Implementation of blended learning in the teaching of Integrated Management of Childhood Illnesses Strategy (IMCI)

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Summary: Blended learning is an emerging educational modality defined as the combination of the traditional classroom teaching and virtual learning. This modality responds to a social context of change with educational technology, which forms a flexible model in time, space and content for the interaction and construction of knowledge. Objective: Identify how the instruction of the clinical component of (IMCI) under blended learning in a group of undergraduate students and health professionals improves their cognitive processes and skills regarding distinct competencies: knowledge, know-how and being. Method: Exploratory case study of the implementation of blended learning in the teaching of the clinical component of the strategy. Study took place in the first semester of 2015 in a class of undergraduate Medicine program in their last semester students of one university and health professionals who work in a health institution in Bogotá. Results: The study included 74 participants of which 16.21% were nurses, 54.05% were medical students, and 28.34% were doctors. There was 27.02% of attrition; 75% of these participants were students and 5% were health care professionals. The course participants indicated that the blended modality favored the learning process, allowed to strengthen practical skills and to apply the perspective of the rights of children to clinical practice according to IMCI strategy. Conclusion: The implementation of blended learning modality improves the knowledge, the know-how and knowing how to be of the participants in areas related to health as long as it is taught in strengthened higher education institutions.

Keywords: **Blended learning, constructivist learning, Integrated Management of Prevalent Childhood Illnesses.**

I. INTRODUCTION

Blended learning is an emerging educational modality defined as the combination of the traditional classroom method of teaching and virtual learning (1). This modality responds to a "social context of change with educational technology, which forms a flexible model in time, space and content for the interaction and construction of knowledge" (2).

Studies on this modality have grown exponentially in recent years (3). Research on this topic shows two types of results: one in the cognitive dimension and another in the affective-satisfaction dimension. Even though the results do not show a definitive trend, they suggest that blended learning leads learners to positively evaluate the quality of the learning experience; additionally, blended learning seems to allow for a better adaptation of knowledge to everyday learning processes than in the traditional classroom approach (3). Specifically, in evidence-based medical processes, this pedagogical modality could increase students' self-confidence and help reduce the gaps between theory and practice (4).

Constructivism stands out as one of the pedagogical paradigms that most prevalently adopts technology; however, it should be noted that behaviorism and cognitivism are present in some phases of ICT-based learning as well (5).

Constructivism as a pedagogical theory represents a shift in how to bring students closer to knowledge, both in terms of learning environment and method (6,7). It is based on the postulates of Piaget's genetic epistemology, which includes the theory of developmental stages, the equilibration theory, the use of formal reasoning schemes and epistemological positioning (7).

For Piaget, the individual approaches the object of knowledge a one endowed with previously constructed cognitive structures. It is through these preexisting structures that he assimilates new knowledge. This process produces a transformation and accommodation of his cognitive apparatus, which changes his perception of the object of knowledge when he confronts it again (7).

Within this model, it is assumed that knowledge is constructed in the mind of the individual (8). Knowledge goes through intermediate processes in which the student interprets and modifies it according to his experiences and previous knowledge. This is why, within the constructivist context, knowledge is subjective and reality is dynamic. The constructivist paradigm is understood as a particular way of interpreting reality (9). It is characterized by a relativistic ontology in which reality is multiple, socially-constituted and not governed by natural or causal law. Truth, in this context, is the mental construction of a better-informed, more sophisticated and more consensual reality (7).

Constructivist learning environments provide multiple representations of reality, avoiding its oversimplification and respecting its complexity. This pedagogical approach emphasizes the construction of knowledge, not the reproduction of it, thus allowing student autonomy and encouraging reflection on the experience. Constructivist learning spaces support collaborative construction through social negotiation and but not the comparison of the different learners' competencies (10). The study proposal is to understand the conceptual focus of constructivist theory implicit in blended learning and the impact it has in the teaching and learning of the clinical component of an internationally recognized strategy created by the World Health Organization (WHO), which is aimed at improving the competencies of health professionals in their knowledge, know-how and knowing of how to be. This strategy is a preventive and public health oriented and it falls under the risk approach (11). It has proven to be very useful in reducing mortality rates in the countries where it has been implemented (12,13).

