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LEARNING AND DEVELOPMENT: INSTRUCTIONAL EVENTS IN AN POSTGRADUATE PROGRAM

APRENDIZAGEM E DESENVOLVIMENTO: EVENTOS INSTRUCIONAIS EM UM CURSO DE PÓS-GRADUAÇÃO

APRENDIZAJE Y DESARROLLO: EVENTOS DE INSTRUCCIÓN EN UN CURSO DE POSTGRADO

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This study aims to outline the main contributions of Robert Gagné learning theory to the E–learning education based on the analysis of instructional events of a *lato sensu* Postgraduation Course. The methodological strategy was performed as a case study. Nine proposed instructional events by the model were analyzed from the postgraduation course such as didactic material, pedagogical model, learning tools, evaluation as well as transference. The outcomes revealed the importance on collective feedbacks toward students' orientation along with learning transference to contexts linked to the practice of social management. It was concluded that instructional events make part of potential resources to the organization of E-learning instructional models by adding teaching quality, besides making it possible learning which promotes changes in the student development.
Descriptors: Learning; Educatión graduate; Education distance.

O objetivo do estudo foi delinear as principais contribuições da teoria da aprendizagem de Robert Gagné para a educação à distância, a partir da análise dos eventos instrucionais de um curso de pós-graduação *lato sensu*. A estratégia metodológica foi o estudo de caso. Os nove eventos instrucionais propostos pelo modelo foram analisados a partir de elementos do curso de pós-graduação, como material didático, modelo pedagógico, ferramentas de aprendizagem, avaliação e transferência. Os resultados destacaram a importância dos *feedbacks* coletivos para orientar os alunos e da transferência da aprendizagem para contextos vinculados à prática em gestão social. Conclui-se que os eventos instrucionais constituem recursos potenciais para a organização de modelos instrucionais à distância, agregando qualidade ao ensino e favorecendo aprendizagens que promovam transformações no desenvolvimento dos alunos.
Descritores: Aprendizagem; Educação de pós-graduação; Educação à distância.

El objetivo de este estudio fue delinear las principales aportaciones de la teoría del aprendizaje de Robert Gagné para educación a distancia, a partir del análisis de eventos instruccionales de un curso de posgrado lato sensu. La estrategia metodológica fue el estudio de caso. Se analizaron los nueve eventos instruccionales propuestos por el modelo en los elementos del curso de postgrado, como material didáctico, modelo pedagógico, herramientas de aprendizaje, evaluación y transferencia. Los resultados destacan la importancia de la retroalimentación colectiva para guiar a los estudiantes y la transferencia de aprendizaje en contextos relacionados con la gestión. Se concluye que los eventos instruccionales son recursos potenciales para la organización de modelos instruccionales en la distancia, agregando calidad a la enseñanza y fomentando el aprendizaje que promueven transformaciones en el desarrollo de los estudiantes.
Descriptores: Aprendizaje; Educación de posgrado; Educación a distancia.

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INTRODUCTION

In cyberculture, learning models are considered increasingly transient, in view of that different tools and elements are continually created to make it easy to accelerate and promote the processes of teaching and learning. Within this new model of understanding the relation between people and knowledge, learn how to learn is a task which has increasingly become more relevant, once technological resources become obsolete every day, causing people to deal with a growing repertoire of data as well as data transit. Such information can include or exclude the subject in the network.

In such a changing scenario, knowing how to deal with new information technology and communication – NTIC it is not only necessary but also the possibility of inclusion in environments which make part of daily life, therefore mastering them also become a way to exist in the contemporary world[1,2] .

Human development science has incorporated debates on access to technologies and in what way they either interfere or enable new readings of reality from their presence increasingly prominent in the daily life[3].

Technologies as mediators of developing processes and learning – as they have been taken by major theoretical authors such as Vigotski, Piaget and Bakhtin – have acquired a character more and more substantial in order to not only equip or empower an educative or developing action, but also to give it a new direction, a different function: to communicate the contemporary world along with belonging to this new network settings.

Under these changes, E-learning education is not presented as a simple possibility or alternative to most conventional models, but a teaching – learning modality which comprises different curricula e.g. training, professional formation moreover pedagogical proposals related to a variety of knowledgeable areas such as public health and health care[5].

