Model to evaluate the impact of IFAM/Centro training

Msc Marlise Pinto Azevedo (marlisepazevedo@hotmail.com)
Federal Institute of Amazon (IFAM/Centro)

Dr. Jonas Gomes da Silva (jgsilva@ufam.edu.br)
Department of Industrial Engineering, Federal University of Amazon (UFAM)
EUREKA Laboratory
Manaus, Amazon, Brazil

Abstract

The article developed a model to evaluate the impact of training provided to active administrative technicians of the Federal Institute of Amazonas (IFAM), located in the Center of Manaus-Amazonas, in the years 2010 and 2011. The research has an applied, descriptive, qualitative and quantitative nature. The theoretical referential included nine training evaluation models, among them, the most appropriate for this study were the models of Kirkpatrick (1976) and Hamblin (1978), Andrade (1982) and Castro (1999). A questionnaire was applied to 42 technicians and 15 chiefs, whose requirements used to assess the impact of training, were: job behavior, learning, performance, support for transferring learning and work. The main conclusion was that the overall average of the requirement responses showed no relevant differences. However, by making an individual analysis of the items of each requirement, it was possible to verify the existence of some differences in the evaluations about the impact of the training, especially about: interpersonal relationships at work, availability of equipment in the knowledge transfer, the importance of the position in company development, more positive attitudes at work and responsiveness to changes at work. On the other hand, there was good alignment of the perception between managers and technicians about the impact of training on meeting demands, improvement in professional performance, operationalization of tasks, increased suggestions for improvement and motivation to apply knowledge.

Keywords: Evaluation Models, Technicians and managers; Training Impact;

1. Introduction

In Brazil, Law No. 11,892, of December 29, 2008, created 38 Federal Institutes, among them the Federal Institute of Education Science and Technology of Amazonas (IFAM), restructuring the Federal Network of Professional and Technological Education. IFAM aims to qualify citizens in various sectors of the economy; insert research in the search for technical and technological solutions, as a response to the desires of social demands; develop extension programs and scientific and technological dissemination; stimulate cultural production, entrepreneurship, cooperative and scientific and technological development; promote innovation and technology transfer with the primary purpose of environmental preservation (IFAM Statute, 2009).

The Institute aims to provide high school technical education and worker training courses; conduct research; develop extension activities; stimulate and support educational process that promotes income generation; teach technology, undergraduate, bachelor, and engineering degrees, lato and stricto sensu postgraduate courses. Its mission is to promote, with excellence, education, science, and technology, with a view to the development of the Amazon.

When the study was conducted from 2012 to 2013, the Institute consisted of a Rectory and ten campuses in the municipalities of Coari, Maués, São Gabriel da Cachoeira, Labrea, Parintins, Tabatinga and Presidente Figueiredo. At the time it had plans to expand to the cities of Itacoatiara, Humaitá, Tefé, Eirunepé. In the capital of Amazonas, there are three units: the Manaus East Zone Campus (CMZL), the Manaus Industrial District Campus (CMDI) and the Manaus Centro Campus (CMC), the latter being the object of the study.

At the time, the Manaus-Centro IFAM Campus consisted of one Rectory and five Pro-Rectories: Pro-Rectory for Institutional Development (PRODIN), Pro-Rectory of Administration (PROAD), Pro-Rectory of Extension (PROEX) and the Pro-Rectory of Research, Graduate and Innovation (PPGI), constituted with Directorate and Management.

1.1 Formulation of the problem

Beginning with Decree No. 5,707 / 2006, the Ministry of Planning encouraged the agencies to adopt in their training management the "Competency Management System", to improve the scope of the institution's objectives.

To adjust a new professional profile through training, IFAM is supported by the Personnel Management Directorate (DGP), subordinated to PROAD, with the following competencies: to propose, coordinate, monitor and evaluate recruitment and selection policies and guidelines, development, training, performance evaluation, health, and quality of life of servers; coordinate the execution of the training plan of the Federal Institute's servers.

