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Perceptions on a Pedagogical Strategy in a Competency-based Curriculum in Medicine

Percepciones sobre una estrategia pedagógica en un currículo basado en competencias en medicina

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ABSTRACT

Introduction: The School of Medicine at Pontificia Universidad Javeriana has been implementing a competency-based curriculum to guarantee the holistic training of general practitioners from a pedagogical strategy called Integrative Activity (IA), which seeks to encourage knowledge, skills, and abilities for the development of competencies of doctors in training. **Objective**: To explore the perceptions and experiences of students, faculty, and school board of directors of developing competencies from the implementation of IA. **Method**: A descriptive and interpretive qualitative method was used from interviews and focus groups with students, faculty, and the board of directors. The integrative activity is constituted as a learning strategy that allows the development of competencies through a specific educational process that transforms the pedagogical scenario into a space of joint construction of knowledge from group work. **Conclusions**: The results show that although the definition of competencies is not unanimous among the actors, the IA would be contributing to the formation of these from the competency-based model proposed by Miller.

Keywords
competence; curriculum implementation; medical education; educational strategies; medicine.

RESUMEN

Introducción: La Facultad de Medicina de la Pontificia Universidad Javeriana ha venido implementando un plan curricular basado en competencias para garantizar la formación holística de los médicos generales a partir de una estrategia pedagógica denominada *actividad integradora* (AI), que busca incentivar conocimientos, habilidades y destrezas para el desarrollo de competencias de los médicos en formación.

Objetivo: Explorar las percepciones y experiencias de estudiantes, docentes y directivos en el desarrollo de competencias a partir de la implementación de la AI. **Método**: Estudio cualitativo, descriptivo e interpretativo que se hizo a partir de entrevistas y grupos focales con estudiantes, docentes y personal directivo. **Resultados**: Se encontró que la AI se constituye como una estrategia de aprendizaje que permite el desarrollo de competencias a través de una didáctica específica que trasforma el escenario pedagógico en un espacio de construcción conjunta de saberes a partir del trabajo en grupo. **Conclusiones**: Los resultados muestran que, a pesar de que la definición de competencias no es unánime entre los actores, la implementación de la AI ha favorecido que los estudiantes desarrollen conocimientos, habilidades y destrezas desde los saberes propuestos por Miller en el marco de un currículo basado en competencias.

Palabras clave
competencia; implementación curricular; educación médica; estrategia educativa; medicina.

Introduction

Currently, medical education seeks to promote forms of learning that guide students in developing knowledge, skills, abilities, values, and attitudes for the complete and safe practice of medicine (1). This has implied a series of transformations within medical schools, especially in the metacognitive processes of students and faculty, as shown by several curricular initiatives implemented in medical schools around the world (2-5).

Within these transformations, there are changes in understanding what a medical student needs to learn during his undergraduate studies (2) and for his professional performance (3,4); also, in the reconceptualization of the role of the faculty. From this reconceptualization, the faculty is positioned as a guide and facilitator of learning processes in specific and collaborative contexts (5,6), organizer of learning through the definition of learning outcomes (LOs), and promoter of the development of skills and abilities in the student (1).

In this context, competency-based education (CBE) has become a benchmark in the curricula of medical programs that allows changing the behavioral and fragmented education—from the traditional model—to a model focused on the development of student competencies that favors more dynamic, comprehensive, and reflective pedagogical and didactic strategies during the training process. In this sense, CBE emphasizes the importance of seeing the learner and knowledge as a whole and not as the sum of its parts. However, this holistic vision implies curricular, procedural, and socioemotional changes since the actors involved (school board of directors, faculty, and students) must leave the comfort zone and modify their pedagogical practices in terms of (a) clarifying what is to be taught, (b) reformulating the objectives and expected learning outcomes, (c) think about the appropriate physical and human resources, and (d) accept that interdisciplinary work is the key to obtaining excellent results (7,8).

