

Formative research and didactic strategies in Dentistry.

Investigación formativa y estrategias didácticas en Odontología.

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In a knowledge society, where new ways of learning and establishing exchange relationships prevail, there is a need for skills for using constant knowledge and knowing how to adapt it to one's own situations. In this context, dental education requires students who can use that knowledge autonomously and strategically. This “use” is achieved through the formation of academic, research and professional skills throughout the undergraduate degree. Referring to research, there is a need to teach how to research and do research;¹ as such, the subjects must have didactic-methodological strategies that are oriented to motivate the search for knowledge and generate concerns around an object of study. Make the student contact the real professional environment and its object of study.²

The formation of research skills in undergraduate studies has been studied as a pedagogical problem based on didactic strategies, teaching styles and link with the curriculum. This requires new ways of teaching to be considered and the ways of learning research skills to be analyzed. To deal with the passive model of the student, some models have been proposed that insert the student in tasks typical of their professional practice: practical training (in-service model), tutorial training, and reflective professional training. This must be developed in a pedagogical context that fosters an active and constructive relationship (and not passive and repetitive) with knowledge.³ In this sense, the teaching of research that separates theory from practice that is taught in the abstract, improvises and is oriented to large groups of students has been criticized,

In this evolution of ideas, to train the student in topics related to research, “formative research” arises as a strategy that links teaching and research. Formative research provides learning experiences to the student, improves teaching methods, the quality of education and the cost-benefit of care work. In undergraduate and specialization, formative research is established without being strict and incorporates pedagogical practices aimed at structuring activities and investigative skills.

Formative research began to be discussed in the mid-1990s; in the beginning it was a model for training based on research. Emphasizing research and innovation as elements that allow participation in a knowledge society.⁴ It arises to avoid the traditional teacher who does not develop an investigative culture and prioritizes the transmission of preconceived

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information without allowing the student to modify it. Formative research does not necessarily produce new knowledge but rather uses established knowledge to train a professional without the need to deliver a new product. For a teacher, applying formative research allows the student to analyze a pedagogical problem and, under guidance, they can take it into a context and be able to transform that knowledge.

The formation of research skills from formative research allows the acquisition of capacities related to inquiry, criticism, observation, understanding, abstraction, information search, data/information analysis, dissemination and communication.⁵

Health Sciences (including Dentistry) require that future professionals can identify symptoms and signs (observation), make presumptive diagnoses (hypothesize), use auxiliary tests to identify a definitive diagnosis (data collection), propose a treatment and observe the findings (identification of results), and communicate the results, whether in a medical record or in a report (communication and disclosure of findings). In other words, clinical practice implies the use of a researcher's skills. However, these skills are perceived as deficient by various studies.^{6,7}

Dental teaching is not different from the training of research skills and formative research is also an applicable approach for the student to start in the research field. Some formative research strategies have been proposed from the foundations of learning theories and many of them may be applicable to the dental context.

Regarding this matter, some practices such as participation in research groups, or figures such as the "young researcher" or "research assistant" are useful practices to insert into a curriculum that seeks to introduce formative research. Some strategies of formative research according to Anzola⁸ are: the German seminar, the reading review, the theoretical essay, the case study, problem-based learning, integrated projects, and classroom projects.

They are also: workshops, bibliographic reviews, round tables, essays, summaries, case studies, conducting diagnoses, context observation, protocols, state of the art, panels, forums, writing abstracts and reading articles. Research hotbeds are another strategy that allows the student to become familiar with the research process; they can be disciplinary or interdisciplinary, and they can create knowledge from students.

Healey *et al.*,⁹ suggest that formative research should present four phases: learn from the research of a discipline, develop research skills, develop research, and participate in disciplinary controversies. In this sense, formative research as transformation implies the strategy of learning by discovery and construction; here the teacher and student operate jointly, more if it is guided by the PBL (problem-based learning) method or the project-based learning.¹⁰

One of the products of formative research that is widely used in Dentistry is the degree work; this work is also a strategy capable of forming research skills in students (as long as the advisor is a demanding and rigorous guide). It is useful for students from their first years to become inserted or become familiar working with a researcher, to learn with the researcher, to have an assistant role; integration into research groups can be part of the curriculum. Another strategy is the "investigative pre-seminar" where topics such as formulating problems, how to search for information, how to help students develop a theoretical framework, how to collect information, etc. are discussed.

The development of research skills in students are essential to develop intellectual and procedural skills, be judicious, solve problems and relate favorably while respecting others. Knowing how to investigate is a skill that goes beyond previous learning. A student will be interested in research practice when the teacher shows their desire to investigate and establishes learning how to research; the teacher shows the student a professional practice scenario through research. In this sense, in formative research, the teacher not only transmits but also investigates and involves the students in this process (pedagogical process of formative research), the student develops their skills to understand and transform their environment.

Formative research strategies applicable to Dentistry are linked to "learning to learn" based on the student having an active participation in the capturing and reconstruction of knowledge. The different strategies planted in this note represent options to implement in teaching practice and ensure that the student develops the ability to be amazed at discovery, teaching acts that involve overcoming the transmission of information and therefore memorization. The formative research allows identifying potential researchers to link them to projects, groups, and institutes.

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