Reporting to the DGP is the General Coordination for People Development (CGDP), which is responsible for planning, coordinating and evaluating actions that promote the development and improvement of the server, and preparing IFAM's annual training plan, which has not yet been implemented, which includes all its sectors.

The problem was that there was no systematic methodology in the institution to assess the impact of training, an element considered important for the professional and personal development of its employees.

In this context, it is necessary to develop a model to evaluate the impact of IFAM/CMC funded training. Thus, the main question of the survey was "What model would be most appropriate for evaluating the impact of training on the professional and personal development of IFAM/CMC servers and Rectory?

1.2 Importance of Research

Resolution No. 026-CONDIR/CEFET-AM, of December 22, 2006, in Chapter VI, Article 22, Items II and III, when referring to training regularly instituted and relates to training events, classroom courses that qualify for the performance of the duties of the position and/or function; formal education at various

levels of education and at a distance; service learning, formal study groups, exchanges, internships, seminars and congresses that contribute to the development of the server and that meet the interests of the public administration, especially this Federal Institution of Education.

According to Gil (2006), the development of actions aimed at a continuous training process is inherent to the dynamic environment of organizations, aiming at the effectiveness in their attributions. According to the author, training programs, training and development of people in companies are becoming more frequent.

For Vasconcelos (2010), the expansion of intellectual or technical skills allows raising the social and economic level of the client. Thus, the investment of organizations in the issue of learning is fundamental. In financial terms, IFAM has made substantial investments in training its staff.

Thus, given the relevance of encouraging the development of servers, IFAM seeks to adjust a new professional profile through qualification, adding value to the performance of internal processes performed at the Manaus-Centro Campus. The research is relevant because it can:

a) Contribute to generating technical subsidies for the preparation of the annual training plan;

b) Produce information that will improve the execution of the IFAM/CMC Technical-Administrative Career Plan, since the Plan foresees that the development process of the servers should be continuous and permanent;

c) Enable the development of a benchmarking process for other Federal Institutes and contribute to the academic discussion regarding training;

d) Improve the offer of courses based on suggestions presented in the research;

e) Advise the financial managers on the courses most relevant to the institution;

f) highlight to the servers the importance of training in improving professional performance;

g) Stimulate the importance of knowledge transfer in the organizational environment, for better execution of daily tasks;

h) Highlight the importance of evaluating training results to optimize future budgetary and financial resources;

i) Serve as a source of future research and as a complement to existing literature.

1.3 Objectives

The overall objective is to develop a model for evaluating the impact of training provided to active IFAM/CMC and Rectory administrative staff during 2010 and 2011.

The specific objectives are:

a) To investigate models of evaluation of existing training in the literature;

b) Map the procedures adopted by CDGP to provide training to servers;

c) Develop and test the data collection instrument with the active technical-administrative servers;

d) Propose the training impact evaluation model, as well as suggestions for improvements that enable its improvement with the managers involved in the training process.

2. Theoretical Referential

2.1 People Management in organizations

Organizations have faced several changes in recent decades, which contributes to the renewal of value production processes, service delivery and modernization of human resource skills (BARZAGAR; FARJAD, 2011). According to Axons (2010), in the organization, one of the main indicators for decision making is the performance of the management process that the company develops. From the 1990s, advances in the production process gave rise to globalization. At that time, organizations were compelled to restructure themselves by adopting new professional profiles in the area of Human Resources (HR). According to Gil (2006), the HR professional went from Administrator to People Manager, which required a leadership posture, aiming at organizational excellence. The manager must consider human capital not only as a resource to be used but as an agent involved with the growth of the company, being aware that their attitudes and behaviors are prioritized.

Thus, according to Palladini (2010), the decision-making agent called "quality manager" becomes indispensable in the management process, a subject that will define the goals, striving to achieve them.