One of the most recognized CBE models is that of Miller (9), in which the acquisition of professional competencies is seen as a gradual process where knowledge (knowing what) is the starting point, learning how to apply it to specific cases (knowing how) and then implementing it *in vitro* (simulated) environments in which the student must demonstrate everything they are capable of doing (knowing how to do). Finally, the physician's performance (knowing how to be) in actual practice (10).

Following in the footsteps of other universities such as Brown, Cambridge, and the National Autonomous University of Mexico, which implemented a CBE model since 2014, the School of Medicine of the Pontificia Universidad Javeriana has been implementing a curriculum plan based on seven competencies (11): (a) professional values, attitudes, behavior, and ethics; (b) scientific reasoning; (c) communication; (d) clinical competencies; (e) public health, and health systems; (f) information management; and (g) critical thinking and research. The plan seeks to: (a) respond to changes in the Colombian healthcare system, (b) guarantee holistic training for physicians, (c) standardize learning outcomes and contact hours for the different areas of knowledge included in the curriculum, (d) to increase student participation in research projects, (e) to incorporate information and communication

technologies into the teaching-learning process, and (f) to adjust the curriculum to international accreditation standards.

The fundamental strategy in this process of academic transformation in the School of Medicine has been the integrative activity (IA). This takes place every week and has an average duration of four hours. The faculty of the different areas linked to the training process during the week of classes oversee guiding and orienting the development of the activity. During the IA, students are asked to solve a problem situation prevalent in the Colombian context through group work, which promotes discussion and application of knowledge, processes, and procedures of the different sciences: basic, clinical, and social.

The IA does not use a single didactic strategy. Depending on the LOs formulated, several can be used, with different emphases, such as (a) inquiry into prior knowledge (guiding questions, exploratory questions, etc.), (b) promotion of understanding through the organization of information (diagrams, cognitive maps, tables, and charts, essays, etc.), and (c) group strategies (debates, round table, workshop, case study, problem-solving, among others) (12).

This article is part of a project "that aimed to understand whether the IA can be considered an interdisciplinary training tool and strategy, useful for the development and mastery of the competencies that medical professionals need for their academic and practical training in different contexts," about the fourth semester of the degree course. This is because this project was generated from the experiences of a group of faculties participating in the subjects of this semester. This article also presents students, faculty, and school board of directors' perceptions of how they understand and mean competencies and how they have been developed in implementing IA.

Method

This research corresponds to a descriptive and interpretative study (13), aimed at understanding from the perspective of students, faculty, and school board of directors the development of competencies through IA as the central axis of the implementation of a CBE in the undergraduate program of Medicine at the Pontificia Universidad Javeriana (11). Three researchers were faculty and wanted to know how this strategy contributes to the students' learning process and what aspects could be strengthened to improve their learning processes.

Population and sample

We used a criteria-based sampling strategy. For faculty: those who participated in at least one IA wanted to be part of the study and represented the three subjects of the fundamental training core. Students in their fourth semester or had completed their fourth semester, active in the university, and wanted to participate in the study. We sought to reflect different academic situations (25% top, 25% bottom %, repeaters, and course representatives). Deans (former and current) and career directors who were present during the project's development and those in charge during the curricular reform process were also invited.

Initially, candidates who met the selection criteria were pre-selected, they were contacted by e-mail, and interviews and focus groups were conducted with those who responded.

Two instruments were designed: one for the interviews and another for the focus groups (whose questions had a different approach according to their role as students, faculty, and school board of directors) to capture the experiences and perceptions of the fourth-semester IA of the different participants. Both instruments included categories and subcategories to address issues related to (a) general, positive, and negative aspects of the IA; (b) IA planning and preparation; (c) role of faculty; and (d) definition of the competencies and the different knowledge (what, how, doing and being).

Because three of the researchers were part of the teaching staff of the School of Medicine and the participants might feel inhibited to

talk about what they thought and thought about the IA, before starting any interaction with the participants, it was reiterated that the information would be kept confidential and that the purpose of this was oriented to improve the pedagogical strategies and the teaching exercise carried out through the IA. In addition, when conducting the groups and interviews with the students, the faculty had already finished academic activities with participants. This controlled any interference between research participants and the participants' educational outcomes.

