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SCHOOL DROPOUT AT THE HIGHER EDUCATION LEVEL IN MEXICO, CURRENT SITUATION AND STRATEGIES TO COMBAT IT AT THE TECNOLÓGICO NACIONAL DE MÉXICO.

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Summary -

School dropout is a very complex problem that has been present throughout history formal education, so Higher Education Institutions (HEI) are not exempt from this situation, therefore in the Tecnológico Nacional de México (TecNM) have implemented various strategies through which to address this situation.

The research in this article is descriptive-documentary in nature, based on a search for information in various documentary sources, in order to obtain a general overview that allows the development of the work to establish the situation of the TecNM and the strategies carried out.

It should be noted that the results shown in this research correspond to strategies such as the Institutional Tutoring Program (PIT) and scholarships, and recently the implementation of the Mooc's and the Early Warning System, the latter seeks to identify the factors that lead a student to abandon his or her studies. With this it can be determined that the strategies carried out by the TecNM are focused on a complex situation, but in the face of which work is being done to cover different areas.

Keywords: *School dropout, Strategies, Dropout factors, Higher Education Institutions.*

INTRODUCTION

Dropping out of school not only affects the person who abandons his academic activity, but also those around him, for example, his family and even the country's economy. If this person does not finish a career, then there is one less professional, so he has a greater chance of not prospering in the personal and professional sphere, and therefore, not having the option of achieving a better quality of life.

The present investigation reveals some strategies carried out to counteract the dropout in the TecNM; nowadays society demands people with greater capacity of interpretation, creative and with a good handling of information; education is a learning process, in which each individual develops cognitive capacities, physical abilities, creates values and beliefs according to what is governed, being a right each one possesses equally. School dropout is an educational problem that slows down the human, social and economic development of people and of the whole country, resulting in a complex situation suffered by the IES. TecNM has a 58 completion rate, which is why school dropout has a direct impact and strategies are implemented with the intention reducing dropout rates.

Currently, TecNM has a presence throughout the country, providing an option for young people to continue their studies at a higher level, being

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It is a challenge to achieve their permanence throughout their professional training, for this reason actions are carried out to meet this objective, including the PIT, scholarship programs through the National Coordination of Higher Education Scholarships (CNBES), massive online courses through the MexicoX platform and the Early Warning System.

Although it is true that school dropout is a major problem in the national formal education system due to its magnitude, it is clear that this problem has internal and external causes, therefore, its total eradication is complex, but the implementation of strategies is an important step that can result in a significant reduction.

PROBLEM STATEMENT

For the 2017-2018 school year in Mexico there were more than 35 million students, considering all academic levels, however, according to SEP data in the 2015-2016 school year, every minute 2.2 Mexican children and young people quit school, having in higher education a total of 6.8% of young people who abandoned their studies [1].

Dropping out of school has a wide variety of repercussions that are reflected in the labor, social, personal, etc. areas. Not finishing a degree implies low incomes, non-formal labor activities, and thus the results of education are slowed down, as well as the country's development.

According to Nava Palacios [2], school dropout is one of the current problems in the Mexican educational system, because even when measures have been implemented to combat the phenomenon, they are insufficient, since it continues to occur in each school year.

GENERAL OBJECTIVE

To identify the strategies carried out by the TecNM based on school dropout based on a descriptive-documentary study to learn about their implementation.

SPECIFIC OBJECTIVES

- Distinguish the general panorama of the dropout problem in Higher Education Institutions.
- Collect information on the TecNM school dropout rate.
- Explain the strategies implemented by the TecNM to address the problem of school dropout.

METHODOLOGY

This research is a descriptive-documentary study based on a bibliographic review to determine and integrate in this document the strategies that are carried out in the TecNM to address the situation of school dropout.

THEORETICAL FRAMEWORK

Since the eighteenth century, technological education was present in France and Germany, and by the nineteenth century it expanded in Europe and America. These institutions were dedicated to the preparation of technicians and engineers and their purpose was that upon graduation they could perform according to the requirements of a new form of capitalist production, in which they had to put into practice their skills and knowledge [3].

