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Strengthening investigative skills of Digital Age apprentices An Innovative Education Proposal

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ABSTRACT: The National Learning Service (SENA) of Colombia, through the Research, Innovation and Technological Development System (SENNOVA), implements an investigative culture, Sincé currently in the centers, most of the projects are formulated and executed. Despite including research competencies in the curricular structures of training programs, the institution does not have relevance or development on the part of the instructor, since they, for the most part, do not possess said competencies, limiting their self-confidence and security before the apprentice, and consequently failing to develop these indispensable skills in the formulation of research Project, which in this context refer to develo ping and strengthening reasoning and scientific writing. From a qualitative paradigm with hermeneutical research method, this proposal addresses the problem, based on the connectivist theories of Siemens-Down and on innovative education; reorienting the traditional learning model and establishing a prototype to apply Connectivism, through collaborative learning tools and strategies, based on an integrating Project.

KEYWORDS: Connectivism, Innovative Education, Learning Model, Collaborative Tools and Strategies.

I. INTRODUCTION

In this, called by many "Digital Era", research has become a priority need, whose objective is nothing more than to produce new knowledge, whether theoretical or applied, demanded by a knowledge society constantly, given the new requirements of the sector productive. Therefore, currently, the vast majority of Colombian higher education institutions are focused on the development of these investigative competencies, since the failure of basic and secondary education in this regard is not a secret; It is enough only to initiate research practices in training environments to verify the lack of these skills on the part of the apprentices and even the instructor themselves.

The National Learning Service (SENA), in the processes of comprehensive professional training from an approach to the development of skills and Learning by projects as an educational strategy, assumes a contextual and multidisciplinary vision through a comprehensive methodology, where the promotion of Inquiry and research is one of the most important factors, starting from the moment of posing the problem situation, when the apprentice in a context of collaborative participation with other apprentices and with the instructor "dynamizes their activity in the different learning domains, generating processes conducive to the construction of new knowledge ", (SENA, 2015).

To this end, SENA creates the Research, Innovation and Academic Production Group whose objective is to develop the institutional policy of Science, Technology and Innovation of SENA, hereinafter SENNOVA; whose investment for the implementation and strengthening is supported by the BPIN project for the Implementation of programs for innovation and technological development, for which 20% of SENA's parafiscal resources are allocated in accordance with article 16 of Law 344 of 1996. Said BPIN investment project has the approval of the Ministry of Labor and the National Planning Department for the period 2019-2022 with the main objective of strengthening the SENNOVA system(SENA, 2019).

Since 2018, SENA, through the SENA Prospective, Surveillance and Organizational Intelligence System, hereinafter PREVIOS, and the Prior National Unit, begins prospecting in technological surveillance and undertakes the construction of technological development plans in all training centers in the country. In 2019, SENNOVA joins SENA's Prospective, Surveillance and Organizational Intelligence System (PREVIOS), expanding the research influence frontier. Article 13 of Resolution 0107 of 2019, which defines the functions of SENNOVA, in number 3: "SENNOVA will have the following functions: Define the development plans and

programs of research, technological development and Innovation projects that respond to the needs of the business, economic, productive and social sector of the country in the territorial environments or regions ".

In accordance with the legal provisions and the corresponding institutional policies, the evaluation and monitoring system incorporates several internal and external components to professional training, namely: assessment of the management of SENA as aState institution, as an educational entity that offers professional training, provides technological services and executes applied research projects; and, finally, the evaluation of the learning process.(SENA, 1997).

On the other hand, since it is part of the National Science and Technology System in accordance with the provisions of Law 29 of 1990, which in Decree 585 of 1991, states: "professional training activities are carried out in accordance with current regulations , aimed at transferring technology for immediate use in the productive sector; carry out applied research and technological development programs and projects, and guide the creativity of Colombian workers "(Colciencias, 1991).

