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# The Scientific Method in Tourism Education: Research Experience at the Autonomous University of Ciudad Juarez, Mexico

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## Abstract

The general aim of this investigation was developing a research experience as a training process that favors the construction and validation of a conceptual model with the stages of the scientific method through a case study with tourism students. A theoretical - applied, qualitative, interdisciplinary and deductive research type was implemented, in which mixed data sources were used, and methods like literature review, observation, triangulation, modeling, case study, and empirical validation were implemented. The main outcomes were the construction of the conceptual scientific model, validation of the model by its implementation in an empirical case study, and identification of learning lessons as opportunities for the replication of the scientific model. As a conclusion, the correspondence between the implemented scientific model and the reality where students developed their projects is recognized.

**Keywords:** tourism, education, method, model, research, empirical experience

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## Introduction

One of the fundamental areas of the university tourism education corresponds to scientific and research education that contributes to the formation of a scientific tourist thought, based on which the appropriation of methods is required to allow the study of different research objects. In response to this statement, the findings of a research experience as a training process at the Autonomous University of Ciudad Juarez (UACJ) are presented, which took into consideration the following research questions: How to integrate the stages of the scientific research method into a conceptual model for guiding undergraduate research carried out by tourism students? What lessons could be learned from the empirical validation of the conceptual model using the syllabus of Tourism Research of the UACJ?

The general aim of this investigation was developing a research experience as a training process that favors the construction and validation of a conceptual model with the stages of the scientific method through a case study with tourism students of the UACJ. The research experience is related to the students learning derived from the use of research methods for the development of their degree project, while the training process was oriented from the Tourism Research subject. The following assumption was established: the construction and validation of a model with the stages of the scientific method will help as a guiding base for the undergraduate research carried out by tourism students of the UACJ.

The combination of the postulates of Project-based Learning theory with the principles of inquiry-based learning, learning based on a case study, learning in situ, and learning by doing is an actual and important topic that allow the students to reach new knowledge, research skills and competencies. Furthermore, the use of scientific methods in the investigation of objects, phenomena, and processes contribute to the development of the students' scientific thought.

## **Literature Review**

The development of the cognitive platform of tourism as a scientific discipline supposes a cumulative process of knowledge construction, which has gone from a very limited framework of scattered constructs to a scenario with more solid scientific foundations (Jafari, 2005). During the last few decades there has been much debate about whether tourism is a disciplinary, multidisciplinary, interdisciplinary (Coles, et al., 2016), or postdisciplinary field of study (Munar & Pernecky, 2016). For this reason, the problem of scientific tourism knowledge is marked by a great diversity of epistemological and methodological approaches, many of which have been extrapolated from other areas of knowledge.

Such antecedents highlight the need to promote the training of new researchers and practitioners with innovative thinking that encourages the development of research methods and instruments in order to continue promoting the generation of tourism knowledge. Scientific and research education in tourism represents a cognitive platform of great importance in the training of professionals of this sector in any of the operation fields, since it contributes to the development of knowledge and research skills useful for the formation of a scientific tourist thought, providing them with valuable methods and tools for the exercise of the profession in different tourist organizations.

To understand the meaning and significance of investigative tourist learning and to favor the emergence of theoretical and empirical knowledge, a multimethodic approach is required that allows the construction of comprehensive realities and the discovery of explanatory theories about the object of study. The value of the scientific method on which the previous statement is based on is that it is a process of search and perfectionism of knowledge that responds to theoretical and practical problems of reality (Igartua & Humanes, 2004; Rodríguez & Pérez, 2017).

From an operational point of view, the scientific method starts from observation to make inductions and formulate hypotheses, and from these make deductions and extract consequences that allow affirming or refuting the deduction made; if the consequences are compatible with the recognized knowledge system, the verification is carried out through the collection of empirical data (Castán, 2014). The method is based on the interaction between the sensory-rational (Arteaga & Fernández, 2010), and between deduction-induction (inductive and deductive reasoning) about the studied object (Dávila, 2006).

For the purposes of this research, the close relationship that exists between theory and method as the basis of tourism research is accepted. Scientific theory is a set of proposals that allow to explain, interpret, discover and understand the reality of the problems faced by the researcher in order to conceptualize and systematize the investigative process (Pirela, et al., 2015); based on these methodologies are developed and the scientific method is required to exam them through the

analysis and interpretation of qualitative and quantitative data (Madero & Rodríguez, 2018) or generate new theories and hypotheses.

## **Methods**

This is a theoretical-applied, qualitative, interdisciplinary and deductive research type, in which mixed data sources were used. The theoretical scope was based on the literature review as basis for the construction of a scientific model using the author's triangulation; the modeling process included the justification and foundation of the proposal, analysis/synthesis and interpretation of the theoretical background, and construction of the model through successive approximations. The development of the applied case study was carried out with students of the advanced level of the degree in tourism (n=7) who studied Tourism Research I and II subjects (August 2019 to May 2020).

