
La seguridad del movimiento en el currículo de la carrera Mecanización The movement security, in the Mechanization major curriculum

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Resumen: El presente artículo aborda la necesidad de ofrecer contenidos especializados sobre la seguridad del movimiento a los estudiantes de la carrera Licenciatura en Educación especialidad Mecanización de la Universidad de Holguín. Estos conocimientos son esenciales para completar la formación académica de los futuros profesionales de la educación de la provincia de Holguín y otras regiones del país. Por lo que constituye el móvil principal del presente trabajo, concretar la propuesta de un programa de Asignatura Propia titulado: “Seguridad del movimiento”, por esta razón se parte del análisis de la necesidad de su implementación en el currículo de esta carrera.

Palabras clave: Mecanización; Seguridad del movimiento; Seguridad vial; Currículo.

Abstract: This paper deals with the need to provide specialized content about movement security to the students of the Bachelor Education Mechanization major in the University of Holguín. The knowledge are essential to complete the academic training of the future education professionals in technical and trade schools of the Holguín province and other zones of the country. In order that, the mainspring of this work is, to fix the proposed subject syllabus titled: “Movement Security”, for this reason is based on the analysis of the need for its implementation in the curriculum of this major.

Key words: Mechanization; Movement Security; Traffic safety; Curriculum.

Introduction

Current progress is aimed at improving people's quality of life and satisfying the needs of the population. In this sense, the commercial exchange between companies, cities, countries, etc., causes the growth of storage and transportation levels of goods and services. It is for this reason that the transportation production process has become one of the most demanded economic activities at international level.

The growth in demand for transportation is an incentive for increased production and sales of automobiles and means of cargo transportation. Although road transport is much safer today than in past decades, it is still much more dangerous than other modes of transport. Thus, the transportation industry faces a complex challenge in terms of reducing accident risk rates.

The increase in accidents caused by road transport services is of great concern at international level. This concern increases if we take into consideration that most of the time these accidents cause the death of many human beings and considerable material losses. No country can escape from this alarming situation, so science and society are engaged in mitigating its consequences.

In order to achieve sustainable development, it is necessary to guarantee life and promote wellbeing for everyone at any age. For this reason, the United Nations proposes to reduce by half the number of deaths and injuries caused by traffic accidents in the world by 2020 (United Nations, 2016). (United Nations, 2016)

A traffic accident is defined according to Cuban legislation as: an event that occurs on the road, where at least one moving vehicle is involved and as a result produces death, injuries to persons or material damage. (National Assembly of People's Power, 2011)

This is a complex problem, so it has to be analyzed from multiple angles, in addition, there are numerous factors involved in the occurrence of accidents. These risk factors in traffic accidents can be: the human factor, the vehicle and the environmental factor (which includes the physical and social). Undoubtedly, in this sense, the human factor plays the predominant role and is responsible for more than three quarters of the accidents that occur. However, this situation must be analyzed globally, especially when the responsibility involves so many sectors of society.

The safety of movement is defined as the property of a vehicle to move and carry out the transportation process without damage to the vehicle, the road and the people involved in the process or as part of the environment surrounding such activity. (Rosales, 1991)

Safe movement contributes to the achievement of productive and economic efficiency and at the same time reduces the negative impact on society. At the international level,

important innovations are being made today in terms of both technologies and operations, and regulations and measures are being implemented to ensure that transportation is carried out safely.

This ownership of vehicles must become a means within the reach of current and future generations. This is where education must play its role in the training of future transport and mechanization technicians and specialists. Hence the need to insert the general elements that characterize the safety of movement in the curriculum of the Mechanization career.

Therefore, the main purpose of this article is to concretize the proposal of a program of its own subject entitled: "Safety of movement", for this reason, we start from the analysis of the need for its implementation in the curriculum of this career.

Development

As discussed above, safe movement means reaching the destination without damage and includes the loading and unloading processes. To this end, all the scientific and technical advances that have been developed at international level in this regard must be taken into account. Numerous research projects, innovations, regulations and standards exist in this area.