This work presents several sessions: the first one where the current problematization of the investigative process in SENA is raised, which lies in a weak development of research skills during training. A theoretical framework in which some antecedents are presented, which contextualize with respect to existing works related to the phenomenon addressed, the different theories provide the constructs that support this research.Next, the methodological framework includes the paradigm in which this proposal is inscribed, the type of research on which it is based, the method that guides it, as well as the design. Next, the results obtained raised, finally, of the final considerations, reflecting on the informational elements collected.

II. MATERIALS AND METHODS

As an element that frames the methodological transit in which this work is inscribed, the qualitative paradigm stands out, which clearly imposes the procedural parameters in the theoretical-practical treatment that sustains the object of study? Likewise, Hermeneutics is the research method, with a learning environment scenario, impacted by IT and the technological educational platforms of an IES; whose key informants were subjects with administrative and managerial responsibility, managers of learning environments, Users of technological platforms and Learning Networks. The Techniques and Instruments were Semi-Structured Interview, Observation, Scripts and Formats, online forms, using as validity and reliability, expert judgment and Analyzing The information through Reduction

When we hear about the requirements and needs of the world of work, the key competencies, the most valued skills, and the skills that prepare us for a full life in citizenship; research is one of the main ones. All the previous references demonstrate the importance of the investigation for SENA, and for the State. However, despite the efforts, the weakness of both trainees and instructors in this regard is notable; developing and strengthening reasoning and scientific writing is not a relevant competence for them. And this is clearly reflected in the little academic production in addition to the lack of quality and protocols in some existing ones, evidenced from the very formulation of some training projects.

After being a SENA instructor for more than eight (8) years in the ADSI program, this year, the researcher is requested as IT support for the technological program in Administrative Management, to guide the competition: Apply information technologies taking into account the needs of the administrative unit, in the File Sofia 1599510.It should be noted that this competence is from the initial phase of the project and the request is made in the execution phase. To try to comply with what is formulated in the training project: "Generation of administrative solutions that facilitate the apprentices to put into practice the skills acquired during their training before starting their productive stage" (SENA, 2018), (formulation not shared by the researcher as it is considered very general), the need arises to articulate IT by applying solutions to a company, all this developing research skills in the apprentices. The challenge was to create a solution that integrates micro-curricula with collaborative tools and a strong research component.

To better understand the research process, it is necessary to conceptualize and understand what the phenomenon of learning means in the context of the XXI century, being necessary to make a brief review of the learning and positions of theorists in the different approaches proposed; as well as the review of some constructs that provide foundation for this work.

According (Gagné, 1987), learning lies "in a change in human disposition or capacity, with a relative permanence character and that is not simply attributable to the development process." For (Siemens, 2004), learning is a process that occurs within diffuse environments of changing core elements - which are not entirely under the individual's control. All these theoretical referents have generated different positions, which have determined the known learning models and that, until recently, were the main theories: behaviorism, cognitivism and constructivism.

From the behavioral perspective and according to (Gredler, 2001)cited by Siemens, learning is a change in behavior. The mind is a black box. From the point of view of Cognitivism, learning is different, because now what happens inside the individual matters. All knowledge is presented as symbolic mental constructions in themind of the learner, the learning process is the medium, learning means including new representations in memory and starting to generate some type of cognitive structure within the head of each one. For Constructivism and according to (Bruner, 1998), learning is an internal and active process, the learner who learns builds new ideas or concepts based on their current or past knowledge. However, and according to Siemens, none of these models took technology into account and that is why it formulates the theory of Connectivism that basically establishes that Learning is a process that occurs within diffuse environments of changing central elements - which are not completely under the control of the individual, very mediated by technology. In this regard, technology today has a close relationship with education. Its evolution has been so great that according to(Kerchkove, 1999) produces what I call the "new ecology of networks" activating contexts that involve interactivity, hypertextuality and connectivity.