The 1930's marked the beginning of technological education Mexico with the creation of the National Polytechnic Institute, but it was in the 1940's, as indicated on its website by the National Technological Institute of Mexico (TecNM), that the first Technological Institutes were created in 1948, when those of Durango and Chihuahua were created. Shortly thereafter, those of Saltillo (1951) and Ciudad Madero (1954) were founded. By 1955, these first four Tecnológicos served a school population of 1,795 students, of which 1,688 were men and only 107 were women. In 1957, the IT of Orizaba began operations [4].

After 8 decades TecNM has the largest national enrollment of engineering students. The page of the National Statistics System of TecNM 2018 gives the following information

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The number of students enrolled in the 2016-2017 school year was 597,031, divided into 591,771 undergraduate students, 5,042 graduate students and 218 TSU students. In this way, they provide education to the different sectors of society.

Education is the foundation of any society and the completion of education by young people is a primary objective for institutions.

Not only do we affirm that education is key to economic and social development, but also that it is an undeniable component of the democratic life of the country to achieve a fairer and more equitable distribution of goods and benefits, by bringing educational opportunities to underprivileged communities and sectors, ensuring access and permanence of young students from the most vulnerable social classes [6]. Education provides people with skills and knowledge to develop intellectual potential, enriches cultural and spiritual aspects, and fosters values, which are essential characteristics of human beings. Education helps to achieve better levels of social and economic welfare, which are necessary in every sense.

Education can be understood as a learning process, in which people develop their cognitive abilities, physical skills, create their own values and beliefs according to what they are governed; education is a right that all people have equally. As mentioned in Article 3 of the Political Constitution of the United Mexican States, everyone has the right to education. The State -Federation, States, Mexico City and Municipalities- will provide and guarantee initial, preschool, primary, secondary, high school and higher education. Initial, preschool, primary and secondary education make up basic education; this and higher secondary education shall be compulsory; higher education shall be compulsory in terms of section X of this article. Initial education is a

The State shall be responsible for raising awareness of the importance of children's rights. The State shall be in charge of education, which, in addition to being compulsory, shall be universal, inclusive, public, free and secular [7].

Today's society demands people with greater capacity for interpretation, creativity and good management of changing information, so the purposes of education are of utmost importance, as it refers to the harmonious development of all faculties of the human being. It is essential that education aims to train students in the conviction and skills necessary to contribute to the construction of a more just and inclusive society, respectful of diversity, attentive and responsible towards the general interest [8].

The Secretariat of Public Education (SEP) is in charge of the application of the General Education Law, as well as of those educational, scientific, artistic, sports and cultural functions not reserved to the states [9]. Therefore, the SEP defines the following concepts:

- Higher education. Type of education which professionals in all branches of knowledge are trained. It requires previous studies of high school or its equivalents. It includes higher technical, undergraduate and graduate levels.
- Technological Education. Studies of a technical nature that, according to the educational level at which they are taken, may range from job training to training and preparation for professional practice in the agricultural, industrial, forestry, marine and service areas.
- Dropout (educational indicator). This indicator expresses the number or percentage of students who drop out of school before completing a certain grade or educational level. Dropout is classified into three categories: extracurricular dropout, intercurricular dropout, and dropout of students who have dropped out of school.

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and total dropout. The dropout that occurs during the school year is called.

extracurricular dropout; the dropout that occurs at the end of the school year, regardless of whether the student has passed or failed, is called intercurricular dropout. Finally, total dropout is the combination of both dropouts [10].

On the other hand, school dropout is an educational problem that hinders the human, social and economic development of individuals and the country as a whole. Tinto "considers dropout as the abandonment of education" [11]. Zúñiga "defines it as the action of abandoning studies in an educational institution for any reason" [12]. In Mexico and in particular, the SEP considers "school dropout as: the abandonment of school activities before finishing any educational grade" [13].

Latin America has had a serious school dropout problem over the years.
10 young people aged 25 to 29 had completed five years of higher education in 2010 (a slight increase from 7% in 2000)" [14].

According to Lowe and Cook, one of the reasons for this is that strengthening the quality of lower levels of education is crucial to ensure that students have acquired the necessary competencies to succeed in higher education. The preparation of high school graduates for higher education is a key factor that will determine their academic success and dropout in the first year [15].

