

Problem-solving approach in the training of healthcare professionals

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Keywords

Health occupations, education. Problem-based learning. Health education. Training.

Abstract

Objective

To discuss the problem-solving approach in the training of healthcare professionals who would be able to act both in academic life and in educational practices in services and communities.

Methods

This is an analytical description of an experience of problem-based learning in specialization-level training that was developed within a university-level healthcare education institution. The analysis focuses on three perspectives: course design, student-centered learning and the teacher's role.

Result

The problem-solving approach provided impetus to the learning experience for these postgraduate students. There was increased motivation, leadership development and teamworking. This was translated through their written work, seminars and portfolio preparation. The evaluation process for these experiences presupposes well-founded practices that express the views of the subjects involved: self-assessment and observer assessment. The impact of this methodology on teaching practices is that there is a need for greater knowledge of the educational theories behind the principles of significant learning, teachers as intermediaries and research as an educational axiom.

Conclusions

The problem-solving approach is an innovative response to the challenges of training healthcare professionals. Its potential is recognized, while it is noted that educational innovations are characterized by causing ruptures in consolidated methods and by establishing different ways of responding to demands presented at specific moments. The critical problems were identified, while highlighting the risk of considering this approach to be a technical tool that is unconnected with the design of the teaching policy. Experiences and analyses based on the problem-solving assumptions need to be shared, thus enabling the production of knowledge that strengthens the transformation of educational practices within healthcare.

INTRODUCTION

In this era of information technology and telecommunications, reorganization and production in the sciences have imposed a rethinking of the dynamics of knowledge in its widest sense.⁹ New ways of looking at and understanding what it means to educate

people have emerged: different fields within science, distinct geopolitical contexts and multiple social realities. These have indicated a need to invest in educational practices that are fundamentally based on critical-reflective participation.

It is important to note that these new reference points

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Received on 12/8/2003. Reviewed on 21/6/2004. Approved on 14/7/2004.

follow paths that have their own inspirations, guidelines and presuppositions. At any given time, there are priorities and choices, and in each space there are experiences, options and projects that are new by virtue of having a dialectic relationship with the "old". Within this panorama, there are challenges and perspectives in the training of healthcare professionals. There are: an interdisciplinary field that brings out different levels of comprehension and intervention in relation to the subjects, thus implying distinct political, social and educational commitments.

In these circumstances, the problem-solving dimension has emerged, in which it is assumed that knowledge is built up as an outline defined from the appropriation of information and explanation of reality, as the start and finishing points in the learning process.

Two propositions within the problem-solving dimension have been identified: problem-solving teaching and problem-based learning. The formulations by Paulo Freire have given problem-solving a sense of real critical implementation in extracting the elements that confer meaning and direction to learning. Knowledge is built up through an action-reflection-action movement, by considering the network of contextual determinants, personal implications and interactions between different subjects that are learned and taught.

Bordenave & Pereira⁵ constructed a problem-solving model that consolidated the so-called arc method proposed by Carlos Maguerez: observation of the reality (construction of the problem) → identification of the key points → creation of a theory → hypothesis for a solution → application to reality.

Problem-based learning, in its turn, is an approach in which students deal with previously constructed problems, in small groups under supervision by a tutor. The problems are generally descriptions of a phenomenon or event to be analyzed by the group, initially using prior knowledge. From this, the students seek to understand the underlying processes, and questions arise. These form the learning objectives and serve as the individual and group study content.

Following this, the students check whether new information leads to an understanding of the problem, and discuss it again. The tutor takes on the role of facilitator, thereby stimulating the process and reflection on it.^{2,12} Under supervision, the students build up learning pathways to the point of producing syntheses and new knowledge.

Presuppositions about how adults learn are central

to problem-based learning: mediation of new learning through previous knowledge; diversification of scenarios for facilitating the building of new knowledge; understanding that knowledge implies access to and constant reconstruction of information; valuing of practice as a learning structure; comprehension that the motivation to learn comes from the intersection of personal projects with social-educational conditions.

Problem-based learning within the scope of medical education first made its mark within institutions in the middle of the 1960s, in the McMaster School of Medicine, in Canada. This was followed by other experiences, such as in Maastricht, in the Netherlands, and the University of New Mexico in the USA. These examples triggered an expansion movement, both to other undergraduate medical courses and into other courses within the field of healthcare.

The pioneers in Brazil were the undergraduate medical courses of the *Faculdade de Medicina de Marília*, State of São Paulo, and the *Universidade Estadual de Londrina*, State of Paraná. Their experiences have formed a reference point for other medical schools that have found that problem-based learning was the way to transform their curricula.¹⁰ Among broad-based (*lato sensu*) postgraduate courses, the work accomplished by the *Escola de Saúde Pública do Ceará* can be highlighted.¹³

Educational innovation requires new levels of organization and production of knowledge that link in with the practical challenges and the struggles that emerge in different social fields. In the case of healthcare, the implementation of public services and the new curricular guidelines for undergraduate courses, among other movements, have contributed towards creating a facilitating context that is receptive towards innovations.³

Within this panorama, the objective of the present article is to discuss the problem-solving approach as the pathway for training healthcare professionals who would be able to act both in academic life and in educational practices in services and communities.