The learning of this particular strategy constitutes evidence-based medicine, and this approach encompasses the competencies that allow the student "to improve the efficiency, pertinence and quality of

the training to overcome the inadequate relationship between the training programs and the institutional reality" (14). Additionally, learning IMCI "helps identify the necessary skills the professional needs to perform successfully, namely, it blends knowledge with skills" (14). The technical competencies (knowledge) serve to identify whether the student possesses the knowledge related to the clinical component of the IMCI strategy which the student master the contents and tasks pertinent to his work. The methodological competencies (know-how) defines the students' ability to apply knowledge to a specific specific situation, use the appropriate procedures, solve problems autonomously and ingeniously transfer prior experiences in new situations. The personal competencies (knowing how to be) identifies if the student acts according to his own convictions, assumes responsibilities, makes decisions and copes with possible frustrations.

Initially, this strategy was taught in a face-to-face modality; however, due to the high cost, poor attendance rate, difficulties in access and the massiveness of the strategy, the WHO suggested the use of a virtual modality, which has been evaluated satisfactorily in different countries and presents only a few differences regarding the knowledge the student acquires 15-18). The virtual approach also improves the use of time and resources. It has had the limitation of not being able to measure know-how. More recently, the blended modality was implemented; however, very few countries adapted the contents (19).

Currently, in Colombia, the pedagogical modality used by the Ministry of Health to make the strategy widely accessible has a virtual component and one or two or two face-to-face practical sessions. This research suggests that since IMCI is a strategy that encourages holistic attention, it allows to be seen not only as the appropriation of technical knowledge, but for it to be analyzed critically from a perspective that is situated in context. This allows a reading of reality that can impact the gaps in equality. For this, it is necessary that the students connect their previous knowledge with the theoretical content provided online, and that they problematize the cases posed to them in the strategy in person (20).

IMCI is incorporated in the universities to supports the implementation and expansion of the strategy: "training senior students who perform their rural / social year in IMCI; use of IMCI in ambulatory / hospital health services dependent on universities; introduction to IMCI in undergraduate training and postgraduate courses; operational, epidemiological and clinical research on IMCI" (21). The current pedagogical modalities in the country are face-to-face, virtual and virtual with one or maximum two face-to-face sessions; however, it is valid to emphasize that each university faculty is free to give the component of the strategy according to the modality that most meets with their needs.

The hypothesis of this research is identifying how the teaching of the clinical component of IMCI using blended learning modality in a group of undergraduate students and health professionals improves their cognitive processes and skills considering the know, know-how and knowing how to be competencies from the perspective of the participants.

II. METHODS

This is an exploratory case study of the implementation of blended learning in the teaching of the clinical component of the strategy (IMCI). The study took place during the first semester of 2015. It was taught to last semester students of the of undergraduate medicine program at the Universidad de Los Andes and to health professionals who work in a health institution in Bogotá (ESE Hospital de Usaquén).

An interdisciplinary team from the Universidad de los Andes composed of members of the Center for Innovation in Technology and Education (Conecta-TE), the Center for Research and Training in Education (CIFE) and the School of Medicine carried out the design, implementation and development of the evaluation instruments. The latter sought to establish: the usefulness of the technological tools implemented in the course; the contribution of the techno-pedagogical strategy to the development of specific competencies and skills; the contribution of the techno-pedagogical strategy to the development of student autonomy; the students' perception of the blended modality in the clinical component of the IMCI strategy. In order to do this, the students took a knowledge test at the beginning and at the end of process, mid-term performance tests. They also completed a survey of satisfaction at the beginning of the course as well as answering questions in a focus group at the end of the course.

The processing of the data was done in Excel. The project was endorsed by the institutional ethics committee and all the participants signed an inform consent before participating.

III. RESULTS

The study included 74 participants of which 16.21% [12] were nurses, 54.05% [40] were medical students, and 28.34% [21] were doctors. There was 27.02% [20] of attrition; 75% [15] of these participants were students of the University of the Andes and 5% [5] were health care professionals. For both groups, the reason for attrition was a lack of time to dedicate to the course.

The survey about student expectations was answered by 27 participants of whom 29.9% [8] were students of the Universidad de los Andes, 40.7% [11] doctors and 33.3% [8] nurses. Among the hospital professionals, 30% [6] of were men and 70% [13] women, whereas among the students of the Universidad de los Andes, 42.9% [3] were male and 57.1% [5] were female. Most of the professionals were between 25 and 30 years old, and the students ranged between 20 and 25 years.