In relation to competency-based education According to (González, 2004), the basic competences have been selected based on three important criteria: they are available to everyone, they are common to many areas of life and they are useful to continue learning. According (UNESCO, 2008)The competencies for educational facilitators include three levels: The first, Digital Literacy or Acquisition of basic notions of ICT, is related to the basic management of technology making use of digital resources that guide the student in their learning as productivity and multimedia tools; in the second or deepening of knowledge, with the use of more sophisticated methodologies and technologies and at the last level, the generation of knowledge with the widespread use of technology to support learners who create knowledge products. In accordance with (MICROSOFT, 2019)Innovative education involves three aspects: student-centered pedagogies (methodologies) that promote learning; extension of learning beyond training environments such as knowledge building and problem solving and integration of IT with methodology that deepen learning and support goals. In this particular case, Innovative Education brings theory and practice closer together through an effective professional development plan; based on the solid results of research programs. Curricular structures are the epistemological, "pedagogical" (didactic) and curricular orientations that the MEN defines and that with the support of the academic educational community support the process of foundation and planning of the mandatory and fundamental areas defined by the General Law of Education in its article 23,(MEN, 1994).

The Epistemological orientations that according to (Nava, 2012) are the philosophical assumptions, the theoretical foundations, the methodological procedures, the technical strategies, and the instruments, which are used to carry out research from the educational sciences, the SENA according to the MFPI, creates the favorable conditions to guide the search for the knowledge as a pluralistic, rigorous and open exercise in its various forms and levels within the fields of sciences, arts, humanities, technology and the professions (SENA, 2012). The "Pedagogical" Orientations that must be named didactic, defined in (MEN, 2014), as education programs that seek to promote in children and young people the development of basic and civic competences, as well as the critical and reflective thinking necessary for taking responsible decisions in economic and financial matters and road mobility.

Among the pedagogical strategies used by the SENA instructor, which are adopted according to the particular characteristics of the subject to guide, are: Master class, Case simulation, Problem solving, Projects, Portfolio, Group techniques, Technical visits of Observation, Practices and Online Evaluation. The SENA instructor must make use of this technological resource that is only used in e-learning in distance study modalities and in virtual classrooms, to make it an instrument for use in each of the subjects taught. The purposes in accordance with the SENA Professional Training Model (MFPI) and in general, promote comprehensive and flexible training in accordance with the requirements of the productive sector of the region and the country, fulfilling the professional, investigative and social service seeking educational excellence. This work has as its final purpose, based on the findings of the investigative process, and the reference postulates, to strengthen the investigative skills of learners in the Digital Era through an Innovative Education proposal at SENA. In this same order of

ideas, from the findings obtained, it is required: a) Specify the components of the current educational model in the study context that can be used to strengthen research through connectivism; b) Determine the emergent conditions necessary to apply connectivism as a didactic approach; c) Identify the competencies that students and instructors must have and develop during and at the end of the investigative process; d) Transform traditional knowledge exclusively from the intellectual elites through innovative education through the contribution of common users within the framework of the construction of collaborative knowledge and e) Develop theoretical elements that can be implemented in research and training processes.

III. RESULTS

With these theoretical foundations and from Current pedagogical model of the institution, a clear and complete idea of the current educational model is established. In the elements that make up the current educational model, from testimonial affinity four (4) components emerge that favor the strengthening of investigative skills and in the conditions that this reaches, as they are: the Characteristics of the current educational model, the Applicability of the current educational model, the etymological contradictions linked to the model and the tendencies of the educational model.

Finally, as results for the strengthening of investigative skills, the following are found:

Instructional Design of the proposal: Instructional Design is the process to determine the current state of the student based on the findings found and defines the objectives of the training and specify an "intervention" to achieve those training objectives (Belloch, 2013), involves systematic instructional planning that includes needs assessment, development, evaluation, implementation, and maintenance of materials and programs.
This design consists of:

General objective of the proposal. Implement IT in the processes of a local company or organization taking into account an existing management model

Specific objectives of the proposal.

- Analyze the information necessary to carry out the project (Company, processes, management model, IT tools, etc.)
- Design a process map with innovations.
- Develop the management model of the company innovate with IT on a website.
- Evaluate the results of the investigation in a document.

