Investigación en perspectiva

Research findings in perspective

Technology research pathways in teaching English to speakers of other languages: a new didactics research concept*

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Abstract

The objective of the study is to elaborate a systemically logic pathway of technology research methodology for teaching English to speakers of other languages based on the inferential cognitive paradigm. The inferential process consists of passing from previous statements, considered as true outcomes, to other ones whose propositions arise from either the need of current real information or the consequence of former statements. If the proposal technology research pathway is followed by educative researchers, then diverse transforming works will arise in their teaching practice.

Keywords: research pathway, didactics of English, scientific skills, communication in science.

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Rutas de investigación tecnológica en la enseñanza del inglés para hablantes de otros idiomas: un nuevo concepto de investigación didáctica

Resumen

El objetivo del estudio es elaborar una ruta lógica sistémica de la metodología de investigación tecnológica en la enseñanza de inglés para hablantes de otros idiomas, a partir del paradigma cognitivo inferencial. El proceso inferencial consiste en pasar de las declaraciones anteriores, consideradas como resultados verdaderos, hacia otras cuyas proposiciones surgen ya sea de la necesidad de información real actual o de la consecuencia de las declaraciones anteriores. Si la ruta de investigación tecnológica propuesta es seguida por los investigadores educativos, entonces diversas obras de transformación serán producidas en su práctica docente.

Palabras clave: ruta de investigación, didáctica del inglés, habilidades científicas, comunicación científica.

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Introduction

This study deals with the connection of pathways, as subsystems, to build up a technology research methodology on teaching English to speakers of other languages. The cognitive paradigm that has been taken into account for this work is called the inferential cognitive and consists of a chain of reaching outcomes as the result of reasoning logic processes.

Any emergent statement is true if the process of passing from one state into a new one is considered as true as the previous one, i.e. there is a set of thoroughly interdependently connected subsystems branched inside the reality. The perception of the researcher is also part of the reality (this point of view is explained below).

The experience scientists have about the world belongs to a paradigm, which may have come from scientific theories; that is, the set of axioms and theorems that give form science as a formal axiomatic system. Other paradigms arise from mythological or philosophical theories. For this reason, people with extreme paradigms can sometimes radically modify the world.

Interdependent connected subsystems are part of a complex world understood by human beings in an intervention on nature concept. Nature is lineal, but the activities human beings do on nature are complex. The content of science is embedded in a social context; that is, science supports human understanding of the world. For this reason, the statement of considering the scientific knowledge as a social outcome comes true.

Then, with the concept of science as a social outcome, the two parts of science are divided into scientific knowledge and scientific practice. The cognitive part of scientific knowledge is enlarged by the outcomes of logic empirical research processes, while the scientific practice of scientific knowledge is enlarged by means of technology research outcomes. Both engineering and didactics are practical branches of their correspondent sciences; i.e. engineering is the practical branch of physics, mathematics, chemistry and other basic sciences together; while didactics is the practical branch of pedagogy, psychology, sociology and other social sciences together. But, the measurement of facts inside them may differ in each case; it is lineal in engineering and complex in didactics.

The statement of the problem is the misunderstanding of technology research that limits the enlargement of the way to do diverse technology research works by using alternative quantitative and qualitative methodologies in didactics. The object under study is the Material Development and Methods for Teaching English to Speakers of Other Languages and the specific field of study is the Research Pathways in Didactics.

The purpose of this work is to elaborate a systemically logic pathway of technology research methodology for teaching English to speakers of other languages based on the inferential cognitive paradigm. The concretion of the research is the proposal research pathways.

The inferential assumption demonstrates that the proposal research pathways will enlarge the way to do diverse technology research works by using alternative quantitative and qualitative methods, put them into practice and increase the knowledge in didactics of English learning.

Proposal research pathways

This section deals with the arrangements of the outcomes in a logic sequence. The proposed methodology comprises interdependently connected subsystems in a 3D supporting platform. There is a research base line called the research process and many connected subsystems to the line; the outcomes of each subsystem are held on the line and give sustainability to it. It is very important for the researcher to command the income-process-outcome during the journey in the pathway.

The thirteen stages are described below with illustrative case study and the help of mind tools to have success in the processes.

An approach to the reality

Concept: the reality is everything that exists and is part of one's consciousness (culture) or being conscious through one's will (learning) or might be conscious spontaneously (sensorial or empirical).