The research was developed through three general stages: (1) construction of the conceptual scientific model; (2) validation of the model by its implementation in an empirical case study; and, (3) identification of learning lessons as opportunities for the replication of the scientific model. Validation is considered to be the process of ensuring that there is a correspondence between the implemented model and reality, which aims to confirm that the analytical-synthetic procedure used during the conceptual modeling process is suitable for the expected use (Martín, et al., 2015).

For the analysis and interpretation of the research experience carried out by the students, the eight-step model of the research process was used, which groups the steps into three phases: deciding what to research, planning a research study, and conducting a research study (Kumar, 2011). The assessment of the implementation of the empirical methods was based on the three phases of the life cycle of the fieldwork: before fieldwork, during fieldwork, and after fieldwork; the fieldwork planning process was based on the following tasks (1) study of location and contextualization of fieldwork, itinerary, study plots, observation units, (2) outline of fieldwork according to the stages of the scientific method and, (3) schedule of fieldwork activities.

For the management of qualitative and quantitative empirical data, the following activities were carried out by students: (a) data collection, (b) evaluation of data quality, (c) data processing and measurement, tabulation and coding to examine emerging patterns, and database generation, (d) analysis and interpretation of data, and (e) reporting. Data collection was carried out using primary sources such as observation, interviews, questionnaire, experimentation, and secondary sources such as sector statistics, survey results, censuses, etc.

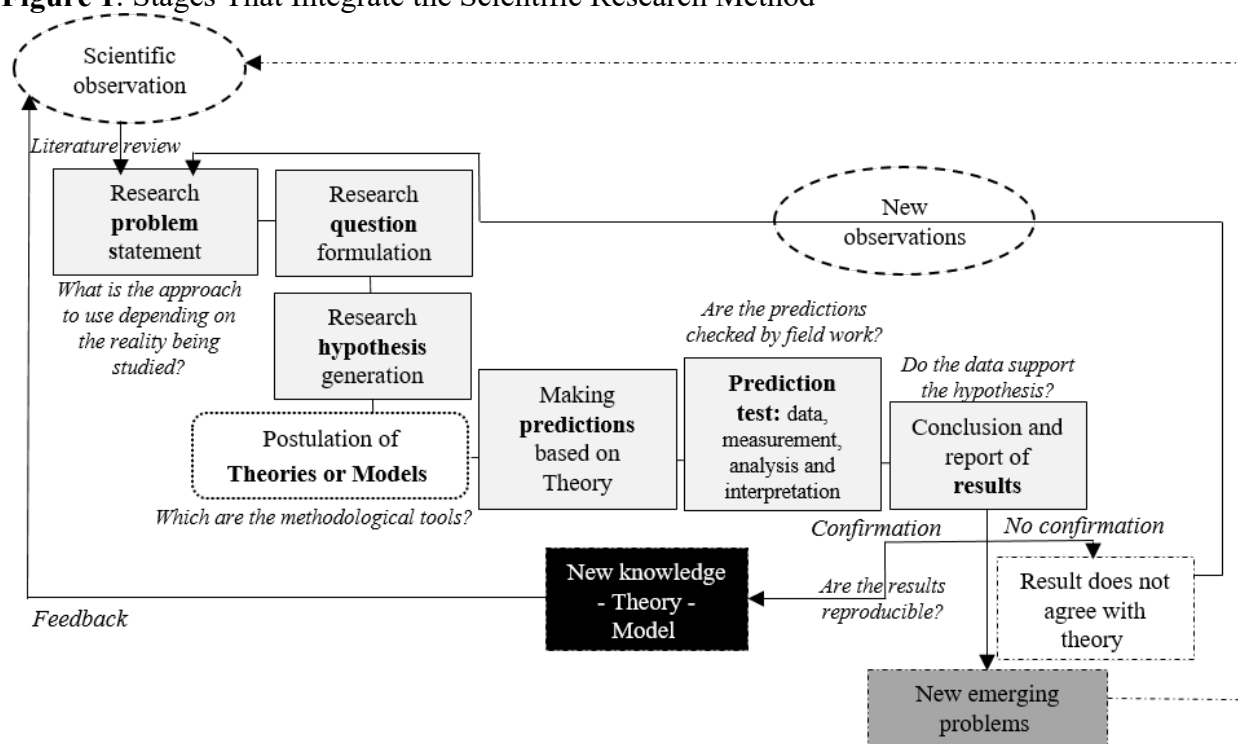
The validation of the model was developed through the product of the activity of the participants: planning research project report, mid-term reports (three each semester), and final research report, for this validation a rubric which lists grading criteria to evaluate student work with the empirical methods was used. During the first semester the theoretical part of the model was validated (research problem, scientific question, hypothesis, theories, predictions) and during the second one the practical part of the model was validated (prediction test, conclusion and report).