In E- learning, NTIC offers a context to learning, besides a ground to people connect each other, share information and knowledge[2]. Learning is not conceived as an asymmetric process which flows from who holds the knowledge to the ones who need to be trained; otherwise it places learners and teachers on a collaborative picture in a joint construction of knowledge necessary to specific groups.

Accordingly, some theoretical models have emerged to provide support to the studies of such changes in the cyberculture framework; on the other hand, the most traditional authors have been invited to debate the current learning scenario of the knowledgeable society. It is through this debate that learning theories have incorporated the current educational settings in its theoretical perspectives, revising not only the form people relate themselves to the learning, but how learning effectively turns out to be an essential aspect in the ways in which we organize and connect cyberculture[2].

One of the authors whose work has been rescued so impressively in recent years is the psychologist Robert Gagné[6-11] who can be considered one the founders of information processing theory. Gagné has lived from 1916 to 2002, graduated in Psychology at the University of Yale in 1937, furthermore taught at the University of California, at Princeton University as well as at Florida State University.

He is considered the pioneer in the so called instructional sciences during the Second World War, when he developed trainings for pilots of the American Air Force, including engaged with applying instructional theoretical concepts to trainings and multimedia. In his instructional designs he has taken into account the presence of different types of learning, i.e. signal learning, stimulus-response, motor skills, verbal associations, discriminations, concepts, rules, and higher order rules. He has believed that different teaching conditions are more likely to allow the achievement of learning outcomes[6].

His theory has been widely debated precisely by offering practical answers to the challenges of learning contexts, like how to design instructional programs what has

enabled the development of E-Learning courses. They can meet their instructional goals from an organized model and be properly coordinated by educational actions.

This study aims to outline main contributions of the learning theory of Robert Gagné based on the analysis of instructional events found in a *lato sensu* postgraduate program.

METHOD

Type of study: A study case developed in the context of a *lato sensu* postgraduate program in the E-learning modality.

The study strategy was applied allowing detailed analysis of instructional events related to learning in the mentioned vocational training context.

Analyzed Case: It comprises a *lato sensu* postgraduate program in sustainable regional development designed to the E-learning modality.

Sponsored by a consortium of federal universities and an institute of teaching and researching, the course was targeted at managers of a public bank for the development of negotiating strategies toward sustainability[12]. Beyond distant activities which were performed in AVA-Virtual Learning Environment, the students have carried out training in the developing communities, the so – called social residence[13], that was guided by expert tutors.

Analysis Corpus: The analyzed educational situations referred to nine instructional events which pursuant to Gagné would make it easier the learning process: (1) to grasp attention; (2) to inform the pupils the target; (3) to stimulate revising previous learning; (4) to present stimulus; (5) to allow orientation toward learning; (6) to elicit performance; (7) to promote feedback; (8) to assess performance; (9) to encourage retention and transference[6-11].

In the current case, we will exemplify and debate each of such events from detailed observations performed in the adopted instructional model. Such observations have considered the following elements: pedagogical program model, the targeted audience, candidate acceptance, teaching material, assessing ways moreover learning transference. Discussions were based on the theoretical framework of Gagné, as it follows.

Theoretical framework: The foundation of this case study sits on the learning theory of Gagné which has got a hybrid basis, since it mixes behavioral and cognitive elements[14-15].

This model has been applied to different educational areas of E-learning, in order to facilitate the understanding of how hypermedia may promote students' learning in both vocational and training programs. Educators, psychologists, managers and nurses have given special attention to the model, mainly due to their interest on instructional planning that aims at certain skill teaching, for instance within organization environment or Nursing teaching[16].

The foundations of Gagné's thoughts are employed in the planning of learning platforms along with E-learning course programs, contributing to organizing not only curricular contents but how this systematization can foster educational goals. From this standpoint we can highlight Gagné's framework is one of the fastest to offer support to learning in the contemporary thinking, not only in teaching conventional environments as the classroom, but also in AVA learning or network organized platforms.

One of the first discussions within Gagné's work is the fundamental difference between development and learning[7]: both concepts refer primarily to changing processes. However, development would be characterized by long – term changes while learning would entail short-term changes.