Road safety engineering, for example, protects the expansion of the automobile from any social or political questioning that might result from the ever-increasing danger associated with this expansion. In other words, road safety engineering manages the increased danger generated by the expansion of the automobile by presenting it in such a way that it is perceived as tolerable by the social body. To this end, it exclusively supports techniques that act on the risk side, trying to reduce the probability that the increasing danger of automobiles will materialize proportionally in damage to people and things. (Estevan, 2003)

In the public health sector, authors such as Alfaro and Díaz (1977) analyzed the repercussion of accidents in this sector for America as early as 1977. The World Health Organization and the World Bank jointly launched a report on road traffic injury prevention, highlighting the growing epidemic of injuries caused by accidents. This report discusses in detail the fundamental concepts of road traffic injury

prevention, the impact of road traffic injuries, their causes and the main risk factors of vehicle crashes, and effective and proven intervention strategies. (Geneva, Global Road Safety Partnership, 2008)

The author Herrer, (2016) addresses the social dynamics of road accidents in Colombia. In addition, the Mexican Institute of Transport Secretariat of Communications and Transport (1999) presents a set of recommendations for the safe securing of cargo to the vehicles where it is transported. These studies provide important elements for understanding and dealing with this problem.

Cuban legislation also addresses this problem and establishes Law 109, the Road Safety Code, as its main document. In addition, the Cuban National Public Health System establishes protocols in this regard and campaigns are carried out in the press and different political and mass organizations. The Ministry of Education establishes road safety education as part of the educational work at all levels of education.

As we have seen, the security of movement is an aspect of utmost importance for the economic and social development of any nation. In this context, "the training of higher level professionals is the process that, in a conscious way and on scientific bases, is developed in higher education institutions to ensure the comprehensive preparation of university students, which takes the form of a solid scientific-technical, humanistic training and high ideological, political, ethical and aesthetic values, in order to achieve revolutionary, cultured, competent, independent and creative professionals, so that they can perform successfully in the various sectors of the economy and society in general." (Ministry of Higher Education, 2018, p. 648)

From the 2016- 2017 academic year, the Study Plan E is implemented, which has a base curriculum that is centrally determined by the National Career Commissions and are mandatory for all universities in which the career is developed. In order to respond to the general objectives of the career, each center decides how to complete its particular study plan, in correspondence with its characteristics and those of its territory, through its own and optional/elective curriculum.

The Bachelor's Degree in Mechanization has among its objectives: "to demonstrate professional knowledge in the management of the training process of technicians and workers in the specialties of transport and agricultural mechanization, which contribute to the appropriation by them of those general, basic and professional knowledge that

will allow them to demonstrate a competent professional performance in the execution of mechanized processes". (Ministry of Higher Education, 2016, p. 8)

Considering the flexibility provided by the E curriculum and from the development of a diagnosis that facilitates the accumulation of other indications about the need to insert some of the contents related to movement safety in the curriculum of the Mechanization specialty. In this endeavor, some methods and instruments of scientific research are applied, such as: observation, interviews to professors, interviews to students, review of documents, dialogue with specialists, as well as, the experience of the authors' collective. From the analysis of the results of these methods, some limitations are determined in relation to the mastery of theory and methodology, such as:

- Movement safety is reduced to the elements of knowledge related to road safety.
- Limited use of the potentialities offered by the contents of the different subjects to contribute to the knowledge related to movement safety.
- Insufficient interdisciplinary relations for the treatment of contents related to movement safety.
- Scarce bibliography that integrally addresses the elements related to movement safety.
- Insufficient treatment of movement safety in its link with labor entities.

These limitations made it possible to deepen the study of the theoretical and practical foundations of movement safety. The fundamental theoretical-practical bases are delimited and how they should be applied in the content system of the degree course in Mechanization Education.

Movement safety is based on the adequate application of technical and organizational measures that make it possible for loads to arrive at their destination without harm to the economy (meaning the vehicle, the loads and the infrastructure) or to the people involved in the transportation process or who are part of the surrounding environment. Therefore, the mastery of technologies applied in vehicles to avoid accidents is a very important factor.

The application of new technologies that avoid or reduce the possibility of accidents occurring (active safety) or keep the consequences of these accidents limited for man and vehicle (passive safety), are aspects that every mechanization professional should be aware of. The benefits of these systems and mechanisms are very important to consider in the process of operating these vehicles. All this reinforces the idea that their study is transcendental to support the intention of avoiding accidents or reducing the damage they cause.

As we have been able to evaluate, one of the aspects that must be taken into consideration for the development of movement safety is the knowledge and training of the personnel that works or interacts in this process. Hence the importance that students of the Mechanization career approach the essential theoretical contents that are addressed in the application of these technologies.