2.1.1 People Management through skills

Organizations can adopt various management practices according to a set of theoretical assumptions that make people management the competency-based management model, which for Freitas and Brandão (2005) aims to plan, capture, develop and evaluate indispensable competences in the different aspects of the organization, whether at individual, group or organizational level. The author comments on the model presented by Brandão, Guimarães and Andrade (2001) called Competency Management Model (Figure 1), based on processes and applications of competency management as follows:

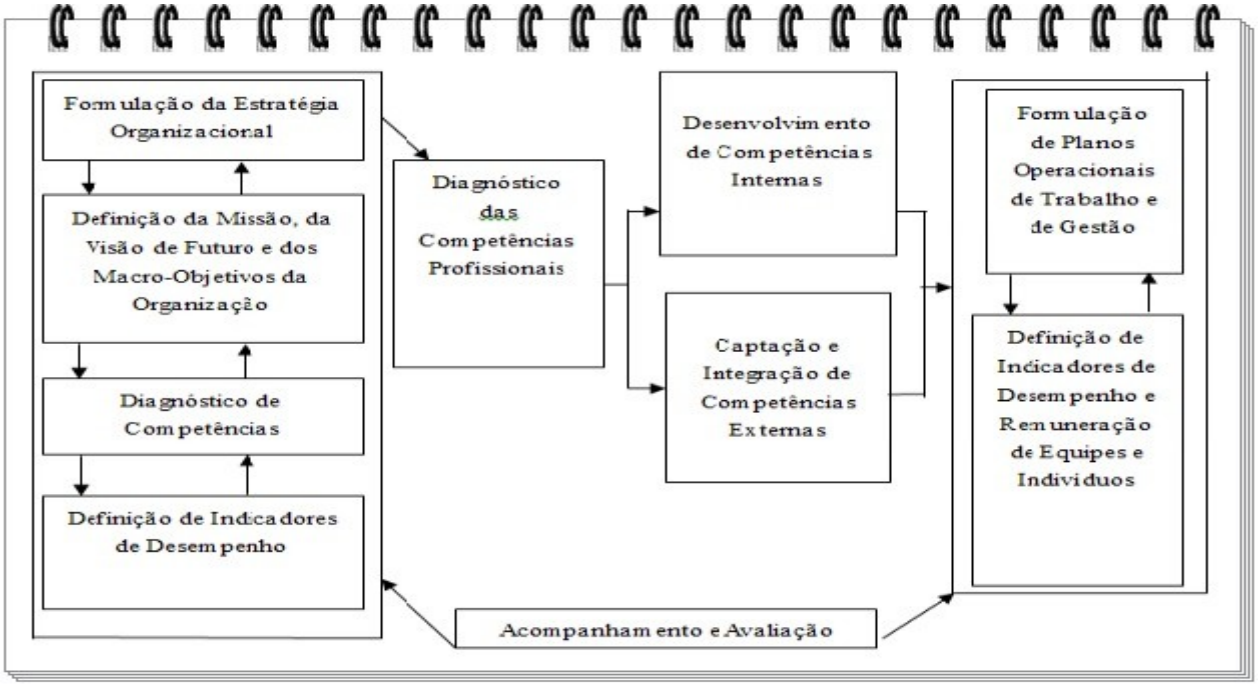

Figure 1: Competency Management Model
Source: Brandão, Guimarães and Andrade (2001, p.14)

Thus, competency management is interpreted as a continuous process that begins with the formulation of organizational strategy, which defines the organization's mission, vision, and macro objectives. In the next step, the organizational competencies necessary to achieve the goals set are identified, as well as the performance indicators based on measures of efficiency and effectiveness, to realize the vision of the future. For Fleury (2002), competence implies mobilization, integration, transfer of knowledge, resources, and skills, either to execute the economic interests of the company or to fulfill the individual social values that are part of the organizational environment.

2.2 Training and effectiveness concepts

Training is a relevant tool for changing attitudes, knowledge or skills essential in the performance of work activities (ABBAD; LACERDA, 2003). For Filho (2004), training has the function of socializing the individual in the company, leading him to seek behavior that promotes self-development. According to the author, development requires the ability to understand reality critically, surpassing the organizational processes.