Apart from that, both of them are closely related as behavioral development would result in cumulative effects of learning, that is, several parts of short-term learning could lead to the most meaningful changes, including permanent ones which would trigger long-term development processes. Therefore, the prominence of his work is learning as the engine for development, so that his contributions have been more

investigated in the educational area and its interfaces such as Educational Psychology, School Psychology and Virtual Educational Psychology than compared to Psychology of Development[14,15].

To Gagné[6-8], learning can be understood as an inner change which manifests through a behavioral change furthermore the persistence of that change. An external observer may recognize there was learning by the incidence of a behavioral change followed by the persistance of such a change. Learning is a change, however not due to a structure maturity or physiological effect like a growing effect. Actually, one can say there was effective learning when its effects turn out to be observable.

Gagné[7] attacks Piaget's theory, one of the most widely spread worldwide. Firstly, he disagrees with the author's clinical method, considered fragile by Gagné.

Such method would not allow to be applied in different contexts. Cognitive adaptation proposed by Piaget would depend on maturity and growing factors attached primarily to acquisitions and biological changes consolidated with the passing of the time. In turn, Gagné believes a child improves because he learns through differencing processes and learning transfer.

On rejecting a learning based on maturity, the aim of Gagné is precisely in the processes of discrimination, retention and transference of learning. Hence, it understands learning as sequential from the simplest to the most complex: the child learns the simplest rules and properties first, and then the most complex ones; it is necessary to learn concepts first to learn the complex rules involving them.

Using learning experiments with children, such as the example performed by Piaget, Gagné argues a child has learning obstructed not because she does not know what conservation, seriating and reversibility are, but because she does not master the concepts of volume, height and width, for instance, simple concepts which support the learning of more complex relations[7].

In short, Gagné focuses on learning sequences, that is, previous learning also its transference as key processes toward the learning.

The author presents five learning categories or main learning outcomes as different types of learned skills[6-8]: (a) verbal information; (b) cognitive strategies; (c) intellectual skills; (d) motor skills; (e) attitudes. Regarding the first category, we learn verbal information when we are able to repeat the correct sequence of presented words or reproduce the main ideas of the message, for example, what implicates in cognitive components.

Verbal information is considered the learning outcome which has most attracted the attention of teachers; it can be expressed in the form of a sentence.

Cognitive strategies refer to the use of cognitive tools – thinking, attention, memory and perception – for problem solving, thus choosing the best route to meet the subject's needs, in other words they are "the specific means by which people drive their intellectual functioning"[14] (p. 413). Those skill acquisitions may occur either from a planning or at random. They seem to be self - learned skills, although educational systems such as schools and vocational programs strongly invest on such learning outcomes.

Intellectual skills refer to concepts, rules and procedures. According to Gagné, a subject has acquired an intellectual skill when he is able to apply a sequence of concepts in other situations. This is the learning outcome on which Gagné gave more importance, once it is related to "skills involved in the acquisition of information, problem solving, discovery of rules moreover rules of speech"[14] (p. 414).

Motor skills encompass the use and control of muscles, they require training and movement repetitions, therefore they demand learning through movement and motor actions. Some examples of such skills are writing, speech as well as taking part of physical activities and recreational activities[14]. Motricity is also related to emotional components so that certain

postures and movements can foster the understanding of different emotional states. Corporeal notion used in some studies of the Psychology of Development departs from the motor component i.e. what a child is able to do, if she can walk, speak and express herself. While the significance of this actor within the social environment may contribute to the respective area of certain discursive practices, besides understanding the educational practices that focus on development[17].

The attitude is an inner state which influences the choice of a personal action presenting cognitive and emotional components. It is considered to be one of the most investigated constructs in psychological sciences owing to cognitive component and social learning[18,19].

Attitudes can be understood as affective reactions which may be positive or negative, whose role is of great motivational value[14]. Imitation is one of the most studied acquisitions of attitudes.

RESULTS AND DISCUSION

The first instructional event proposed by Gagné stresses the need to grasp the student's attention in a way to arouse his interest on learning a specific content[7,14].

In the present case, a sustainable regional postgraduate program stimulates interest at the very moment to disclose the selective process by course data accessing, such as course syllabus, content sequence, teaching strategies, learning approach and evaluation.

Candidates shall be selected by testing the proof of knowledge on logical reasoning along with Portuguese language. At the very starting of enrollment further specific data is supplied, therefore students can engage themselves more effectively in the program context, enhancing their motivation and interest on the ongoing process.