METHODS

The starting point for the proposed objective is an analytical description of experience in the training of healthcare professionals through a *lato sensu* postgraduate course. This was developed at a university-level healthcare education institution, between 1998 and 2002.

This course was aimed at graduates with profes-

sional involvement in both education and healthcare. Its objective was to prepare such professionals for developing research projects connected with educational practice at various levels of activities within healthcare. The objective was related to training and developing human resources or to community-based proposals.

The axes along which the course was analyzed were: the curriculum design, with emphasis on its problem-solving dimension; the course content that was selected; the strategies that prioritized the knowledge-building process; and the proposed assessment process.

Data collection was done by means of document analysis: the course project, with its amendments; programs and strategies utilized; records from teachers' planning meetings; follow-up and assessment of the course; teachers' written records; and students' portfolios.

Three analytical perspectives of the experience were focused on: firstly, in relation to the course design, involving the singularity of the experience of the *lato sensu* postgraduate course, the collective process of planning it and the interdisciplinary nature of the course. At the second level, the focus was on the student as the center of the learning process, covering the process of active and interactive search for information, the devising of a research project and the self-assessment routes. Finally, the focus was on the teacher, with analysis of the different roles within the teaching-learning process.

RESULTS

The choice of problem-based teaching-learning for the specialization course "Education in Healthcare" reflected consultations of the literature, other experiences in progress and, above all, an interest in the proposal to produce knowledge on the problem-solving approach applied to a *lato sensu* postgraduate course for healthcare professionals. The preparation for the course took one year and brought together a teaching team with a diversity of professional training and involvement in university-level teaching practices relating to healthcare. It was decided that the project should be based along the following lines: public healthcare and education policies; educational planning, curriculum; teaching-learning theories; educational practices; education assessment; and research methodology.

Following this decision, nine modules were delineated and problems were devised by considering the objectives proposed and the content to be focused

on within each module. After defining the overall teaching project, the separate parts were designed, thus leading to continual reconfiguration of the whole course. This whole project-parts-whole project procedure characterized the construction, implementation and assessment of this educational proposal.

Thus, the curriculum design was made up of tutorial sessions, active and interactive seeking of knowledge and consolidation sessions. Problem-based learning was thus incorporated in a singular form, with constant reconstitution as the course developed over the five years when it was given.

In the tutorial sessions, the students dealt with problems in small groups, under the supervision of a tutor. These sessions lasted for an average of two hours, with longer sessions for the earlier problems.

The following is an example of a problem that was utilized within the modules "Theories of the Teaching-Learning Process within Healthcare":

Problem

The multi-professional team of a healthcare center managed by a university was faced, when delineating its educational project, with the need to develop actions that would involve professionals, students and the community. This produced the need to lay out the learning, teaching and training concepts and also made it relevant to discuss learning among adults and understand the relationships between learning and work in the field of healthcare education.

The analysis of the problem involved reading together and mapping out the conceptual network and its critical nodes. Answers were sought within the subjects that students had no knowledge of, and this building up of new knowledge formed the guiding objective. The objectives relating to this problem were thus defined:

1. To reflect on the concepts of learning, teaching and training that guide educational actions within healthcare;
2. To analyze the learning process among adults, highlighting its specific features;
3. To discuss the relationships between learning and work within the context of healthcare education.

This initial process of approaching the problem triggered the planning of learning practices, with the active and interactive seeking of information. These searches originated from the group of students (interviews, observations, videos and texts) and from the teachers (reading suggestions for each problem, which

were presented to the students at the end of each tutorial session).

The process and the products from the searches provided the instruments for the consolidation sessions. These consisted of study and learning forums around a topic, in which the teacher was the interlocutor, thus encouraging the (re)construction of knowledge.

Such sessions, which were not considered in the original proposals for problem-based learning, recognized the mediation of the teacher's knowledge, with the teacher occupying the position of a privileged interlocutor. Thus, a continual link with the process of building up the student's knowledge was established. In following the concept that the student is at the center of the learning and that the teacher occupies a position that goes beyond transmission and facilitation, mediating practices were intentionally constructed.

Within this path, the roles attributed to students and teachers became altered. Both occupied the positions of subjects under training who were interacting with the systematized knowledge from a critical and prospective viewpoint. The differences in the knowledge and experience of the teachers and students was recognized, but it was understood that the asymmetry required relationships between people and not an attitude of submission/authoritarianism.