Expectations for both groups were related to the improvement of skills and knowledge in relation to the IMCI strategy, according to the established competencies (see Table 1. Expectations).

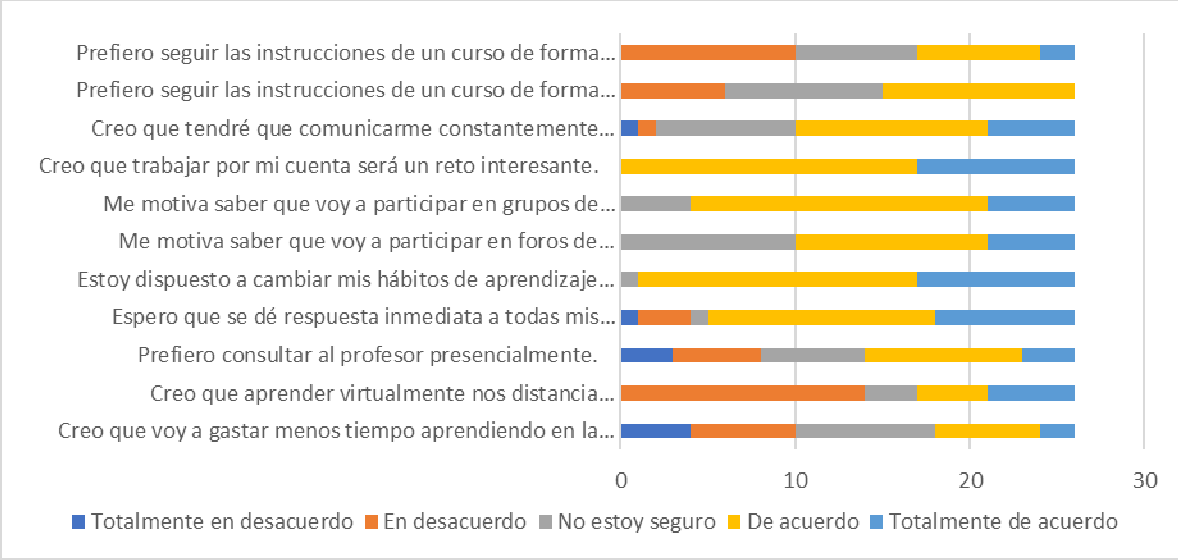
Table 1. Expectations for the blended modality course on the IMCI strategy.

Competencies	Professionals	University Students
Knowledge	• "Update the knowledge on the strategy to be able to implement it in the development of our professional activity."	• "Improve my knowledge about recognizing and managing prevalent childhood diseases."
	• "Acquire tools to promote children's health, prevent childhood diseases, and support networks for the comprehensive care of children who receive our services."	• "Learn the fundamental management of all prevalent childhood diseases and how approach them effectively."
		• "Learn to diagnose, treat and develop integrated childhood care."
	• "Learn and strengthen knowledge."	
Know-How	• "To improve and consolidate my knowledge and skills on the IMCI strategy to put it into practice	• "Consolidate my knowledge in pediatrics and apply it in the context of medical consultations with child-

	in my workplace and in my life in pursuit of improving children's quality of life."	ren under 5 years."
Knowing How to Be	• "Improve my clinical abilities and attitudes regarding prevalent childhood diseases and help to decrease infant morbidity and mortality."	

Regarding the expectations about blended learning mode, students suggest that they agree that "working on their own will be a major challenge" and that "They are willing to change their learning habits" (see figure 1).

Graph 1. Expectations of the learning mode



Source: Expectations survey. Prepared with the support of CIFE - conecta-TE, IMCI course 20015 I.

In total, the course was completed by 54 people. Of these, 22.64% [13] were nurses, 47.17% [25] were Universidad de los Andes students and 30.19% [16] were doctors. A total of 33.3% [18] students did not pass the course. Of those who did not pass, 66.6% [12] were students from Universidad de los Andes and 33.3% [6] professionals.

Of the 36 people who passed the course, 30.6% [11] were professional nurses at Usaquén Hospital, 33.3% [12] were last semester students at the Universidad de los Andes and 36.1% [13] were medical professionals from Usaquén Hospital. A total of 17 participants answered the satisfaction survey.

A. Regarding the competencies

• *Knowledge:* The course participants indicated that the blended modality favored the learning process since they managed to strengthen the knowledge on assisting children and pregnant women ac-

cording to the parameters of the IMCI strategy. Additionally, this innovation contributed to more autonomous learning that requires greater effort and dedication.