Organizational information is provided by the bank which advertises the course based on strategies and short-term, long-term aims as well as by the institutions that offer the courses based on sound data and its operationalization. Future students are motivated by the possibility of career rising advertised by the organization and the interest on attending an E-learning course, information conveyed by the MBA offering institutions.

Hence, learning preparation process can be broadly understood from the initial design from course needs to detailed course information – its organization, beginning, term, tools and faculty. All mentioned aspects are relevant to prepare the student for the new course.

The second event refers to the need of informing the students the learning aims which may be diluted into different contents and themes. From the very beginning, students shall be clearly informed of learning targets within a certain theme.

Targets are necessary to lead the learning process high lightening main points of attention to new contents, including meaning and importance of that knowledge for their formation[8]. Thereby, during the reading on either printed material or digital files, the student may drive his attention, thus at the end his understanding has been fulfilled.

Learning targets shall be designed by a course pedagogical team; consequently it will enhance certain student's points leading to formation. That does not mean the student cannot either follow different tracks or focus on different aspects of the same theme.

In fact, given sequence is presented to the learner following an assumption of learning to Gagné: from the simplest, from the concepts to the complexity of the relations established among different concepts[6,7].

A task educators should devote diligently is to design closely objectives in a concise and clear way, in order that they organize and plan an ideal learning sequence. For instance, in a sustainable regional developing program in order to understand the MBA approach, it shall be necessary to begin with sustainability readings. From there, other more complex concepts may be acquired i.e. empowerment, local

development, sustainable strategies, and practices of social management among others.

The third event refers to the recalling of previous learning. This event engages itself closely with acquired knowledge as proposed by Vigotski[2°], so that the whole learning does not start at zero point, however from an already-said, an already-known, that is the previous learning related to the new presented learning.

As pointed out by Vigotski[20], all new learning shall engage with previous learning in a way that they can work as a ground for new contents which shall be acquired or applicable. According to Gagné, previous learning work as cognitive structures supplying support for new acquired knowledge, thus recovering them is a key step so students can select already internalized structures that help in the new learning task. Such a knowledge bound make it possible students also to set connections facilitating the learning.

The information recovering process for acquisition of new knowledge highlights the information sequence proposed by Gagné, in which contents will be organized in a hierarchical manner, moreover in an increasing degree of complexity. In the analyzed course such an event is clear within the course sequences and theme sequence provided within each course.

At every new content or theme inserted in a certain course, already learned contents shall be recovered what can be performed through an initial summary at the beginning of a new theme by a brief video lesson. This strategy recovers cognitive memory mechanisms processing the new learning in a meaningful way, producing an inwardly dialogue the student has already acquired.

The fourth event refers to presenting the studying material. Called as stimulus, the material can be a brochure, a book, a video lesson, video conference, among others. All E-learning material shall be organized to meet a number of principles e.g. language focus as well as material layout. In trainings and E-learning courses, the form to present the student the stimulus defines the student's permanence along with conclusion of the program. Stimulus attention is not sole toward aesthetical aspect, instead also didactic organization.

E-learning course may not be compared to attendance courses, since they differ in the educational approach meeting different targets, so that looking for a media transition from the classroom to the learning platform may be a learning hindrance. Specific E-learning strategies have to be developed considering NTIC communication change on how we communicate when entering in touch with others.

A forum interaction is not the same of a meeting room when students face a leading question. Key element is to understand people learn and interact differently, recognizing such an aspect on building E-learning strategies is to maximize the learning. As a consequence, stimulus is not only the shape and the material but also a broader instructional design.

The fifth event refers to promoting the student learning orientation aiming to help them to understand, organize also realize the importance of using semantic codes in verbalization[11]. Such orientation can be performed in a variety of forms such as general and specific orientations to each new activity, either by general documentation which informs the students learning tool rulings, besides course organization of the program.

They are commonly found in course brochures and didactic material like either reminders in handouts or video lesson notes, seeking to orientate student's learning while he attends the class. Furthermore, it is seen as diagrams, illustrations, knowledge systematizations, referring to both certain contents and course organization itself. An example of the second idea is presented in Figure 1 below, representing the working model of assessing activities in a MBA of the studied sustainable regional program.

From this picture pursuant to Gagné, the student is able to boost cognitive

mechanisms which hold up information retention toward learning. In this manner, most E-learning programs make use of such a schematic model to empower learning furthering a quicker process.