Case study: the economic activity of people is related to what they do and what they want, thus originating an economical system. In this scenario, the need of communication worldwide appears because of global development and business trade. The situation of learning foreign languages, for example, is a key topic for people right now. The crucial decision to learn a foreign language has been taken into account and the following step is to find a centre to have success with the personal purpose. The case study is about a Secondary School, its background and connections in the community. The researcher must gather enough information to feature the Secondary School appropriately.

View of a problematic situation

Concept: the problematic situation is the necessary current condition of reality that surrounds the object under study. There are two pathways that give form this point of the chain. The negative pathway deals with deficiencies, wrongly working processes, or lackness of activities. The positive pathway deals with the gaps between successful processes for improvements. The researcher can gather data or information quantitatively or qualitatively by means of a Matrix for Diagnosing the Reality (see table 1), which is constructed according to one's own background and expertise.

Keywords: they are those ones that frequently appear and emerge when describing the problematic situation. They are useful for giving form to the problem and databases.

Table 1. Matrix for diagnosing the reality under study

INTERNAL ENVIRONMENT	EXTERNAL ENVIRONMENT OF OBJECT UNDER STUDY		
Secondary School ABC	**Teaching strategies**	**Scenario**	**Accessibility**
Acquisition process	Does teaching strategies increase acquisition process?	Does the current scenario increase acquisition process?	
Own practice			
Own motivation			
Own skills			

Source: author

Case study: the Secondary School under Study shows the following deficiencies:

- Inadequately teaching strategies when acquiring a new language
- Students of a foreign language use the new language inappropriately
- Diversity interests of students
- Misunderstanding of own skills

Keywords: teaching strategies, foreign language use, acquiring skills, motivation

The problem node and statement

Concept: It is the abstraction of problematic situation, by contrasting concepts, theories, or experience that limit or impede reaching a desirable, feasible, sustainable state. The parts of problem are two: the *deficiency* itself: shortness; permanent need, lack, or weak process; and, the *limitation*: something that restraint; the state of being limited (skills or processes) right now.

Case study: after tuning ideas and key words at problematic situation of Secondary School, it is found that:

Deficiency: teaching strategies for acquiring a new language

Limitation: own learning strategies to acquire a new language at Secondary School

Statement of problem: there is a deficiency on teaching strategies when acquiring a new language that limits the students' own learning strategies in order to acquire a new language in ABC Secondary School.

The area of knowledge: object under study and specific field

Concept: the pathway for getting the object under study is by abstracting the research topic from the problem through a systemic connection among the exogenous and endogenous elements in a scientific area of knowledge. If the interacting mechanism among the intervening elements: a) cannot be observed, then it is a scientific research

(scientific cognition) b) can be observed, then it is a technological research (scientific practice).

Case study: according to the problem at Secondary School, the solution is found in Pedagogy Sciences, Didactics, and in the Sub-Area "EFL Teacher and student Autonomy", that constitutes the Object under Study. Then, the specific field of study or topic inside this sub-area is found the "Teaching strategies for learning" (see table 2).

Table 2. Major and minor areas of knowledge in didactics

Area	Sub-area	Topics: specific fields
Didactics	Linguistics in Teaching English to Speakers of Other Languages (TESOL)	- Improving Indicators of the Quality of English Acquisition - Trends in English Resources for Strategic Achievement Gap of the Net Generation - Future Skill Demands in English as a second or foreign language
	Principies of Second and Foreign Language Acquisition	- Classroom practices abd curriculum design - Describe and analyze school contexts - Teaching digital natives - Phonological Issues in Language Learning - Reading and Language Learning - Grammatical Development in Language Learning
	Sociolinguistics and Communication in the Classroom	- Methodologies that favor children's acquisition of English - Net Help for Solving Teaching-Learning English
	EFL Teacher and student Autonomy	- Attitudes, Orientations and Motivations in Language Learning - Language as a Complex Adaptive System - Teaching strategies for learning
	Material Development and Methods for TESOL	- Task-Based Language Learning - The impact of School Resources - Assessment Results to Improve Teaching and Learning

Source: author

The course to a new State: objective of research

Concept: the objective is the desired or shifted situation (the new state) once human intervention is concluded. The pathway to the objective is by transforming the current state.

Parts: transitive verb + direct/indirect object + circumstances (place) + theory support (based on) + sustainable criterion

Case study: design a teaching strategy plan for acquiring a new language in ABC Secondary School based on multiple intelligences theory with a semester review of indicators.