Thus, students not only received information, but also put themselves into a position of dialog and exchange. Teachers did not pass information across, but put themselves at new levels, either as tutors and facilitators for the group to perceive its own rhythm, characteristics and possibilities, or as a privileged interlocutor, the mediator in building up provisional syntheses regarding the different thematic study nuclei.

The assessment process took the central presupposition of the training dimension, involving self-assessment, portfolio, participatory observation, individual and group work, and also the course conclusion work.

The assessment route invested in took a triangular shape, between the student's view of his or her own learning process and the teaching dynamics that had been implemented (self-assessment and portfolio), peer review (observer assessment done by the student's colleagues) and the teacher's view, through oral comments and written opinions.

Self-assessment was done at all tutorial and consolidation sessions and had the objective of rethink-

ing the students' development, individual participation in the learning process, the teachers' involvement and how the course was going.

The products that the students produced in the different modules, in the form of records, syntheses, critical analyses, bibliographic surveys and seminars were the subject of discussion and analysis that sought to map out the levels of appropriation and building up of knowledge, in a constant monitoring exercise on the learning process.

Within this assessment route, the portfolio assumed a special place, either because it was the student's expression regarding his or her learning process (impressions, readings, findings and self-assessment views), or because it represented moments of dialog between teachers and students, in continuous discussion and analysis movements.

Participatory observation brought in the teacher's view on the teaching-learning process at its various moments, thus enabling socialization of the teachers' assessments at planning meetings.

The end-of-course work consisted of preparing a research project that was connected with the situations experienced by the students within their fields of professional activities.

This preparation process took shape with follow-up by a supervisor and also through periodic collective discussion, within the scope of the subject of research seminars. Initially, presentation and debate on the topic/subject chosen was given priority. After a period of studying the chosen topic, following a detailed bibliographic review, a preliminary version of the research project was presented and discussed, with the implication of reviewing the theoretical-methodological dimensions. In a third stage, a further deepening of knowledge took place, with emphasis on the methodological design, thus resulting in drawing up the final project.

Within the teaching team, a group identity was constructed to sustain the course proposition. This was structured through the systematic and continuous dynamics of weekly planning meetings, at which each module was discussed, with regard to its objectives, formulation of problems and organizing of consolidation sessions. They were open for the opinions of tutors (descriptions of sessions, difficulties and indications for sequencing the studies) and the privileged interlocutors (how the groups arrived at their consolidation sessions, setbacks and advances, and assessments of the process and the learning). All teach-

ers participated in these meetings, which were open for discussion of the proposition itself.

Controversy and the consensus reached left their mark in building association, partnership and harmony among the teachers, thereby constituting effective teamwork.

DISCUSSION

The experience from five years of developing the course have allowed some comments to be made. From the perspective of preparing and following up the experience, it is emphasized that:

1. The training of healthcare professionals at postgraduate *lato sensu* level was a singular experience. It utilized methodology from the international literature that has almost exclusively been applied in undergraduate teaching course projects. Within the national scene, Soares et al¹³ reported on their experiences of this methodology from a specialization program on public administration, in which they indicated how recent its utilization is for postgraduate training.

The problem-solving approach provided significant impetus to the learning experience for these postgraduate students. There was increased interest, motivation, leadership development and teamworking. This was translated, over the course of the experience, through their written work, seminars and, in particular, portfolio preparation.

2. The collective planning process for problem-based teaching-learning was shown to be necessary. It took on traits of continuity that strengthened the choices, overcame the traditional logic for organizing and individually assessing academic work, and incorporated the assessments made, in a continual movement of replanning over the course of the process.
3. The perspective of the interdisciplinary nature of this process was the translation of a view of science that extrapolated subject boundaries. Without denying subject definitions, problem-based learning presupposes a teaching culture in which it is sought to overcome the stagnant character of fixed teaching content and teaching preparation for each module. As well as integration, it requires the implementation of formative experiences that incorporate questioning, collective discussion, interaction between individuals and the social group, partnership and the search for scientific knowledge. It must be understood as a process that is in progress, with the building of autonomy and an ethical-political commitment towards society.

From the perspective of the student as the center of the learning process, it is emphasized that:

1. Active and interactive searches within problem-based teaching-learning already begins in the tutorial session, from the demand for prior knowledge and the questioning generated within the group itself, with interaction and exchange of experiences. There is a second level in the individual and collective search for the proposed learning objectives, and this is found at the time of analysis and synthesis in the consolidation session. This is characterized as a dialog between the student group and the interlocutor. It thus provides for deepening of theoretical-reflective knowledge, and it marks out and certifies this moment of learning within the *lato sensu* postgraduate course. Discussion from the situations experienced in the daily professional lives of these students further affirms this process of active and interactive search.
2. The preparation of the research project puts practical work as the subject of reflection and investigation within the context of active knowledge-building, and it structures situations that enable the students to experience being authors in the activity of research and scientific production.