The sixth event refers to eliciting performance, which is raising the expected answer allowing the learner reveals learning or learning questions by memorization stimulus, applicability, summaries and generalizations. Students may be invited to write on the material itself, to come up with examples trying to apply learned knowledge into practical situations.

An example refers to a reserved box in the course brochure aiming to note taking of personal impressions, building summaries as observed in Figure 2. Nowadays, other technological tools have been applied as the *wiki*[21] even publishing tools found in tablets, favoring student's comment which alter textual material and can be shared throughout the net. Consequently, NTIC improvement and development have enabled re-readings including the instructional events of Gagné.

The seventh event refers to feedbacks – students' performance assessing on course activities focusing at the learner's reinforcement by learning efforts[22]. In the model under discussion it was inserted a mentoring message which is a space for collective feedbacks arranged by groups. Those messages are created by tutors and addressed to 30 – student different course groups. In the messages, tutors supply detailed comments of each student's performed activities during the week, retaking evaluation targets also analyzing student's performance collectively, without individual outcomes.

Such an evaluation is appraising as it stresses evaluation strong points, besides the acquired and internalized processes by the group.

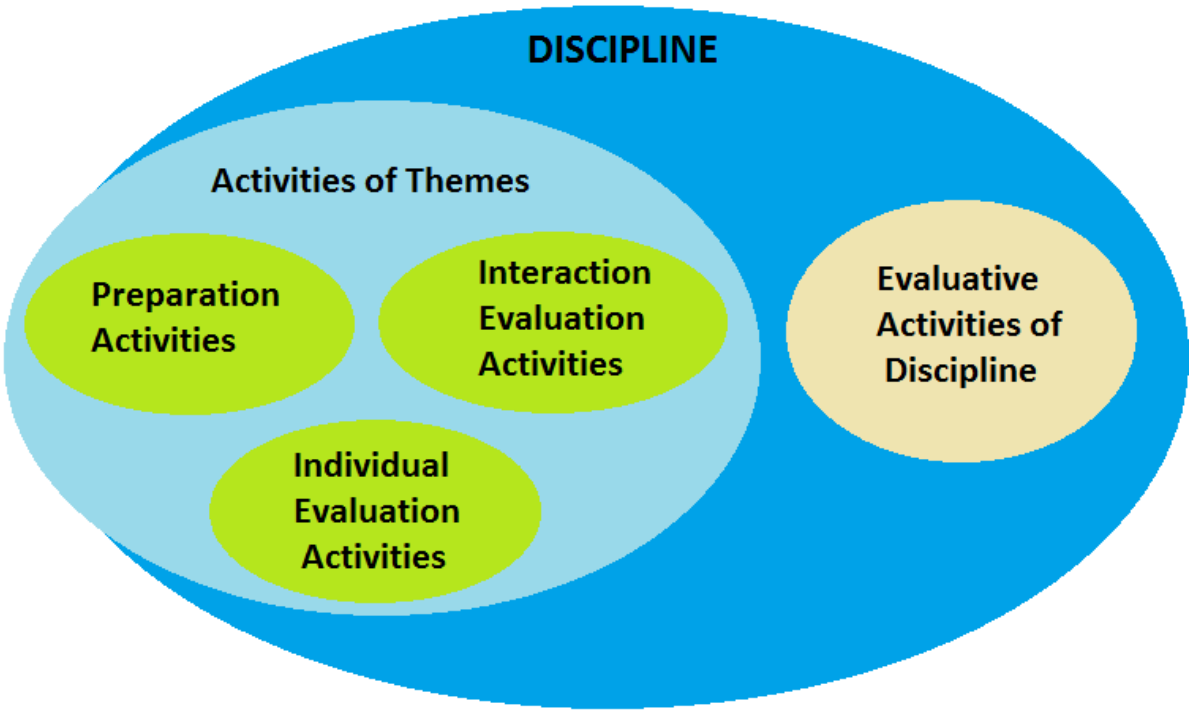
However, it also rises up the points which deserve to be prioritized by the groups in future learning, aspects which are not plenty developed plus structures which earn greater attention by the students.

Figura 2. Space available in the MBA studied material for student's note taking and summaries.