All interviews and focus groups were transcribed verbatim and coded with N-Vivo software, version 11. Subsequently, the content of the information was analyzed (14), starting with deductive categories constructed from the theoretical and conceptual references that guided the study. As the coding progressed, inductive or emerging categories were complemented by combining open coding techniques with axial coding (15). A total of 9 categories and 109 subcategories emerged. Once the coding process was completed, the findings were described by categories. The researchers discussed, analyzed, and triangulated, giving rise to the redefinition and reorganization of new categories that were subsequently interpreted in the light of Miller's model (9). The results of this analysis are presented below.

Results

The focus groups were conducted with students from the first and second academic period cohorts of 2016, 2017, and 2018. The interviews focused on faculty, the school board of directors, and students who could not participate in the focus groups. For both the focus groups and the interviews, each participant read and signed an informed consent form and was asked for authorization to be audio recorded.

Eleven interviews were conducted with faculty, six school board of directors, and one with students. There were also four focus groups with an average of 6 students per group, for 25 participants. The analysis based on the information collected from the interviews and focus groups showed the following results related to how faculty, the school board of directors, and students understand and apply the meaning of competencies in the framework of IA development and their relevance and usefulness for the development of knowledge (knowing what), the ability to solve problems and apply concepts (knowing how), for the application of these in practice environments (knowing how to do) and for their performance as professionals (knowing how to be).

About the definition of competence, a first finding is that the participants do not have an unambiguous meaning of the word; some find it challenging to define competence, and several admitted that there is a lack of clarity within the faculty on this concept.

Among the definitions given on competencies, some participants consider that these involve knowledge and its application in each context; therefore, they would be achieved as part of a process:

> It's not just the knowledge, but how it is applied and how it is put in context... Competence is achieved at different levels. There are different levels of the same competence, but [in training] you have left the elements for that person to go from the theoretical to act, to do something, so for example, one [competence] in all the programs is communication. (Interview with faculty 2)

Others understand competencies primarily from an applied perspective, as an ability or skill developed or acquired to make a task more effective. This perspective was the most predominant among the participants in this research. In the words of one interviewee:

> [Competence is] an ability that the student must develop throughout his career so that at the end she/he leaves with the capacity to do what he has to do in the development of his profession. (Interview with the school board of directors 4)
>
> [Competence] is a skill that you develop in which you find tools in yourself to be able to do things. (Interview with Student 1)

Regarding the contribution of the IA to the development of the four types of knowledge (what, to do, how, and to be), essential for the development of the competencies of general practitioners, specific findings were identified for each of them.

Thus, regarding the relationship between the IA and the development of the *knowing what*, the participants point out that to the extent that this knowledge refers to the understanding that students should acquire, according to their moment of training, IA constitute spaces to encourage students to gain knowledge about the situations and diseases with which they will come into contact as general practitioners and those prevalent in the country. Below are some testimonials that help exemplify this perspective:

> As I was telling you [in] clinical and surgical subjects, integrative cases are much more focused on the clinical part because it is the competence at that time; I am not going to teach a fourth-semester student how to put a nail... but what a fracture is. (Interview with Faculty 8)
>
> Woman: Yes [in IA], they should share what is most likely and most important in their specialty as a general practitioner. Let's say more prevalent things, urgent, and one should know how to identify... Not a disease, there, a mysterious illness. (Focus group 2 with students)

Others point out that the IA is the space for students to consolidate the knowledge given during the week of classes or the scenario to acquire part of the knowledge that was not covered during the week:

> For us this particular case, or for me, who was the person who proposed it, my intention is not to form professional competencies but to reinforce the basic knowledge that was seen that week, which will help to configure a competency but not yet, that is, not complete, but it is the basis, if I am clear about the basis, the anatomy, physiology, semiology, possibly the clinical competency to establish a good diagnosis or make a treatment or whatever it is that is going to be achieved. (Interview with the school board of directors 3)
>
> You remind me of something [name] said that said it could be a space to fill in those gaps that were left. I don't think it's wrong, especially knowing the reality that we don't get to cover everything during the week. (Focus group 1 with students)