According to a research conducted in 2016 by El Tecnológico de Aguascalientes, among the factors that can influence students to abandon their studies in the first year are: class schedule, vocational actors, teacher, socio-cultural environment, labor [16].

Studies conducted by the University of Puebla regarding university dropout show that it is multifactorial, among most frequent causes are "economic, family, health, maternity, indiscipline, changes of school or home, poor school performance, labor issues or academic dissatisfaction, to mention a few elements" [17].

Attrition is not a current problem, so many studies have been conducted on the subject and strategies have been implemented to counteract it.

DEVELOPMENT

In the last decade of the last century, countries such as Argentina, Brazil, Colombia, Cuba, Chile, Costa Rica and Mexico began to implement national evaluation and accreditation systems, including academic efficiency and student retention among their quality indicators. When these indicators were evaluated with very low results, the need to continue studies to understand and address the problem of dropout was identified [18]. Thus, each country carries out actions, and its institutions seek strategies to counteract it.

Finishing a degree can make a difference in the standard of living, which is why education represents a relevant aspect for the governments of different countries. In Mexico, access to education has with the TecNM opportunity and presence throughout the Mexican Republic, thus giving an option to young people to continue their studies at the higher level, the most important challenge is to achieve the permanence of students, since there is a high dropout rate, as stated in an interview with the newspaper La Jornada in 2017 "Margarita Contreras Mata, director of Planning and Evaluation of TecNM, acknowledged that the terminal efficiency rate is 58 percent, so it is seeking to reduce dropout" [19].

The fact that a student drops out of school leads, in most cases, to feelings of frustration at not achieving a goal.

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and the consequences can be varied, such as: decreased self-esteem, lack of motivation to continue academic preparation, among others. Therefore, it is of vital importance to implement actions that facilitate the continuity of university studies in a comprehensive manner, involving not only academic measures, but also affective and personal development [20].

Therefore, there is a need to provide support to students to address different issues that may lead them to decide to leave their studies. Among the strategies implemented by TecNM to accomplish this task are the Tutorials.

The concept of mentoring has a long tradition in education, both formal and informal. Internationally, over the last 20 years (or more) it has been the subject of study and has been conceptualized in various ways. What prevails in all these definitions is that there is a relationship between two subjects and an activity that is intended to assist the development of one of these two subjects. For most, such activity must be conscious, intentional and methodical [21].

Tutorial action can be carried out individually and/or collectively and according to the Center for Educational Research and Documentation (Spain) indicates "the importance of tutoring as a complementary part of the teaching work can be pointed out, since its main purpose is to facilitate the teaching-learning processes of students and contribute to their personal, professional and social development" [22]. This seeks to collaborate significantly in the task of reducing school dropout and at the same time increase academic development.

Considering a society in constant transformation, where education must be integral, the National System of Technological Institutes (SNIT), establishes the PIT and makes available to the entire community the "SNIT Tutor Manual", as stated by the Director of Teaching at that time MIE. Mara Grassiel Acosta Gonzalez to the Directors of the different institutes on November 21, 2012 through Circular No. 010/2012 [23].

In its first pages, the "Tutor's Manual" emphasizes that tutoring is an educational strategy that the SNIT has designed and has the following purposes: to contribute to the improvement of the academic performance of students, to contribute to the achievement of their integral formation with the participation of teachers and other instances that can lead them to overcome the obstacles that arise during their development such as: low levels of performance, repetition, student lag and failure, desertion, abandonment and low terminal efficiency, and to influence institutional goals related to educational quality, thus favoring the terminal efficiency of educational programs [24].

Tutoring at TecNM revolves around a vision where in addition to being comprehensive, it has to be humanistic, and thus achieve the generation of knowledge for the tutored to develop professional skills, use methods and study strategies, identify their strengths, areas of opportunity, weaknesses, etc.; elements that help them to face and reflect on situations and make decisions. To develop this work, in 2013 the "Student Workbook" is a complementary instrument whose objective is to be a tool to guide the student's learning, either individually or in groups; it contains the indications and formats of the exercises of each session and annexes with the instruments that will be used throughout the tutorial sessions [25].