It is necessary to explain that when referring to contents, it is not simply reduced to knowledge, but also includes skills and values. An analysis of this category is made by Horruitiner (2006) who considers that content as a pedagogical category expresses that part of the culture related to the object of study, whose assimilation is necessary during the training process to achieve the proposed objectives, i.e., those qualities, characteristics and features that have to be incorporated into the training process.

In correspondence with this analysis, the author himself later adds that knowledge, as part of the content, characterizes the way in which the subject reflects in his consciousness the object of study, by identifying those qualities and properties of interest to him. Skill, on the other hand, is that part of the content that characterizes the interaction of the subject with the object of study.

He then adds that values are also part of the content and, as such, it is necessary to specify them in the study programs and work on them pedagogically to achieve their incorporation into the personality of the students.

It is for this reason, that a subject program is proposed to contribute to the eradication of the limitations that despite the efforts made by the country to disseminate and expand road education, still persist in the training of professionals and specifically to deepen the current trends in the development of technologies and existing regulations in relation to the safety of movement.

Being consistent with the analysis carried out so far, a program of its own subject entitled: Safety of movement is designed. This course is designed for third year students of the Bachelor's Degree in Education, specializing in Mechanization, who are in the E curriculum, and offers the bases oriented to deepen in elements related to transportation safety, taking into consideration sustainable development. It constitutes a working tool to adequately use the knowledge acquired in previous subjects and apply it in their professional practice.

The current application of movement safety and its development perspectives in Cuba constitute a premise to contribute to solve technical problems, which in turn are respectful with the environment, as well as to achieve a higher preparation, efficiency and scientific-technical level.

The objective of this course is to analyze the basic elements of movement safety, starting from the need to study it as a way to protect human and material resources, taking into consideration the current conditions of development of the transportation means and services system.

In the content of the program of this subject, the first topic is a characterization of the safety of movement as a complement to the operation of vehicles, starting from the need for its use in transportation, taking into account the safety elements to preserve the life of man and the means of transport, speeds and safety in the placement of loads, encouraging students in the need for its study from the economic and social point of view.

The second theme deals with roads, their classification and historical evolution, the administrative authority in the organization of movement, as well as signaling and the calculation of the braking distance of a vehicle, adopting the formation of a road culture.

A third theme is devoted to the study of active safety and its importance, starting from the elements that compose it and its main technical characteristics, diagnosis and technical maintenance, contributing to the assimilation of a responsible awareness of the dangers that can be caused by a poor technical condition of a means of transport.

The fourth topic is oriented towards the study of passive safety and its importance in vehicles, starting from the elements that compose it, its main technical characteristics

and repairs, promoting awareness in the use of the means of protection that the vehicle has.

Lastly, the fifth topic delves into those general elements related to road safety education, starting from its definition and regulatory documents, the negative factors for pedestrian safety, encouraging the development of a responsible road culture and compliance with the rules established in this regard.

Finally, the evaluation of this study program is developed in a systematic way by checking the knowledge that the students have about the contents oriented to their self-preparation. For this purpose, a partial control work must be developed and different evaluation methods can be used, such as: oral exposition of an aspect, delivery of reports and written summaries, collective debates, as well as oral and written questions and others that adjust to this study modality. In all cases it is necessary that the student has clear and precise objectives to be evaluated and the necessary time for adequate self-preparation. In addition, materials will be elaborated (extracts and/or teaching aids) where the potential of the content developed in the course will be valued as a way to solve pedagogical and technical problems.

After the elaboration of this program, a process of analysis of the feasibility of its application begins. In this process, some methods and instruments of scientific research are used, such as documentary analysis, critical opinion and collective construction workshops, an opinion issued by the scientific council of the Mechanical Engineering department, surveys to users of the proposal and scientific observation.

As a result of these methods and instruments, the importance of the development of the subject was corroborated. As part of this process, the workshops were developed with the objective of obtaining information through the evaluation, analysis and collective discussion of the professionals related to the subject, which contributes to improve and confirm the relevance of the proposal of the subject program in the training of the professionals of the Mechanization career, so the following was carried out:

The number of workshops to be held was determined.

- The order of execution of each workshop was determined.
- The execution schedule was planned.
- The structure of the workshops was designed according to their objectives.

- The workshops were carried out according to the planning.
- The evaluations of the participants in each workshop were systematized.
- The proposal was enriched based on the systematized elements.