The concretion of research: artefact or process

Concept: It is the viewed impact or result after human intervention on reality. It arises from the direct object of Objective statement

Case study: the teaching strategies for learning plan

The inferential assumption

Concept: It is the retrospective or prospective relationship of a sufficient and necessary condition as logical cause-effect propositions (see figure 1).

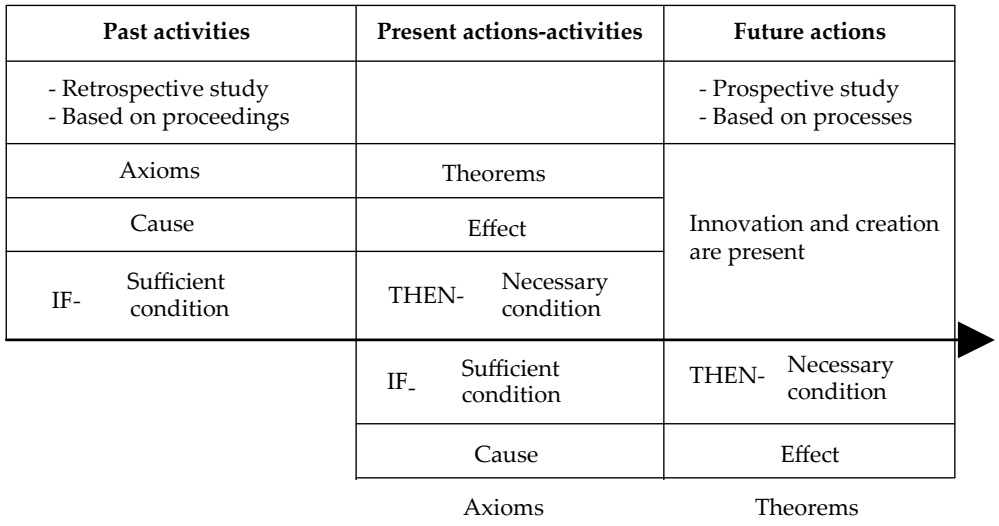
The relations between axiom and theorem are made by means of logic implicative propositions. Thus:

IF (sufficient condition or axiom), THEN (necessary condition or theorem)

Demonstrations are held on sufficient condition, the necessary condition will be the new state.

Case study: If a teaching strategies for learning plan for acquiring a new language in Secondary School based on multiple intelligences theory with a semester review is put into practice, then students will be aware of their foreign language learning skills.

Figure 1. Retrospective or prospective pathways for cause-effect situations



Source: author

The tasks of research

Concept: three base tasks are developed on doing the research work:

a. Identifying the object and specific field

b. Elaborating the proposal (plan, model, methodology, approach, strategy, process) based on a theory

c. Validating process of the proposal

Case study:

- Identification of the object and specific field by diagnosing the reality under study has previously done
- Elaborate the teaching strategies for learning plan based on multiple intelligences theory
- Validate the proposal plan by experts

Methods and techniques for demonstrations of sufficient condition

Concept: It is a means or manner of procedure, especially a regular and systematic way of accomplishing something. It is an orderly arrangement of parts or steps to accomplish an end (The American Heritage Dictionary of the English Language, 2009).

Case Study: An action research method is used to produce educative changes in this work. The methods and techniques for demonstrating the successfulness of the plan at modeling level are taken from the Book of Cohen, L. 2007. Research Methods in Education. A list of current methods is given:

- Historical research
- Developmental research
- Surveys
- Case studies
- Correlational research
- Ex post facto research
- Experiments, quasi-experiments, and single-case research
- Action research
- Accounts
- Triangulation
- Role-playing
- The interview
- Personal constructs
- Multidimensional measurement
- The ethics of educational and social research

The purpose and rationale of research

Concept: It is the impact in terms of the outcomes of learning in complex situations. Argue the reasons or importance of substantial gaps in our knowledge base on a number of issues. The way the study enriches the knowledge of the specific field.