For this reason, the PIT is based on involving the student in a series of activities focused on supporting and guiding the actions not only in the academic field, but also in the personal field, since the human being is made up of a whole that must be in balance for an adequate performance in the different roles of his daily life; thus developing abilities, skills and attitudes.

Tutoring should not be considered as something distant or a complement in the student's training,

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should be an intrinsic part of their training, because this is the way to prevent them from dropping out of their studies due to lack of guidance and/or support. According to the guidelines of the National Tutoring Program (PNT), its scope is to all Institutes, Units and Centers attached to the TecNM.

The tutoring program has three fundamental axes: academic development, personal development and professional development, which are offered in each institute.

According to the Complementary Activities Guidelines, tutoring can be validated as a complementary activity, assigning it a value of one or two credits [26].

The generalities of the tutoring operating policies are as follows:

- Implementation, development and follow-up of the Tutorials, each Technological Institute is responsible.
- Semiannual report sent to the Academic Development area of the TecNM, this activity is the responsibility of the Academic Development Department of each Campus.
- The Director of each institute appoints the tutoring coordinator.
- The Head of Academic Development of each institute and in the decentralized institutes its equivalent is responsible for the PIT of each platel. The action is carried out through the tutoring coordinator.
- The Director of each Institute is the only one who can authorize tutorials to be considered as complementary credit upon recommendation of the Academic Committee with a maximum of 2 credits [26].

The operating guidelines clearly establish the administrative requirements to carry out tutoring activities, but the commitment, knowledge and experience of the tutors is essential to perform the activity according to the needs of the school.

student population in each Technological Institute.

Within the tutorial action, information and follow-up must be given to other strategies whose objective is to help students economically through the granting of scholarships, with which the TecNM also seeks to support students, the allocation of scholarships can be from public or private funds so that a person can pay for their studies, either partially or totally according to the amount obtained by it.

The scholarship programs that have been implemented in recent years to help solve the situation in 2008 by the Ministry of Public Education through the Undersecretary of Higher Education provided more than 50 thousand scholarships for a total amount of 446 million pesos, which are intended to benefit students of public higher education institutions in the country.

The types of scholarships awarded are Excellence, Linking, Social Service, Graduation, Mobility and Professional Improvement, with the aim of enabling students to complete their studies and integrate into the labor market [27].

In 2019 the Tecnológico Nacional de México at the Isthmus campus, in order to guarantee the right to an inclusive, equitable and quality education, the Government of Mexico, through the National Coordination of Prospera-Social Inclusion Program, carried out the delivery of scholarship cards of the "Jóvenes Escribiendo el Futuro" scholarship to 345 beneficiary students. On instructions from the Ministry of Public Education, the "SEP-Prospera Inicia tu Carrera" scholarships were delivered to students of this , with the support of the National Coordination of "Benito Juárez" Scholarships, the Regional Coordination of "Bienestar" of the Federal Government and the Banco del Ahorro Nacional y Servicios Financieros (BANSEFI). The above, as part of the efforts made by the Instituto Tecnológico del Istmo before the corresponding federal agencies, to serve the student population of low income and at greater risk of

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school dropout, thus strengthening their permanence in higher education [28].

Such is the importance of a student finishing their studies and graduating as a professional, that the Undersecretary of Higher Education (SES) of the Ministry of Public Education (SEP), through the National Coordination of Higher Education Scholarships (CNBES), based on the Thirteenth Transitory Article of the Federal Expenditure Budget for the fiscal year 2019, launches a call to Mexican students enrolled in the second or third year of undergraduate, professional license or TSU in Public Institutions of Higher Education (IPES) in the country, to apply for the 2019 Maintenance Scholarship, whose objective is to encourage them to have access to education services and continue their studies in a timely manner in higher education, thus avoiding school dropout [29].

Regarding federal and/or state scholarships that are implemented to help guarantee the stay of students in the institutions, it is the job of each school to designate specific areas to inform students of the procedures to follow to access them.

According to the Organizational Manual of the TecNM published in the Official Journal of the Federation of June 2018 states that the objective of the Directorate of School Affairs is "To coordinate and evaluate the administration of school services and support to students of the Tecnológico Nacional de México (TecNM) in order to contribute to the institutional purposes." [30] in points 8 and 9 it deals with the subject of scholarships whose functions in this regard are:

Manage before the public, social and private sectors the granting of scholarships, incentives and other means of support for TecNM students, in accordance with the applicable norms and coordinate and oversee the operation of scholarship programs in the institutes, units and centers, in accordance with the applicable norms [30].