• *Know-How:* The course allowed participants to strengthen practical skills to assist children and pregnant women according to the parameters of the IMCI strategy; however, more simulation activities with real patients are necessary. The students stated that the face-to-face activities were closely related to the virtual activities. They indicate that it is necessary to have more dynamic activities since the course is very long. Additionally, the face-to-face sessions allowed for continuous learning as they were essential to staying active in the course.

• *Knowing How to Be:* The students state that, to a large extent, the course allows them to apply the perspective of the rights of children to clinical practice.

Additionally, in the focus groups conducted, although it is evident that an effort to better contextual learning in the real world was made, the constructivist position for the learning of this strategy must be strengthened as can be seen by this participant's comment:

"The course allows us to see many more realities. In other words, for a student it may be more technical (...) but for professionals, the logic is to put them in contexts of what they are doing because it is important. You are there and you are a doctor; maybe some have already done it and want to get up to date (...). The doctor is in the field. She is a practicing doctor. She might talk about what she is living in public health and that can enrich my experience because I have not been in the field myself (...) then that can be the forum topic, other things that help us all to get to know other perspectives and enrich our attention to children under 5, so that in the end, the impact in the consultation positive. "(GF2)

In addition to the focus groups, the need to train teachers in these learning modalities is highlighted.

This study shows how blended learning can strengthen three competencies in students: knowledge, know-how (application) and knowing how to be. This statement is supported by articles where blended learning is compared to traditional methods such as classes, lectures or virtual learning (1,3,4,22). Students prefer mixed modalities that combine face-to-face sessions, virtual classroom and practical field work. Likewise, it was shown how, in the field of health, it is necessary to have more and more alternatives when it comes to pedagogical innovation, particularly those that allow for problem-based learning, case studies and interactions with scenarios that resemble reality (2, 3).

Hybrid teaching environments aimed at health professionals pose opportunities and challenges that allow students to examine reality with a transformative perspective (1). The development of this innovation at the Universidad de los Andes seeks to motivate students to go beyond being passive receivers of information and to building on that knowledge, to become the center of the learning process, to be autonomous and coherent.

The constructivist approach recognizes the role of students' prior knowledge in the construction of new knowledge. The hybrid environment enriches learning in that it integrates face-to-face and virtual sessions, and it is promoting the development of real activities in real contexts (24). In the implementation of the course, it was evident that in real contexts, students had difficulty linking their previous knowledge with the knowledge of the course. These scenarios must be strengthened so that when students face real situations, they are more spontaneous and can generate more effective interventions that improve their professional practice.

The results of this study are similar in those found for the evaluations of other blended learning innovations, which identify the contributions of this modality to how students' interpretation of reality, and to their demand for the autonomous creation of knowledge. These finding reinforce the importance of the implementation of ICT in education. However, special care must be taken so that each of the activities generated both in face-to-face and virtual interaction meets the proposed objectives (3).

The blended learning modality is a pedagogical innovation strategy that does not solve the problem of developing a competency-based curriculum with a critical approach by itself. It is necessary to carry out a curricular planning exercise prior to implementation that comprehends an understanding of the health-disease process in children in a social, political and historical context (25).

The teaching processes that include constructivist approaches generate new ways for students to relate to their process. This is why these strategies must be strengthened and educators should be trained to make good use of these strategies such that students obtain the benefits (26).

IV. CONCLUSIONS

The implementation of blended learning courses in areas related to health should be strengthened in higher education institutions. It is necessary that students builds their knowledge and have more contact with the reality of the country, where there are countless factors that affect the health - disease process. It is important to abandon a paternalistic approach to knowledge transfer as this does not permit students to apply and build on that knowledge in meaningful ways.

The blended learning modality for IMCI specifically requires greater planning and teaching ability than a 100% face-to-face modality since it starts from the principle of recognizing the equal importance of face-to-face and virtual spaces. The former implies a greater dedication of time for both teachers and students.

This research work promotes medical students' critical thinking at the University of the Andes. It approaches the social determinants of the WHO based on the risk approach.

The blended course without a renewed epistemological framework can strengthen the biomedical model, but will not advance the recognition of Social Determinants. There is a need to modify the contexts of the child and his family.

It is necessary to build teaching scenarios that include continuing education of assistants in the IMCI strategy implemented with the blended modality.

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