Autor	Ano	Treinamento
Campbel	1971	Treinamento é a educação profissional que visa adaptar o homem ao trabalho, preparando-o para o exercício do cargo.
Hamblin	1978	Treinamento abrange qualquer tipo de experiência destinada a facilitar um ensino que será útil no desempenho do cargo atual ou futuro.
Borges-Andrade	1986	Treinamento é uma tecnologia que envolve um conjunto de princípios e prescrições formado por partes coordenadas entre si, que funciona como uma estrutura organizada.
Certo, Samuel	1994	Treinamento é o processo de desenvolver qualidades nos recursos humanos para habilitá-los a serem mais produtivos e contribuir melhor para o alcance dos objetivos organizacionais.
Decenzo, David	1996	Treinamento é a experiência aprendida que produz uma mudança relativamente permanente em um indivíduo e que melhora a sua capacidade de desempenho em um cargo.
Dessler, Gary	1997	Treinamento é o processo de ensinar, aos empregados novatos, as habilidades básicas necessárias para o desempenho do cargo.
Eboli	2002	Treinamento faz parte de um sistema de educação estratégica (corporativa) cujos princípios possibilitam a criação de um sistema de aprendizagem contínua.

Chart 1: Training Concepts
Source: Adapted from Filho (2004, p. 58)

In summary, Chart 1 presents the evolution of the concept of training over time from 1971 to 2002. For Campbel (1971) training is a professional education that aims to adjust man to work, preparing him for

the job. Hamblin (1978) believes that training includes any kind of experience designed to facilitate teaching that will be useful in performing the current or future position. Andrade (1986) believed that training is a technology that involves a set of principles and prescriptions formed by coordinated parts that function as an organized structure, etc.

In Lima's view (2007), training programs should be analyzed as a process and not as an event. He emphasizes that training HR is a major factor in the results of the organization, leading to differentiated and quality service delivery, as well as constant improvement of the work process.

Autor	Ano	Conceito
Bio	**1996**	➢ A eficácia está vinculada aos resultados alcançados; ao produto obtido através de uma atividade; ➢ Depende da tomada de decisões, da escolha da solução certa para cada situação e do nível de eficiência; ➢ Diz respeito ao método escolhido para viabilizar o modo certo de fazer as coisas; ➢ A empresa eficaz disponibiliza no mercado determinada quantidade do produto certo para suprir as necessidades dos clientes.
Daft	**1999**	➢ Avalia o grau de alcance dos objetivos propostos; ➢ Associa meta planejada a resultados obtidos; ➢ É fazer a coisa certa, ou o que deve se deve fazer; ➢ É um dos indicadores de desempenho de uma organização no sistema de produção, juntamente com a eficiência, produtividade, lucratividade e qualidade.
Certo	**2005**	➢ As empresas de alta eficácia estão genuinamente voltadas para as pessoas, proporcionando-lhe: boas oportunidades de treinamento, desenvolvimento e carreira, bons programas de remuneração. A comunicação interna é aberta, encoraja-se a participação dos funcionários e a alta administração está comprometida com os Recursos Humanos.
Costa e Jardim	**2010**	➢ Eficácia revela se as oportunidades estão sendo bem aproveitadas.

Chart 2: Authors' Opinion about Effectiveness

Source: Author

Evaluating the effectiveness of training actions is an important issue for organizations, mainly due to the financial resources employed in this area.

The literature presents several authors (Chart 2) who approached about efficacy, such as Bio (1996), Daft (1999), Certo (2005), Costa and Jardim (2010) achievement of the goals set that justify the training actions.

2.3 Training, Development and Education (TD&E)

The expression training and development, according to Vargas and Abbad (2006), originated from the North American business scenario in the period of World War II, which constitutes a pillar for the recognition and systematization of training and development actions for personnel.

Sallorenzo (2000) proposes a learning action diagram in organizational environments formed by four concepts such as instruction, training, education, and development.