Learning objective: Develop investigative competences in the apprentices of a SENA technological program through IT.

Target population. The professional training selected for the pilot was Technology in Administrative Management, from the Center for Industry, Business and Services, from SENA, North Santander Regional, Sofia 1696360 file, specifically in the orientation of the initial phase competence: Aapply information technology taking into account the needs of the administrative unit.

Planning of learning methodologies. Through the use of collaborative tools and group learning activities, achieve the construction of this first phase of the project and individual projects, as described below.
Collaborative Tool. To mediate learning, LAMS, short for Learning Activity Managment System, will be used to design, manage and develop collaborative online learning activities. Provides teachers with a highly intuitive visual authoring environment to create sequences of learning activities. These activities can include a variety of individual assignments, small group work, and content- and collaboration-based whole-class activities. Professors Gámez and Marín describe LAMS as a learning sequence design tool that allows us to build routes through which students can advance based on their achievements. (Gamez & Marin, 2019).

Learning strategies. Aronson's Puzzle technique will be used as the main strategy, which is a fundamental tool to confront different points of view, to apply a dynamic and functional methodology and increase the skills of the participants(Martinez & Gomez, 2010), in addition to other tools such as billboard, discussion forums, resource sharing, wiki. etc., and others included in LAMS.

Didactic instrument. Interactive Learning Guide

Assessment planning. The initial phase of the integrating project and one article per group of learners.

Roles of participants. The role of each one is defined as: Author, Student, Monitor and Administrator.
To see how the COMINV19-1 connectivist course works, copy the following link into your browser and provide the supplied key: www.lessonlams.com:443/xbbewwu
Products Obtained.

Essays in collaborative production:

a. Outsourcing application in the CENS company
b. Tic applied to the NS College of Public Accountants
c. Application of the Total Quality model in the company Black Shirts
d. Aguas kapital and the implementation of the Empowerment model.
e. ICT implementation in Home Center
f. Management model at natural Cleaning Service
g. Implementation of the Corponor strategic planning managerial model
h. Just-in-time management model implementation

User questionnaire

- Learning platform
- Dynamic learning guide.

IV. CONCLUSIONS

For SENA, fostering inquiry and research is one of the most important factors, starting from the moment of posing the problem situation, when the apprentice in a context of collaborative participation with other apprentices and with the instructor "energizes their activity in the different domains of learning, generating processes leading to the construction of new knowledge ", promoting comprehensive professional training from an approach to developing skills and project-based learning, assuming a comprehensive methodology from a contextual and multidisciplinary perspective.

Under this educational context, the apprentices through the research hotbeds tend to carry out professional qualification in parallel with the performance of work activities, influencing the limitation of time to devote to research training; A situation that accentuates the problems related to those who manifest deficient processes in their investigative skills, especially those related to locating, using, organizing and treating the information that allow them to evaluate the reliability, relevance and relevance of the consulted content, in order to generate the appropriate responses that imply the approaches made from the subjects corresponding to the curriculum studied within SENA.

Connectivism, undeniably affects as a "source of inspiration" for teachers, being logical that, as technology enables new scenarios, the need to extend didactic models also increases. (Nephew, 2014).
Innovative Education is closely related to online learning. It occurs when several people learn something together. Knowledge arises from the interaction between people who share experiences and who, faced with a problem, adopt different roles and tasks.

These new schemes they must strike a balance between two options: flexibility versus structure. That is, when creating these environments, attention must be paid to the design so that they include these two essential characteristics that facilitate learning.

These new dynamics make the instructor's roles rethink where he loses prominence, he is no longer a source of knowledge, but is a manager of learning environments, a fact that forces him to train in information technologies. Likewise, the role of the apprentice changes, since he is the main actor of the entire training process.

Take advantage of all the benefits in technological tools to support educational processes, which, as in the case of LAMS, allow the construction of new knowledge.

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