. Ensuring that the student learns by doing, researching and producing is one of the potentials that the company has as a pedagogical context. This previous element facilitates the establishment

of the productive process-pedagogical process relationship, building essential productive-pedagogical scenarios for professional training.

The logic of the process and its eventualities breaks with the monotony and schematics of professional training. The students assimilate gradually working procedures, actions and operations essential and own career studying, they learned of "academic" way (reproductive and / or simulations productive learning object) in college. The solution of a professional problem forces him to mobilize, in his own work activity, the entire arsenal of knowledge previously learned. To the extent that it becomes more involved, from production and research, with productive and service processes and their professional situations, together with teachers and production specialists, learning becomes more meaningful and authentic. (Shulman, 2005)

No one doubts that the company is the one who has the greatest possibility and speed to incorporate the changes that occur in the world because of advances in science, techniques and technology; it also has a greater capacity for rapid response to transform, incorporating the new orientations. This makes *the possibility of technology transfer* also become an educational potential of the company.

One of the essential contradictions that must be identified by all those who dedicate ourselves to professional training is *that which occurs between permanent changes in scientific, technical and technological development and the demands of teaching tasks and problems*; these transformations in the technological paradigms favor, by necessity and logic, the company. However frequent educational planning and curricular arrangements are carried out, they always have relative stability in

relation to the accelerated changes in the world of work, which it constitutes another contradiction to identify.

This forces a permanent reflection on the principle of technological transfer with adjustment to professional training. Every day it is necessary to make a more intelligent and rational use of the technology that is possessed, while the objectivity of the scientific-technological development, however advanced, is given in the capacity of the professionals in training to assimilate and use it properly. While it is important to incorporate new technologies into teaching for students to learn, more important than that will be that the pedagogical process takes place where the technology is.

According to the above idea, another contradiction arises, related to *the differences between the training and theoretical-practical updating of university professors and the accelerated technological development presented by the business sector*. Conceiving the university as part of the training process engineer, represents the possibility of converting the company, its facilities and its scientific potential in ideal scenarios to keep updated theoretical teachers and/or practical in their respective professions. When this process conceived properly, all teachers who make up the faculty of the career can be in systematic contact with the technological development of the company, to incorporate and update the content of programs and teaching.

The company also constitutes a strong educational potential in relation to *the professional reaffirmation of students*. It is no secret to anyone that students reach university careers without due professional guidance. The process of professional training in productive and service scenarios, when well conceived, influences the consolidation of interests

and motivations towards the career. In this process, the professional is being trained, achieving, even before his discharge, if the conditions of his integration into the company are favorable.

In the curriculum of each career, hours are allocated for the work-research function. Without being used according to the needs and demands of an integrated university-company professional training.

Hernández Martín et al. (2017), consider the need that, during higher-level professional training, all substantive functions take into account the labor nature, since it is a comprehensive training with an essential purpose: the profession. For these authors, labor must be present in each one of the personalized components of the professional training process. The objectives, the professional content, as well as the teaching and learning methods should reflect the spheres and modes of action of the training engineer.

Taking into account this criterion from the conception of the pedagogical process with the participation of the company, encourages students to gradually incorporate into the business

scenarios, gradually becoming familiar from the very beginning of the training. It is not necessary to wait for the stage in which the labor component is practically developed. All disciplines and subjects, coordinated by the main integrating discipline, have ample possibilities to manage their process from a university-company integration conception.

When the pedagogical process is methodologically conceived with an integral nature from the academic year, students have the possibility of integrating the contents, solving real

professional problems, with the accompaniment of a pedagogical group composed of teachers and tutors of the productive sector and services. This makes the teaching and learning in a dynamic way, mediated, professionalizing that drains, significantly, to the reassertion of the profession.

The climate created, the existence of a favorable professional environment during the process, the relationship between learning tasks and the objectives of vocational training, favors the development of intrinsic and autonomous motivations, based on one's convictions, feelings deeper and of the ends and projects the student has personally elaborated that for himself and / or for the collective. (Bermúdez et al., 2014)

Likewise, the formation of professional aspirations and interests is strengthened, which in turn allows the development of these motivations to be consolidated, since the influence of political-moral motives that act in the labor sphere, as well as internal needs and stimuli, prevails as The young man gets in touch with the content of the work, he is given scope for his responsibility and creativity, diminishing the monotony and repetitive character.