About *knowing how*—which refers to the ability to solve problems and apply concepts —some interviewees consider that the IA is a space in which they begin to use and integrate previously acquired knowledge:

> [Students] have also become very good at searching for information to solve a problem. Being in contact with clinical spaces at an earlier stage also sensitizes them. (Interview with the school board of directors 5)
>
> Another thing is the interpretation of the paraclinical tests. For me, it has helped me a lot in cases. One get used to the more medical language, to read data, the hemogram... (Focus group 2 with students)

Although the participants recognize that the IA is a good activity for the development of the *knowing how* others point out that the work on this knowledge could be improved:

> One always focuses on pathophysiology, on medications, but the patient will ask you, "what do you recommend I eat?", "what can I not eat?", "what physical activity do you recommend after such and such?". You don't know... These are supposed to be the essential things you should know, and you can't tell them...
>
> [Participant]: They also asked us how to do a sitz bath, and we didn't know. These things will help the patient, and you don't know, and those are the things that most people ask about.
>
> [Participant]: In other words, although we have been approached. In this way, we could delve a little deeper into non-pharmacology, that is, non-pharmacology contributes to our life. (Focus group 2 with students)

When asked about the contribution of IA in the development of the *knowing how to do* competencies, which refer to the application of knowledge, skills, and abilities in practice environments, participants commented that in IA, there is the opportunity to apply knowledge in understanding, explanation, and integration exercises. In this regard, the students pointed out

as significant those activities in which they have had contact with people with specific health-disease situations, as they are a real scenario for applying the knowledge learned in practice contexts, in the words of one participant:

> The case that [my partner] said seemed very cool to me because it was like a psychiatric interview there and how the patient explained everything, and one could see there what they felt because many times one arrives and presents from a perspective of what one has read. Still, one does not understand the subject and does not know what is happening to the patient; that was very cool. (Focus group 3 with students)

About the above, some students expressed the importance of having more of these types of exercises in the IA framework, for example, through role-playing:

> I don't know if it would be essential like... Ready, pretend that I am the patient, do it to me, yes, like me doing that skill that I am explaining, but doing it. (Focus group 4 with students)
>
> Not in all cases, can it be done as a role-play. Still, especially in the fourth semester, I think it is essential to develop tools that help a doctor explain how diseases are treated from a much simpler perspective. (Interview 1 with students)

In terms of knowing how to be, students and faculty agree that IA is a space that favors learning to be confident people, work as a team, trust peers, be supportive, work collaboratively, and communicate effectively. Below are some testimonials from interviewees:

> The case that I liked the most [was] the Glaucoma case because there was a question being asked to a group and nobody knew the answer... I think I started to see how the readings that were left [on] the computer was only for the task, and that was it because the speaker was talking, so I started to read the material, and from one moment to another, I found an answer to what they were asking that group. Nobody knew how […] No, not even [name of classmate] who knows everything in the semester and reads a lot... And then the truth is that he told me something and I related it to what I had just read, and that helped us a lot, and I felt for the first time at that moment that I had stood up for the group, I am not very self-confident but really when you know that you think outstanding about yourself... In truth, I mean that it is not by chance that one is given competencies, but that one must go beyond, well... This is what medicine is like. You don't always have to be satisfied; you must go beyond. (Focus group 4 with students)
>
> Well, I would define the Integrative activity as a space that allows us beyond articulating the knowledge, we have seen during the week to interact with our classmates, because at the end of the day in the medical field when we are practicing, we are going to have a relationship not only with the patient but also with the medical team. (Focus group 4 with students)
>
> I feel that it teaches one to be very humble, that is, to realize that illnesses and careers are complex things... That reality is much more complicated than what one sees. In truth, with the integrative cases, one learns to say that I was wrong, that is, I am not right, he is right, and I am happy because he belongs to my group and he contributes to me and well, in some other way I learn from him. (Focus group 4 with students)

Some students pointed out that there are competencies, such as communication, that, although assessed during the IA, are not necessarily taught, or worked on adequately:

> I think the main and the first is communication. Especially in the fourth semester, you study psychiatry. I believe it is vital because that is normal in medicine. Secondly, when you enter the fifth semester, they take for granted that you already have all that... To see patients from the first day, they do not even know how to approach a patient, so I feel that it would be necessary to reinforce it much more as the ability to communicate until the fourth semester. (Interview 1 with students)

Despite the above, according to the participants, a particular feature of IA is their contribution to the formation of a professional with a holistic and integral view that distinguishes the physician of this university from those of other universities in the country:

> One often underestimates it, but that is also a part of the training that we as Xavierians, as I feel it, makes us more integral, and I think that

is also why last semester we clashed so much in other hospitals. We are taught to see the patient differently.

[Participant]: You look at the family, the environment, where the patient lives. Thinking about that from an early age helps a lot.

[Participant]: I think that makes us unique. That stands out a lot in other hospitals as [institution members]. (Focus group 2 with students)

I can't forget a patient I had last semester in [a health institution], I saw him, and he had a sac-like a tumor of... well, I saw him. Still, he had such ugly wounds, but he was an incredible being, and he was my patient and everything, but the doctor said no, rotate patients so that you know more, but... I always went and talked to him, and one day we were turning patients, and that week something happened, and at the end of the week I went and said hello, how is it going, and he said... "Can you believe they come to me and haven't touched me since you've been away?" ... This is basic: how can you not examine a patient, how can you not ask him how he is, how can you not ask him how he woke up, and I would say: "Look, go out to the park." I don' know…. The day the Colombian national team had a game, I looked for the nurses and told them to look for a wheelchair to watch the game because he wanted to watch it. (Focus group students 3)

Discussion

The School of Medicine of the Pontificia Universidad Javeriana, since its curricular reform, opted for a competency-based model for the training of undergraduate medical students, defining IA as a strategic pedagogical tool to promote the integration and development of competencies for the practice of medicine in the Colombian context. The findings reported in this article show advances and challenges in this process.

The first aspect to highlight is the lack of clarity and the multiple interpretations of students, faculty, and school board of directors about competencies. This makes it difficult for IA to be conceived as a pedagogical strategy focused on the development of skills and abilities linked to the different types of knowledge (*knowing what, knowing how, learning how to do,* and *knowing how to be*) and to the development of the competencies defined in the curriculum.

This is noteworthy because the way the competencies are understood will define the structuring of the LOs and the subjects' thematic development, pedagogical and didactic strategies. This may impact the materialization of competency-based training (16). Other studies have found that it is essential to inform students about their performance in competency-based curricula. This stimulates reflection on their learning process (17), particularly those that need to be strengthened and transformed to achieve the learning outcomes. Likewise, some authors have identified the importance of the participation and deliberation of the entire academic body to consolidate a common identity essential for the implementation of new curricular proposals (18); as well as the importance of carrying out discussion processes on the conceptual elements that guide the curricular proposal, and the legitimization and validation by the community involved (19).

In this context, it will be beneficial for the school of medicine to work towards the development of a common language among school board of directors, faculty, and students on the competencies, how these materialize throughout the students' training, and the professional expected to go out to practice medicine after completing their studies. Seeking to contribute to this scenario, after an extensive review of the literature and its critical discussion considering the Colombian context, we propose the following definition of competence that may be useful for this and other medical schools:

The concept of competence cannot be reduced to a single moment of training, since being competent implies acquiring knowledge, strengthening skills and abilities to solve problems, being critical, thinking reflectively, being honest and ethical in each of the dimensions of life; as well as putting into practice the *knowing what*, the *knowing how*, the *learning how to do* and the *learning how to be* indifferent

scenarios: classroom, hospital, health centers, community, among others. (20)

Although it is clear that the definition of competencies is not unanimous among the different actors involved in the implementation of the curriculum, when analyzing the role of the IA in the formation of professional competencies in medical students from each of the knowledge proposed by Miller (9), it is evident that they contribute to the construction of each of these.