Accompaniment of tutoring teachers and scholarships are not enough to combat school dropout, being aware of this in the TecNM, working on other alternatives to help students to complete their studies and is why now having the technology as a basis is given the creation of Mooc's.

Since their emergence in 2008, massive open online courses (MOOCs) have come to be catalogued as a phenomenon with high impact on university education; however, over the years it has become evident that the initial conception of MOOCs has undergone transformations [31].

For TecNM it is important to provide students with tools that help them, thus:

- The main objective of the courses is to assist the professors who cover each of the nine subjects, as well as to promote the development of the students, reviewing the topics seen in class to improve the pass rate and retention indicators [32].

It was in September 2015, when the TecNM offered the first massive online course "Linear Algebra", which was designed at the Tecnológico de Morelia and ranked "as the second massive course of greatest interest among users of the MéxicoX platform, which offers twenty-two online courses, which shows that Mexican students are willing to use new technologies for their academic training" [33]. It was emphasized that this type of strategy has already been tested in other countries with positive results in terms of dropout and failure rates.

By 2017 TEcNM already had 9 massive courses:

1. Probability and Statistics,
2. Differential Calculus (1st part),
3. Understanding Integral Calculus,

4. Ethics, the human being and science,
5. Management and communication tools in the cloud,
6. Research, discovering facts and principles
7. Sustainable Development,
8. Arithmetic and Algebra principles,
9. Linear Algebra (Part 1) [34].

Collaboration is also an important point in this area, that is why in 2014 an agreement was signed between the University of Salamanca and the TecNM, their first collaborations consisted of advisory services by Dr. Almaraz Méndez, an academic from that institution, who supported the development and production of the massive courses. He also stated that the number of users of the TecNM Mooc's is a great reference, since it has a 26% satisfactory completion rate, while internationally it is 7 and 10% [35].

The Mooc's as a support tool teaching are a resource that gives students the opportunity to reaffirm knowledge and/or acquire it, for which materials such as texts, videos, forums, etc. are made available, and are constantly evaluated to reaffirm knowledge.

The TecNM continues to work in the area of new technologies and under the premise that school dropout is a situation that is increasing in Mexico and based the data obtained from the Ministry of Public Education in which it is known that more than 1 million students at different educational levels have abandoned their studies, the TecNM through the implementation of a Pilot Early Warning System in the Tecnológico de Campeche seeks to reduce these rates.

The first approach to carry out the project took place between the Director of the Decentralized Technological Institutes, Lic. Chávez Saenz and the general directors of ITESCAM Lic. Edilberto Ramón Rosado Méndez; Instituto Tecnológico Superior de Hopelchén, Ing. Hiram Aranda Calderón, Tec de Monclova, C.P. Raúl Farías Martínez and Itsa Tec Acuña, Lic. Saúl Noguerón Contreras. During the work meeting, the project was presented and a course on how to use the software was given. The system is already in operation at TecNM Monclova and Acuña [36].

This system focuses on identifying causes that lead students to drop out of school, importance of the Early Warning System is focused precisely on detecting these possible risk factors, when they are identified then strategies are carried out the institutes to address each situation in a timely manner.

Irving Lara and Ms. Tere Borges, respectively, who are personnel assigned to TecNM, are responsible for the design and responsibility of the program.

Training courses are currently underway for the management of the system, and the decentralized technology centers are setting the pace for implementing this strategy.

DISCUSSION AND ANALYSIS OF RESULTS

The interest that institutions have had at different times in relation to the identification and generation strategies to reduce school dropout at the higher education level is centered on the large percentage difference that exists between the number of students who enter, those who remain in the institution, those who manage to complete their studies and those who graduate, situations that involve a series of personal, emotional, economic, social factors, etc., which lead to not very encouraging results in terms of terminal efficiency.