These workshops allowed perfecting the proposal based on the theoretical-methodological suggestions provided by its participants, who have a high pedagogical experience and trajectory. Four of them are professors of the Mechanization career, all of them have higher academic categories and three of them have the scientific category of Doctor in Pedagogical Sciences that support them to issue opinions in relation to the development of this work.

In this process, the following indicators were determined as indicators to analyze the improvement program:

- Requirements and standards of the program's own curriculum (relation between its components, actuality of the bibliography, methodological recommendations and evaluation).
- Relationship of the content with the objectives of the course and the year.
- Relevance of the program from the technical and methodological point of view.

As a result of these workshops, the following criteria are obtained:

It presents an adequate relationship between the general objective and the objectives of the topics.

- Relationship between the objectives of the subject and its contents.
- Adequate link between the contents of the program and the scientific knowledge of the technical subjects of the specialty, as well as of preceding subjects.
- The elaboration of programs corresponds to the norms established for this type of program according to Resolution No 2/2018 Regulations of Teaching and Methodological Work in Higher Education.
- It contributes to the identification of the potentialities of the content to contribute to the use of technologies used in movement safety.
- It must contribute to the preparation of students to efficiently face the new scientific and technical advances related to movement safety.

- It maintains an adequate logic and wording.
- The proposed bibliography has an adequate level of updating.
- The proposal complies with the ideas that support the training process of higher education professionals. (Unity between the instructive and educational aspects and the work-study link).

Once the criteria of these specialists have been obtained, the proposal is submitted to the scientific session of the department where the corresponding opinion is issued.

Conclusiones

The safety of the movement has to guarantee the integrity of people, vehicles, cargo and roads with their environment, hence the importance of the subject for all sectors of society and the economy.

The scientific-technical advances and organizational measures in the field of movement safety require the preparation of professionals in the different branches related to it, in order to apply the basic scientific and research knowledge for its development.

The elaboration of the program of the subject related to movement safety contributes to facilitate the preparation of students to face professional problems that appear in the exercise of their profession.

Bibliographic references

Alfaro, C. y Díaz, C. (1977). Los Accidentes de Tránsito: Creciente Problema para la Salud Publica. *Bol Of Sonir Panum* 83 (4).
<http://iris.paho.org/xmlui/bitstream/handle/123456789/16146/v83n4p310.pdf?sequence=1>

Asamblea Nacional del Poder Popular (2011). *Ley 109, Código de Seguridad Vial*. La Habana: Capitán San Luis.

Estevan, A. (2003). *Los accidentes de automóvil: una matanza calculada*. España: Instituto Juan de Herrera. <http://www.iigov.org/seguridad/>

- Herrer, A. N. (2016). Accidentes de tránsito con heridos en Colombia según fuentes de información: caracterización general y tipologías de accidentes. *Revista CES Psicología*, 9(1), pp. 32-46.
- Horruitiner Silva, P. (2006). *La universidad cubana: el modelo de formación*. Félix Varela.
- Instituto Mexicano del Transporte Secretaría de Comunicaciones y Transportes (1999). *Guía para el diseño y uso de sujeciones de carga en el autotransporte*. Sanfandila, Qro: Publicación Técnica No. 113. <https://www.imt.mx/archivos/Publicaciones/PublicacionTecnica/pt113.pdf>
- Ministerio de Educación Superior (2016). *Plan de Estudio E. Carrera Licenciatura en Educación. Mecanización*. Cuba.
- Ministerio de Educación Superior (2018). *Resolución No. 2/2018. Reglamento de Trabajo Docente y Metodológico de la Educación Superior*. Gaceta Oficial de la República de Cuba. <http://www.gacetaoficial.cu/>
- Naciones Unidas (2016). *Agenda 2030 y los Objetivos de Desarrollo Sostenible. Una oportunidad para América Latina y el Caribe*. <http://www.sela.org/media/2262361/agenda-2030-y-los-objetivos-de-desarrollo-sostenible.pdf>
- Rosales Echarri, V. (1991). *Transporte de carga por carretera*. Pueblo y Educación.
- Sociedad Global de Seguridad Vial (2008). *Control de la velocidad, Un manual de seguridad vial para los responsables de tomar decisiones y profesionales*. Suiza. http://www.montevideo.gub.uy/sites/default/files/control_de_velocidad_1.pdf
- Unión Europea (2012). *Transporte por carretera Un cambio de rumbo*. Luxemburgo: Oficina de Publicaciones de la Unión Europea. https://www.learneurope.eu/files/4213/7526/6935/Transporte_carretera_es.pdf