## Findings

### *Construction of a Model to Use the Scientific Method in Tourism Research*

The theoretical model is based on the review of the published literature; for its construction, ten authors were selected who offer different operational conceptualizations of the scientific method, based on which the data triangulation corresponding to the stages that make up the scientific research method was carried out (Igartua & Humanes, 2004; Dávila, 2006; Lafuente & Marín, 2008; Abello, 2009; Arteaga & Fernández, 2010; Castán, 2014; Otzen, 2017; Rodríguez & Pérez, 2017; Jaime & Ladino, 2018; Menéndez, 2019). Based on the cross examination of the data, similarities and differences were established, on the basis of which the stages represented in Figure 1 were systematized; the use of the model allows an analysis and exchange of approaches that move between the deductive and the inductive, taking as a starting point the observation of the researcher.

**Figure 1:** Stages That Integrate the Scientific Research Method



### *Empirical Validation of the Model With Students of Tourism of the UACJ*

For the development of the empirical experience, the postulates of Project-based Learning (PbL) theory were implemented; this focus allowed the students to appropriate knowledge, skills and competencies through the investigation of objects, phenomena and processes of objective reality, in a way that encouraged the relationship of their learning with a situation of daily life to which they had to find a solution. The experience was a student-centered process, promoted active learning and inclusiveness, generated a broad socialization, presented an open and flexible design, and conceived evaluation as a continuous and formative process; therefore, the implementation of



this methodological approach contributed to the development of the student's scientific tourist thought.

Other didactic proposals applied to the teaching and learning experience were: inquiry-based learning, which promoted discovery learning by collecting data and researching a topic of interest; learning based on a case study, through which the students built their knowledge using case studies that reflected problematic situations conducive to learning; learning in situ, which represents a form of cognitive learning that promoted learning in real scenarios; and learning by doing, represented by a constructivist methodology that assumes learning based on the approach of practical doing as a way to reach knowledge.

The scientific research education of the students of the Tourism Program was developed through the subject of Tourism Research with a total of 64 hours of classes, distributed in two semesters; the first dedicated to research planning through the theoretical and methodological design, and the second to the implementation and presentation of the research report. Students carried out their individual research work for the degree in tourism during the last semesters of the advanced level of this academic program. The purpose of the research experience was to design and implement empirical methods for fieldwork in tourism research using the designed scientific model, for this goal the didactic strategy of successive approximations to the empirical field research methods favored the sharing of the experiences learned among the students themselves.

The implemented phases for the research experience with fieldwork empirical methods were: (1) presentation of the scientific model, guidelines and instruments; (2) project planning using the scientific model; (3) method design; (4) fieldwork, data analysis and interpretation; (5) individual reports; and (6) collaborative work activity in plenary session introducing appropriate evaluation criteria and guiding challenge questions.

The findings related to the analysis and interpretation of the research experience indicates that students were able to satisfactorily verify the correspondence among the decisions made with respect to the research object, planning, conduction and conclusion of their tourism research projects taking as a transversal axis the scientific research method, which confirms the value of the eight-step model of the investigation used in this study and the three phases of the life cycle of the fieldwork. The products of the activity developed by the participants through the planning research report, mid-term reports, and final research report reflected an appropriated conceptualization, accurate operationalization, and adequate management of qualitative and quantitative empirical data, validating the theoretical and practical parts of the model and revealing its high utility.

The most significant learning lessons for the replication of the scientific model are: feasibility of the collaborative management of tourism learning through the development of research projects carried out by students; the utility of the scientific modeling as an instrument for creating research experiences; the scientific model allows the students to make a broad set of observations, inferences, and predictions; research method is key to the formation of scientific tourism thinking; students are able to design and implement empirical methods for fieldwork in tourism research; the development of experiences through research projects favor the construction of knowledge in a collaborative way and encourage creativity.

## Conclusions

A logic correspondence between the implemented scientific model and the reality where students developed their projects was found, which permitted to conclude that the analytical-synthetic procedure used for the conceptual modeling process was appropriate for the aim and research questions of this study. The fieldwork carried out allowed to corroborate that the specifications and the assumptions established for the implementation of the scientific model are closely related with the modeled stages of the scientific method which coincide with the assumption elaborated for this study.

The implemented postulates of PbL theory combined with the principles of inquiry-based learning, learning based on a case study, learning in situ, and learning by doing allowed the students to appropriate new knowledge, research skills and competencies through the use of scientific methods in the investigation of objects, phenomena and processes of objective reality where tourism takes place, which contributed to the development of the students' scientific tourist thought.

The model did not undergo significant modifications prior to its implementation and it was not necessary to correct it after it was validated in this case study. The main limitations of the research correspond to the size of the sample, which corresponds to the total number of students allowed to enroll in each semester, as well as the difficulties detected by the students for the application of some methods that required the participation of stakeholders. In the future, the practical relationship between theory and scientific method in tourism studies carried out by undergraduate students should be deepened, as well as replicating the use of the model with other groups of students to continue its improvement through replication.

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