Zerbini (2003) and Carvalho (2003) added the concept called information. Vargas and Abbad (2006) expanded and modified the diagrams also including the information. Over time, the order of the concepts "development" and "education" have changed. The inversion implied a change in the way of interpreting the comprehensiveness of the concepts. In contrast to the thought of Sallorenzo, according to the authors, the concept of education includes that of development, summarized as follows:

a) Information: short-term educational actions such as classes, manuals, scripts, portals, links, databases, virtual libraries, etc.;

b) Instruction: orientations, learning events held with the support of manuals, booklets, scripts, and similar;

c) Training: short and medium-term educational events such as courses, workshops, etc.;

d) Development: educational actions in support of life quality at work, career guidance, career self-management and similar programs made available through workshops, courses, seminars, lectures, etc.;

e) Education: medium and long-term programs such as technical-vocational courses, undergraduate, specialization, professional and academic masters, doctorate.

2.4 The agents of the training process

According to Campos and Guimarães (2009) to NBR ISO 10015, the training process is formed by several agents responsible for generating its efficiency and effectiveness, namely:

• Senior management: responsible together with company managers to check if possible skills gaps are being eliminated and especially to analyze the return on investment in training;

• The Human Resources/Training and Development (T&D) manager and its team: who should participate in the definition of the company's strategic objectives so that it can guide trainees and their managers in the evaluation of the training results, issuing an opinion about them. It should also elaborate on the forms that will be used in the evaluations and prepare reports relevant to the training process;

• The managers of the other areas of the organization: the manager of the area that is training him/her should evaluate him/her;

• Facilitators: whose group is composed of instructors, consultants, technicians and all those directly or indirectly involved in the development of training programs;

• Training service providers: formed by external and internal training providers, who must carry out appraisals of learning, behavioral changes and results through the training they will develop;

• The trainees: considered agents and patients of the evaluation processes. As agents, they evaluate the training program, the instructors and the resources used. They are patients when the instructor and the manager of the area to which they belong evaluate them.

The authors emphasize that before starting the planning of a training system and consequently evaluating

it, it is necessary to use a participatory methodology that involves the evaluation subjects, such as managers, instructors, and trainees.

2.5 The importance of training and models to evaluate it

Providing training for staff, the organization provides opportunities for learning, developing and expanding knowledge, technical and operational strategies of the activities it performs. Aiming to make it more effective, with higher quality, to increase productivity reducing costs and satisfying the goals set by the institution.

According to Freitas (2004), due to increased investments in training by the organization, the need for evaluation becomes increasingly indispensable. The evaluation allows fully analyzing the training process and from it verifying its contributions in performance at different levels, whether for the individual, group and organization. The systematization of the evaluation processes has been of interest to several authors, who elaborated evaluation models.

According to Andrade (2008), the company promotes the evaluation of training to control and feedback the training. Some, moreover, make decisions and schedule improvements through the information obtained. But few can perform external validation, ie detect changes outside the training environment.

After the bibliographic investigation, nine training evaluation models were identified, as briefly described in the following sessions.

2.5.1 Tannenbaum et al. Model (1991)

The model focused on face-to-face military training. The authors evaluated the relationship between clients' characteristics (demographics, commitment, self-efficacy, motivation and trainee desires, and expectations), course reactions and learning. According to Filho (2004), this model aims to measure the effects of post-training strategies, trainee reactions to the program and their performance regarding commitment, physical self-efficacy, and motivation;

2.5.2 Training Transfer Evaluation Model

According to Filho (2004), this model was created by Rouiller and Goldstein (1993), based on the issue of organizational climate and its influence on learning transfer. This model uses organizational climate metrics for transfer, learning, impact, job performance, and the business environment. For the authors, the more positive the organizational climate about knowledge transfer, the greater the impact on work;

2.5.3 ROI (Return on Investment) Model

According to Andrade and Rodriguez (2009), Jack Philips presented in 1997 a model based on approaches, containing five main levels: reaction and planned action, learning, application, and implementation; Impact catch changes: return on investment.

The ROI model is gradually formed by the purposes, instruments and the moment of the evaluation, which must be previously defined by the organization that will use the model.