While it is true that the programs that have been generated with the intention of reducing dropout have specific purposes, and it is necessary to evaluate them and give them a particular follow-up in the institutions that have been created with the intention of reducing dropout, it is necessary to evaluate them and give them a particular follow-up in the institutions that have been created with the intention of reducing dropout.

belong to TecNM, since the student community of each institute has unique characteristics.

The objective of this research was to identify the strategies carried out by the TecNM based on school dropout from a descriptive-documentary study to know its implementation. The information gathered shows that the work is arduous and involves not only the areas of the General Direction of the Technological System, but it is also present in each institution with the application of the PIT, with regard to the allocation of scholarships, this action is carried out together with the Federal and/or State Government, also working on actions based technology such as the Mooc's and the Early Warning System. All of the above denotes the commitment that exists in the TecNM to implement strategies that directly counteract school dropout.

In this way, we work to respond to a globalized society that demands quality programs that can contribute to the strengthening and permanence of students in higher education institutions.

The four strategies presented in the development of the work carried out by the TecNM to prevent school dropout (Table 1), cover different aspects, such as those responsible for implementing them, forms of assignment and guidelines.

Table 1. Strategies carried out

Strategy	Responsa-direct costs	Realization/ Assignment	Guidelines
Tutorials	Teachers and institutional representatives.	Group and/or individual counseling.	In accordance with the guidelines set forth in the operating .
Scholarships	Are granted by the Governme nt.	General 1 per student.	Its delivery is based on a convocator ia issued by the government.
MOOC's	They are applied in the institutions .	Optional	Online and there are stipulated course periods and minimum qualificatio n requirement s to receive proof.
Early Warning System	TecNM personne l.	So far, it has been carried out only in decentraliz ed technol-ogical centers.	It is based on operating in line with the detection of risk factors.

Own elaboration

It should also be noted that the number of beneficiaries in each strategy varies (Table 2), which has a direct impact on the results of the students who benefit from the support that can lead them to remain in the institution.

Table 2. Beneficiaries

Strategy	Beneficiaries
Tutorials	Its scope according to the implementation is to cover 100% of students.
Scholarships	Only a certain percentage of the students of each Tecnológico is covered and it is a function of the budget allocated by the government.
MOOC's	The scope of the courses is 100%, factors that may limit them would be access to technology. and personal decision.
Early Warning System	For the time being, only the following are being covered decentralized

	which limits access TecNM students.

Own elaboration

If 100% of the students could be covered in each case, it would be ideal to work homogeneously; however, the characteristics of the strategy determine its application and scope.

Proposing strategies to counteract desertion is only the first step in a long road to follow, it is definitely important to follow up on their application and development, however, the fact that they are present in the TecNM is a sign of the interest in reducing one of the major problems that occurs in the IES and is a reason that has a impact on the low rates of terminal efficiency.

CONCLUSIONS

The interest that institutions have had at different times in relation the identification and generation strategies to reduce school dropout at the higher level, is due to the large difference observed between the number of students who enroll in the first semesters and the low number of students who remain during the career and those who manage to graduate, this coupled with the economic and social impact that results school dropout, , the objective that supports the research was achieved, since it was based on identifying the strategies carried out by the TecNM based on school dropout. For this purpose, a descriptive-documentary study was carried out, which resulted in knowing its implementation, that is, giving an overview that allows identifying what is being done and how it is being carried out.

The programs that have been described in the development of the research and that TecNM has generated with the intention of reducing school dropout have specific purposes: scholarships help to solve the lack of economic resources of the students, the PIT and the Early Warning System seek to follow up the academic development of the students, the PIT and the Early Warning System, the PIT and the Early Warning System seek to follow up the academic development of the students, the PIT and the Early Warning System seek to follow up the academic development of the students.

The students and the Mooc's provide support to reinforce topics covered in different subjects of the study programs, promoting their learning in an autonomous way.

It is also possible to realize that there are programs such as the PIT that are part of each institute and that have well-determined operating rules, however, there are others such as the Early Warning System that is emerging and comes to complement the efforts of the work being done in the TecNM,

The strategies implemented have a specific purpose and cover different areas, which opens a great panorama for other works to evaluate their effectiveness jointly or individually and also serves as a guide for further research leading to the identification of the main causes of desertion in the TecNM institutions.

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