Developing educational, extra-educational and research activities in the conditions of companies or with the participation of specialists, either in the company itself or in the university, constitutes an exceptional breeding ground for the development of positive attitudes towards the profession, strengthening with it the formation of aspirations and professional interests. The student, from the academic and the research, gets in touch with the content of the work (work) and in doing so the scenario becomes conducive to the development of professional values such as their

industriousness, responsibility, independence and creativity. (Rodríguez Fuentes et al., 2019)

Currently, in practice still many teachers to conceive the higher-level pedagogical process locate the academic in the school and the work in the company. It should not be forgotten that although the academic allows to establish the fundamentals (general, basic and specific) of the object of science in the object of the profession; The work allows to deepen its essence by integrating the partial, the derivative and the fraction of the learning of the contents in a single whole (professional problem) in a totalizing, integrated and globalizing way. (Mena Lorenzo, JL & Mena Lorenzo, JA, 2019)

Combining academics and work in a systemic and comprehensive manner, using business scenarios properly, constitutes a condition to awaken and affirm in the engineering student the love for the profession by facilitating:

"[...] Fall in love with his work, and find it, as it is, nobler than any other, even if it is only because it allows the most direct exercise of the mind, and [...] know in an intimate way, in its effects and way of working, science [...]". (Martí Pérez, 2015, p. 103)

Finally, and without the intention of closing the analysis, because of the conviction that there are other educational potentials in the company that make it an important pedagogical scenario for university education, we do not want to ignore *the scientific - research nature of production and the services* and their importance both for the university and for the training of engineering students.

The university plays a strategic role in the current context and assumes an extraordinary challenge; since the new productive economic paradigm is based on the extraordinary use of knowledge and information, replacing traditional capital, labor, raw materials or energy (Infante Caballero, 2017). Given these realities, the fundamental contradiction of the university is given in the knowledge and information that it is able to manage, depending on the training of the students through the academic-research component and the information that is generated globally, from the change of an accelerated technological paradigm in all spheres of the economy and services..

The university continues to be primarily responsible for managing knowledge of academic origin as the raw material for its training. No one can ignore this knowledge, it has an origin in scientific research technological order and companies today earn ground every day in the management of research results and production of knowledge, making it an educational potential.

Faced with this new challenge, the university must transform; but this change must take place without leaving aside its essential condition as a producer of knowledge through research and management of the pedagogical process. It means the conception of academic- research processes where students gain prominence, participating in projects that, while solving real professional problems, allow their integral training. These problems are generally on the side of companies as essential carriers of the interests and socio-economic problems of each territory. To assume this change, since the pedagogical process shared with the company makes the university increase its role and continue to be a strategic pillar in the

socio- economic development of any nation.

Integration to the company represents the possibility of new knowledge generated by academic-research processes, which can be incorporated to the university educational process, enriching the intellectual capital of the university and thus its management. On the other hand, the incorporation of the specialists of the companies to the university cloisters, enrich their scientific potential, making the production of knowledge grow. This situation means that, regardless of other measures that may be adopted, higher education needs to be brought closer to the productive and services sector, as a means of facilitating academic, research and development activities. (Mena Lorenzo, JL & Mena Lorenzo, JA, 2019)

That students are linked, during the training process, to joint university-business research, increases their ability to learn about the contents of the profession. In addition, it promotes the development of certain social skills such as entrepreneurship, communication, group work, creativity, project generation, among others that make their training as engineers more comprehensive.

Undoubtedly, there are much educational potential that the company possesses that make it an essential context of the higher-level professional training process. A deeper and more detailed study can bring up many more potentialities; even, from each of those rose in the article, many others worthy of study and exploitation can be derived as part of the engineer's training process.

Therefore, although, as stated previously, the company by definition does not constitute an educational institution, after university and school in

general, it is the entity that has the most educational conditions in the community. However, the use of these potentials depending on the training of the engineering student requires a work integrated to the university.

Learning in the work context requires that students be prepared to learn. This requires a knowledge base that must be guaranteed by the university. That a student arrives at an activity in the company without proper interdisciplinary guidance (guiding base) is as sterile and useless as if the activity was not carried out. The development of educational, extra-educational and research activities in the business context must be part of the conscious and intentional preparation of the process in each discipline, subject, academic year and career. In other words, it must be part of the general curricular strategy to be developed throughout the training cycle.

The university and the company should not be seen as neighbors, they constitute fundamental pedagogical contexts in the process of professional training of the engineering student. It is up to the university, faculties, departments and careers to identify the educational potential of the company and use them in a consistent manner in the training of the integral professional that the Cuban society and its labor market demands.

CONCLUSIONS

Achieving a shared university-business professional training process, based on identifying and exploiting the educational potential of the latter, is first changing the traditionalist conception of the closed and academic process. It is to involve the company in the training of its future engineer; is to break the omniscient character of the university in

the company and vice versa; it is to understand that this is a path for an accompanied and not solo transit, which is achieved by the fusion of the productive process with the pedagogical process.

The identification and exploitation of the educational potential of the company by the university represents a condition for the integration between these two institutions responsible for higher-level professional training. A more active participation of the company in the pedagogical process does not cause the university to lose the main responsibility in the training. On the contrary, integration with the company increases the guiding role of the university in the pedagogical process, while management must exceed, throughout the training cycle, traditional academic boundaries extending teaching-research activities to all productive-pedagogical scenarios identified in the business context.

This integration is currently reaching the category of invariant for higher education, seen as a harmonious, systemic and shared process of a pedagogical nature that manifests itself between both entities, based on the coherent and mediating actions of teachers, specialists and tutors, in the direction of academic, research and extension activities that, conceived throughout the training cycle, enable the integral training of future professionals, as a sensitive contribution to national and local socio-economic development.

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