Then the data collection and processing process is done, isolating the effects of the training. The data is converted to monetary value and then the return on investment in training is calculated.

Data that cannot be monetarily converted will be identified as intangible benefits at the end of the process.

2.5.4 Multilevel Approach

For Freitas and Andrade (2004), the Palaces model (2003) divides the organization into levels. Thus, the lower level is the individual contained in the broader levels, that is, the group and the organization.

The impact of training on the individual's performance can occur through the individual's motivation; the group who belongs to, depending on how to interact; of the type of organization, whether public or private.

The author identifies two directions of influence called “top-down” and “bottom-up”. The impact of training at the organization level is considered a “bottom-up” phenomenon because the individual receives the training. Thus, improving individual performance is expected to lead to changes in the workgroup and organization.

2.5.5 Sallorenzo Training Evaluation Model (2000)

Sallorenzo (2000) presented a model based on the support of knowledge transfer as a function of time passed after training.

Motivation is classified as the most important factor, is a direct predictor of all other variables.

Through the model, the author verified that training and development professionals must consider the work environment.

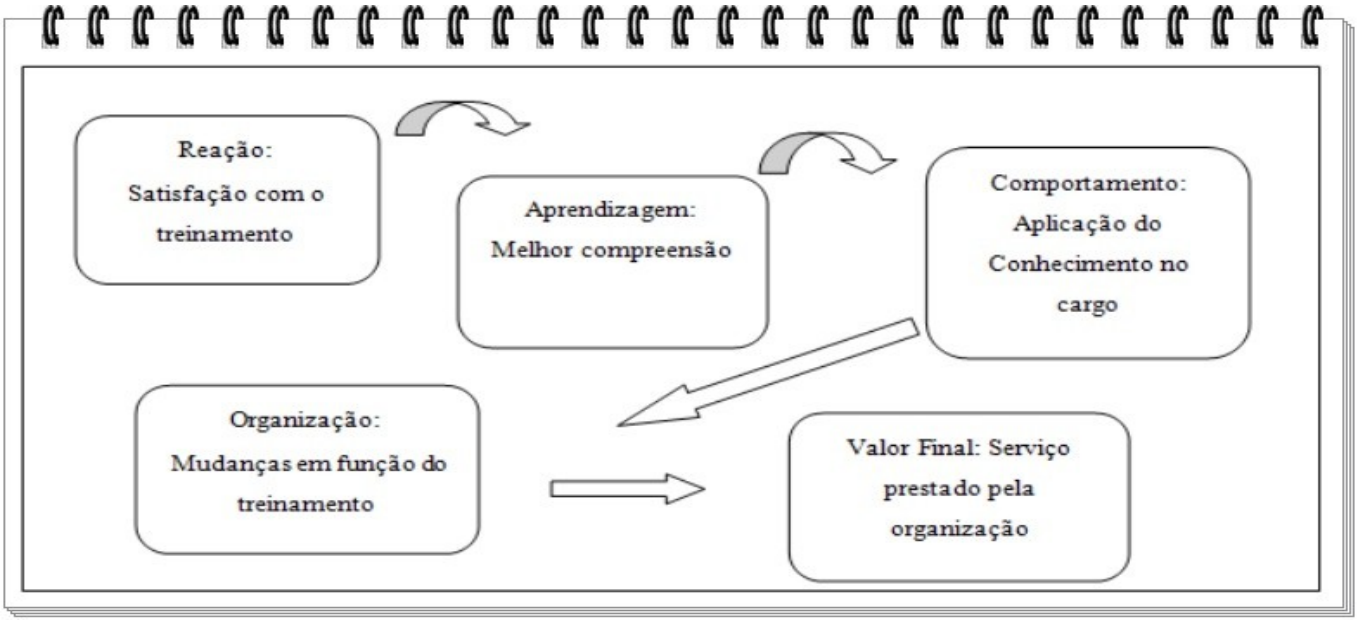

Figure 2: Training Evaluation Process Sequence
Source: Filho (2004, p. 74)

2.5.6 The model of Kirkpatrick (1976) and Hamblin (1978)

Lima (2007) points out that Kirkpatrick was one of the forerunners in the design of systems for evaluating educational programs in organizations. His model focused on four levels of assessment composed of reaction, learning, behavior, and results. For Filho (2004) and Zerbini (2010), Hamblin

(1978) adapted Kirkpatrick's model, unfolding the level of Results into two, Organization and Final Value, as can be seen in Figure 2.