Now it's your turn

Well, did you finish the study of Ambiance. So, this is the last activity of synthesis to be held.

Figure 1. MBA activities in Regional Sustainable Development.



It is to evaluate how the group has evolved and how it can enhance their learning from the investment in a variety of interactional tools. Feedbacks are also provided individually in case it is requested by the tutor, although according to the course pedagogical premises, collective feedback is able to place the students[22] through sharing and interacting in the virtual learning.

Consequently, it withdraws from the E-learning the intimate, individual and lonely character greatly associated to the students of such a modality, giving to it a rather collaborative and shared view. Feedback in the studied program works out not only as a reinforcement of appropriate behaviors, but also learning postures which contrast the student's profile to be formed, in the case of social managers. So, it is clear that this event stands out in the course precisely by aligning the objectives of vocational training aimed by the course contracting organization.

The eighth event refers to performance evaluation. Considering the studied course there are a number of evaluations toward diversity needs, making it easier for the students to practice knowledge into multiple tasks under differentiating targets. Along the process, learning is favored through outlined tools, which provide different outcomes: performance is evaluated by forum debates, opinion panels, answers to video lesson questions, questionnaires moreover dynamic contents. Each tool requires distinct targets demanding specific cognitive strategies closely related to memorization, retention and transference.

As an example, a debate forum presents a proposal lacking a sole answer, leading students to discuss into different solutions. Such tutoring based discussions are triggered to meet course content goals encouraging critical positioning what enables to educate a student into critical disclosures

followed by learning changes within the social managing practices.

The new and last event refers to stimulus, retention and transference of learning focusing on the learner's opportunity to apply the learned content on decision-making of contextual practices. Learning transference is broadly investigated by researchers markedly in Organizational Psychology of Work in E-learning training contexts[18,23].

Transference processes are key elements to enable courses to enhance a continuous besides autonomous learning. This stimulus can be improved by continuous evaluations, the possibility the E-learning former students apply knowledge to their daily routine. Concerning the studied program, practice bounding is provided immediately after the end of the course by offering them the chance to work within the social managing banking areas. Professionals can also give lectures and trainings to employees, promoting to spread knowledge to a great number of ongoing people at formation.

To Gagné[7], transferring is inherently within the learner, in a way that it is possible to transfer if situations and sequences are similar or quite resembling.

As a result, there is the importance of social home in management training, since it does not concern simply training, instead a planning: intervention followed by evaluation of a design in a regional community under sustainability focus. Students not only apply acquired knowledge within the place but also bring up questions to the course forum, also problems and solutions found in the empirical field. Dialogue between theory and practice is a must, according to Gagné's approach.

The mentioned link shall be presented in social management along with giving priority to the current study in different sectors of expertise like the public health area[5], in order that professionals may emphasize experiences empowering it to changes.

CONCLUSION

When considering the application of instructional events to Gagné on an E-learning program, it is possible to understand possibilities along with limits of such approach.

Among main contributions of Gagné learning theory to E-learning, we state instructional events provide theoretical methodological framework so that E-learning programs shall be designed accurately under suitable planning. All that can enhance higher learning quality improving the learner's processes which are increasingly more complex, reaching meaningful development changes.

One of the hindrances of Gagné's theory to E-learning is to organize and design learning to contexts when the target audience is unknown, i.e. in an open course. Although, some aspects may be added to the student's profile, diversity may interfere executing some events specially the ones referred to transference.

Learning transference to other contexts may be a hindrance in E-learning trainings. Hence, it is important to take into account those different contexts in an instructional course design, though such consideration is not always performed in a controlled and suitable manner.

Among applying possibilities of E-learning instructional events, it stands out the construction of clear parameters and targets favoring the same course to be applied to other contexts.

Despite this systematization, pedagogical models are not hermetic allowing that open dialogues among students to be carried out into changes along the learning route. There is no doubt a sound register of sequences can lead to learning, however it is necessary constantly to reflect about the transference of what it has been learned.

From this perspective, transferring knowledge is also to learn, contributing to strengthen the changing process. In such a context, there is the need to train skilled educators not to apply automatically the

method proposed by Gagné, instead, to plan, develop and evaluate programs and training proposals.

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CONTRIBUTIONS

Fabio Scorsolini-Comin e **Manoel Antônio dos Santos** had the same contributions on the design, analysis and final writing of the article.