This process has not only made it possible to design studies, but also to go more deeply into topics such as the curriculum versus the training process for healthcare professionals; assessment of learning; university students in healthcare; education as a healthcare promotion strategy; training of teachers for university-level healthcare teaching; teaching-learning process and interactive methodologies; and continuing education on activity scenarios for healthcare professionals, among others. It is emphasized that this production by students can and must result in concrete projects within the different institutions that these students are professionally linked with, and in research undertaken within the scope of master's and doctorate-level courses.

3. The assessment process for formative experiences that are theoretically and methodologically centered on the problem-solving approach presupposes assessment practices that are grounded in the expression of views by the individuals involved: a network of overlapping self-assessment and observer assessment. To this end, the relationships between learning, teaching and assessment among students and teachers are expanded at different levels by exchanging knowledge, expectations and objectives.

Finally, from the teachers' perspective, it is stressed

that this methodology has a singular impact, with regard to their experience of playing the roles of tutor and privileged interlocutor. These teachers were trained within an academic culture marked by the transmission of information. As tutors, significant transformation is required, so as to become available to learn in new situations, thereby taking on the role of guide, facilitator and listener in relation to students' arguments. As privileged interlocutors, a mediating function emerges.

These new roles for teachers, which have already been described in the literature, indicate the need for teachers involved in problem-solving formative experiences to access, discuss and go more deeply into educational theories that provide backing for the principles of significant learning, the teacher's function as mediator, assessment of training and research as an educational principle.

Through consultation of the literature and this formative experience, the possibilities for configuring educational practices that deal with diversity, plurality and complexity can be recognized.

Formative experiences for healthcare professional will continue to take innovative shape insofar as concrete experiences create new challenges. As a training proposition, the problem-solving approach presents a differentiated and innovative response to these challenges, thus requiring clarity about what this approach characterizes.

To this end, it is understood that this approach involves:

- Recognition of man's activity and interactivity in his processes of knowing about, explaining and intervening in the world;
- Construction of training and activity proposals that put practical work as the subject of reflection and knowledge production;
- Appropriation of theoretical and methodological references within a reflective dimension that is fundamentally based on questioning and the systematic seeking of answers;
- Recognition of the interdisciplinary perspective as a central presupposition, thereby requiring attitudes that are open to building new partnerships, a questioning stance and interventions in the real situations.

The experience from the course, study of the literature and critical reflection on the learning from it are critical nodes of the problem-solving approach. Colliver,⁷ in a review on problem-based learning, analyzed its relationship with the results from the

learning and its impact as an educational intervention. This author showed that there was no scientific evidence for affirming that problem-based learning significantly broadened students' theoretical-conceptual foundation and clinical performance.

Norman & Schmidt¹¹ analyzed Colliver's conclusions⁷ and agreed that there was a lack of statistical evidence to link problem-based learning and the acquisition of clinical knowledge and skills. They thus recognized that problem-based learning cannot be investigated as the only intervention in the training process. Nevertheless, they emphasized that it provides a motivating, challenging and dynamic dimension for the students' learning process. They also believed that the production of knowledge within this field would only advance through systematic research that considered the theoretical-conceptual determinants, with rigorous designs including controls that could cover the multiple variables involved.

Albanese¹ also commented on Colliver's study⁷ and stated that there was a need to broaden the investigations of the implications and impact of problem-based learning on the appropriation of clinical knowledge and skills. This author also emphasized the urgency of research on the foundations of teaching methods, with expansion of the theoretical-methodological reference points for investigating the processes present in the proposed dynamics.

Camp⁶ questioned whether problem-based learning signified a change in concepts or was just a passing fad. While indicating his belief that it was a concept-based proposal, this author pointed out the risk of treating it as a fad, with partial incorporation in association with conventional techniques that would not provide support for long-term sustainability.

Added to this present-day debate, there is also the risk of taking the problem-solving approach simply as a technical instrument, unconnected with the design of the teaching policy. There is the bias of having discussions only centered on the individual who is learning, thereby giving secondary importance to the concrete conditions of practice and training and the constituting of teaching as an intentional action. There is also the challenge of reconfiguring the educator's role within a perspective of dialog and the dilemma regarding the (re)construction of curriculum designs.

These critical nodes represent challenges in constructing training proposals within healthcare. They indicate that it is relevant for teachers to build up knowledge using this approach by means of investi-

gative activities within their particular situations, their teaching practices and the possible impact generated on the daily lives of the enrolled students.

Experiences and theoretical analyses based on the problem-solving assumptions need to be shared, thus

enabling the production of knowledge that strengthens the changes. Through this, they can contribute towards constructing what Vasconcellos¹⁵ called “crossover teaching”: to overcome the traditional, one needs to start out with the clear idea that the pathway is made while walking on it.

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