- Reaction (Reação): evaluates the participant's impressions of the learning experience, both in terms of satisfaction, course content, course material, time and place. This assessment can be done through a questionnaire, verbal consultations, and written reports immediately after the training;
- Learning (Aprendizagem): The assessment focuses on obtaining information on the variation of knowledge acquired before and after the event, using knowledge testing and interviews;
- Behavior (Comportamento): seeks to measure changes in conduct and procedures from the application of the information learned, detecting them through interviews and self-assessment;
- Organization (Organização): The effects of training on the organization should be defined as objectives;
- Final value (Valor final): analyzes the services provided by the organization, comparing the cost-benefit of the training.

2.5.7 Summative Integrated Assessment Model (SIAM)

Created by Borges Andrade in 1982, this model stood out in Brazil (SANTOS, 2012).

The model (Figure 3) consists of five items: Inputs, procedures, processes, outcomes, and environment (needs assessment, support, dissemination, and long-term outcomes).

For Andrade (2006), the first four components of the SIAM Model are considered the most important for the TD&E system, and their interaction is usually analyzed in the field of instructional psychology.

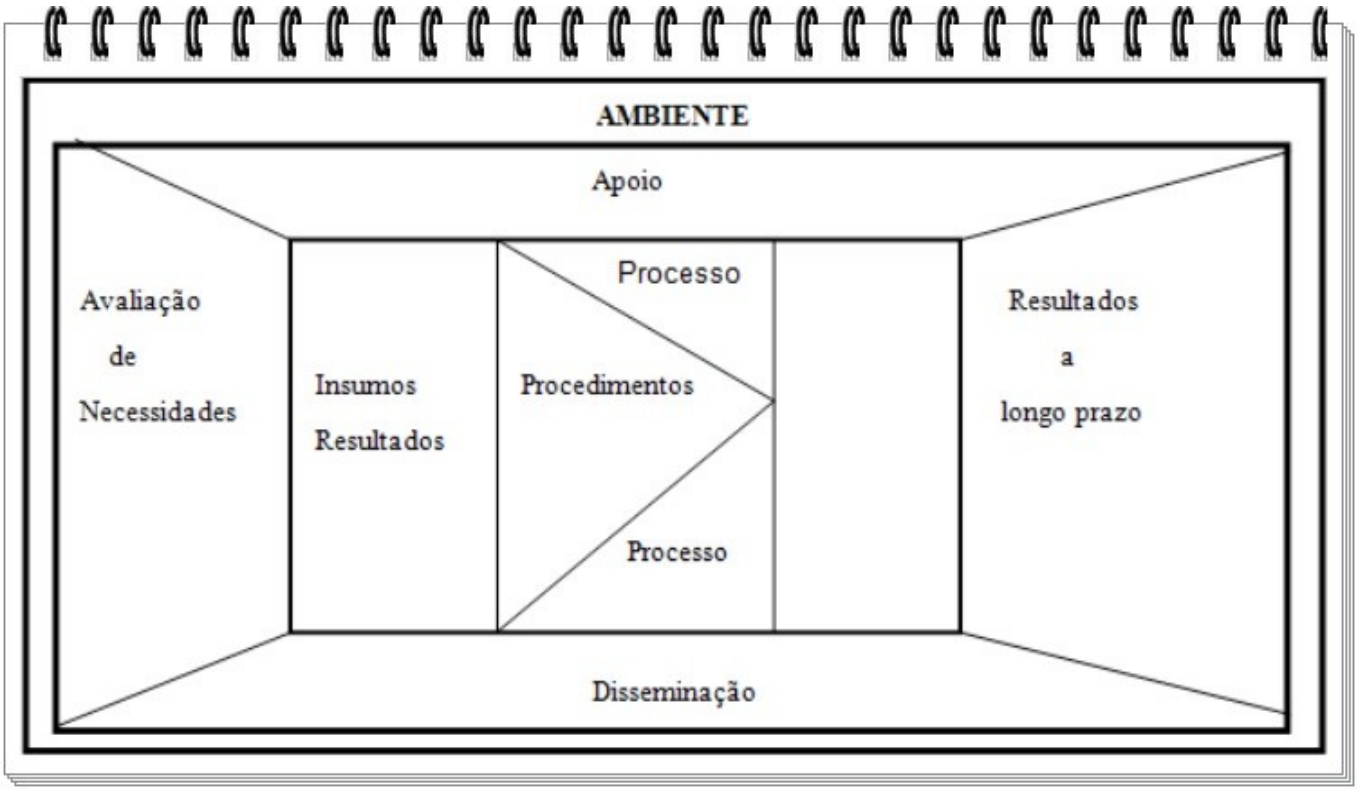

Figure 3: Summative Integrated Assessment (SIAM)
Source: Andrade (2006, p. 344)

The last component (environment) represents the inclusion of this system in the organizational context, as detailed below:

a) Inputs: defined as physical and social factors, behaviors presented before training, such as socioeconomic level of participants in TD&E events; educational level; time passed since the end of the last stricto sense course; age of participants; self-efficacy (belief in the ability to succeed); locus of control (personal control over the results obtained); position held at work by participants; commitment to career and organization; perceived psychic pleasure and suffering at work; use of behavioral learning strategies (seeking interpersonal help or written materials); use of cognitive strategies and learning (repetition and mental reflection); use of self-regulating strategies (emotional control, comprehension monitoring); personal use of learning transfer strategies at work; voluntary participation in TD&E;

b) Procedures: it is the operationalization of the learning process, to facilitate it and to achieve success in the knowledge transferred. For example sequence of objectives, time for practice, demonstrations, verbal instructions, lectures;