Starting with the *knowing what*, the students' consolidation of the knowledge imparted during the week of classes stands out and their exposure to situations they will face as general practitioners. They are then encouraged to apply their knowledge to solve a specific problem; in this sense, the IA would also contribute to the *knowing how*. However, in the face of this latter knowledge, there is a need to emphasize and strengthen the acquisition and application of knowledge to resolve patients' concerns.

As for *knowing how to do it*, although the IA is a strategy that contributes to its development, it could be strengthened by promoting more significant contact of students with people who have specific health-disease situations and with the realities they face. This does not necessarily imply that these people attend the IA since various audiovisual resources and simulation environments could be used so that the student meets the desired situation, as in the case of role-playing where they can show how they solve problems, a scenario that can also be used by faculty to offer options for action and resolution, as well as to provide modeling of professional behaviors. Studies have identified that learning in simulated environments seems to favor the assimilation of the knowledge learned (21) and the development of attitudinal competencies (knowing how to be) (22).

From a competency perspective, it is worth remembering that one only becomes proficient with practice and in real life (10). Unlike other disciplines, this work is carried out in medicine with people who look to health institutions and professionals to maintain and promote their physical, mental, and emotional well-being and resolve or manage their disease processes. Therefore, being a competent general practitioner implies not only having the knowledge, skills, and abilities to practice medicine, but also having a series of values and personal conditions to relate to the people who consult them, their families, and the health team in a responsible, ethical, and humane manner that corresponds to the *knowing how to be*.

This research shows that IA plays a strategic role in developing this knowledge. On the one hand, frequent group work favors students' recognition that managing health-disease processes requires the joint and articulated work of different actors, each of which makes a relevant contribution to the promotion of health and prevention and management of the disease. About the above, I would also be helping to prepare students for collaborative work, which requires a high degree of individual commitment and recognition, and trust in the knowledge and work of their peers.

On the other hand, the fact that a problem situation is approached from different perspectives (basic sciences, clinical sciences, and social sciences) seems to be contributing to the understanding that the patient who consults is not a patient with a specific pathology but is above all a person in a particular social and family context that needs to be understood and approached in a comprehensive manner (23).

The World Health Organization, the Pan American Health Organization, and different medical schools have highlighted the importance of including tools throughout the training of health professionals that provide competencies to address personal, family, and community aspects in the population, integrating networks and multidisciplinary work teams. Such a recommendation would be in part materializing in the medical school through IA (24). Other studies have found that competency-based training favors approaching patients and their problems from a broader context involving social, cultural, and political aspects.

Meanwhile, the didactic strategy used in the IA, by encouraging individual and collective work to solve a problem, promotes active learning inside and outside the classroom, and this, in

turn, favors the development of competencies at the knowledge level, such as the search for and correlation of information (*knowing how to be*), as well as argumentation, self-confidence, and teamwork (*knowing how to be*).

Studies have identified that problem-based learning that promotes active learning favors the development of competencies by encouraging greater participation of students in their learning processes: active learning (25), collaborative learning, and metacognition (26). Other studies have also identified that didactic activities that promote active learning help complement ideas among peers and stimulate listening and the exchange of views (27).

Given the results of our study, it is recommended to strengthen the IA tool due to its potential for the active learning process, integration of knowledge, and development of competencies in medical students. In this sense, it is essential to promote the development of communication skills by students to generate assertive, respectful, and ethical links within the practice of medicine (28).

All the above seems to be contributing to a particular hallmark of general practitioners who graduated from this School of Medicine, which is favorable and encouraging amid a health system questioned by the quality and treatment given by health professionals. Also, this hallmark is consistent with the Integrated Health Services Networks (29), Statutory Health Law (Congress of Colombia, 2015), and the Comprehensive Health Care Policy (Ministry of Health and Social Protection, 2016), from which it is sought to transform the Colombian health system, promoting the strengthening of comprehensive care through health promotion, disease prevention, and the strengthening of low complexity care as a gateway to the population's health services, this being one of the critical scenarios for the practice of general practitioners.

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Conflict of interest

The authors declare no conflict of interest in preparing this article.

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