Case study: Teaching strategies for learning plan will help the way students acquire a new language by means of a process called

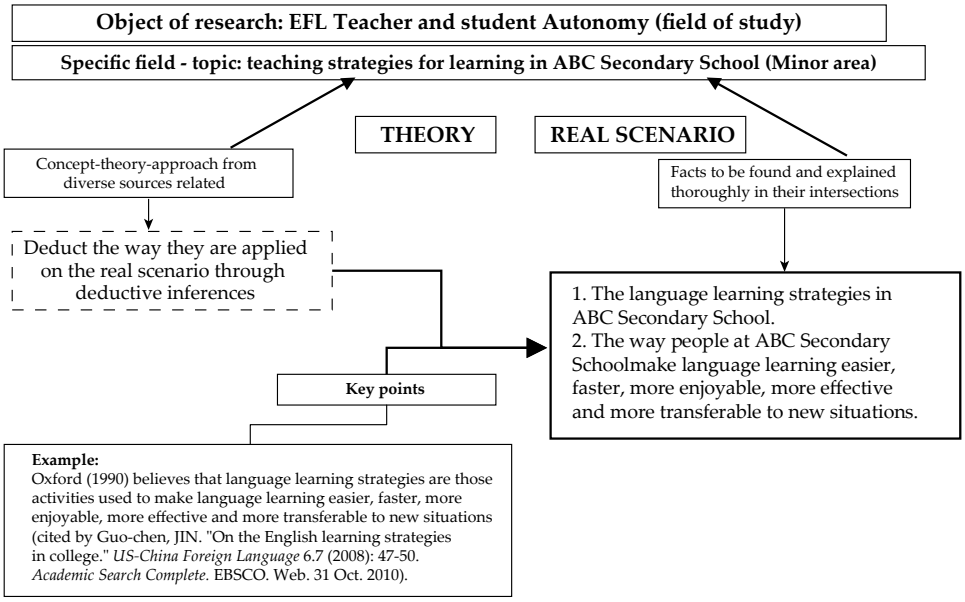
meta-cognition of skills. Here, students find their own skills in order to sustain their lifelong learning. It is important to make sense of the relationships between cognition-skills for building models and analyses that will be applicable in a range of contexts. For this reason… (continued)

The state of the art

Concept: It is a systematic analysis of data and information for featuring the object under study by using key words and updated databases. Analyze the way other authors treated the axioms or theorems you are discussing to characterize the object under study. Social and natural complex fields are described, where the researcher performs its critical and analytical practice, communicative and argumentative skills. Here the researcher command its own deductions and apply them into the reality under its intervention (see figure 2).

Case study: "Oxford (1990) believes that language learning strategies are those activities used to make language learning easier, faster, more enjoyable, more effective and more transferable to new situations" (cited by Guo-chen, 2008). For this reason… (continued).

Figure 2. Pathway for the state of the art



Source: author

The conceptual framework

Concept: It is the ideal solution. The pathway for the conceptual framework is the fusion of critical thinking, logic reasoning, creative thinking + State of the Art. A connection between the objective and methods is established to solve the problem. The final condensed outcome is innovative or creative as it comes from the gaps of the previous process.

Case study: Students can command their learning experiences qualitatively thus making "language learning easier, faster, more enjoyable, more effective and more transferable to new situations" (Guo-chen, 2008) if they direct the nature and quality of learning provision as much as on the number of hours or years spent in schooling. To move beyond these skills requires consideration of educational contexts (the level and type of education); educational content (the curriculum and pedagogy); and the ethos of educational settings.

The factual framework

Concept: justify and explain the methodology to have the problem solved. Statistics may efficiently contribute to turn a theory-conceptual situation into factual: variables appear. Some statistical solved problem could coincide with the variables under study, thus facilitating the viability to verify the facts. Not only adequate experimental or semi-experimental tests, but also logic demonstrations are recommended to validate the Conceptual Framework.

Case study: The methodology to be used to support the conceptual framework consists of:

- A review of the public objectives of education will be done. The criteria and measures that are used to monitor progress are:
- Strengthening the knowledge base: analyzing social outcomes, policy indicators and other measures, and the application of cost-benefit analyses.
- Enriching data analysis: construction and application of longitudinal data, experimental designs, biographical analysis and in-depth studies of learning processes are high priorities.
- Exploring the implications of pedagogy, assessment and qualification systems: how learning achievements of different kinds are recognized and valued.
- Statistical quality control of processes.

In a way...

The research pathway understood as a complex system is typically composed of smaller aggregated subsystems, whose interaction and interconnectedness are non-trivial. The interactions are non-linear and the connectivity has a high clustering coefficient.

The cybernetic pathway of technology research proposed for teaching English to speakers of other languages based on the inferential cognitive paradigm let educative researchers understand their reality and enrich the area of knowledge in didactics by means of outcomes after solving didactic problems.

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