c) Processes: Refers to the participant's behavioral contributions during the experiment. Examples are the results of practical exercises, individual study time, number of dropouts;

d) Results: refers to the learning levels and skills acquired through training, ie any skill, attitude, knowledge resulting from the TD&E event;

e) Environment: is formed by needs assessment, identifying the people who need to be trained, determining what type of learning will be offered; support the participant receives to apply the skills acquired through training, ie event facilities, teaching materials, academic and pedagogical training of the instructor; dissemination that focuses on the peculiarities that contribute to the selection of training, such as means and strategy for publicizing the event; long-term results with the effects of training on performance on individual motivation and organization, occurring at three levels: individual, team, and organization.

2.5.8 Integrated Workplace Training Impact Evaluate Model – IWTIE

According to Abbad et al. (2012), this model was developed by Castro (1999) and is divided into seven components: organizational support, training characteristics, client characteristics, reaction, learning, transfer support and impact of training at work, as shown in Figure 4.

In his doctoral dissertation, Abbad (1999) reports that organizational support is the trainee's opinion of the organization's practices regarding performance management, employee appreciation and company support for training.

The characteristics of the training refer to the type of course, duration, education, etc. The client characteristic involves information about trainees. As for the reaction component, it deals with the trainee's opinion on the usefulness of the training program, expected and achieved results, instructor performance.

Learning is the degree of assimilation and retention of the content transmitted in the program. Transfer support focuses on effectively utilizing the knowledge and skills acquired in training.

According to Abbad et al. (2012) Job transfer support analyzes the support provided to trainees in applying new skills acquired. This component is subdivided into two factors: Psychosocial Transfer

Support, which assesses managerial, social (concerning co-workers), and organizational support for applying new learning at work; Material Transfer Support that reviews the quality, quantity, and availability of material and financial resources, the suitability, and the quality of the physical workplace environment conducive to transfer of training.

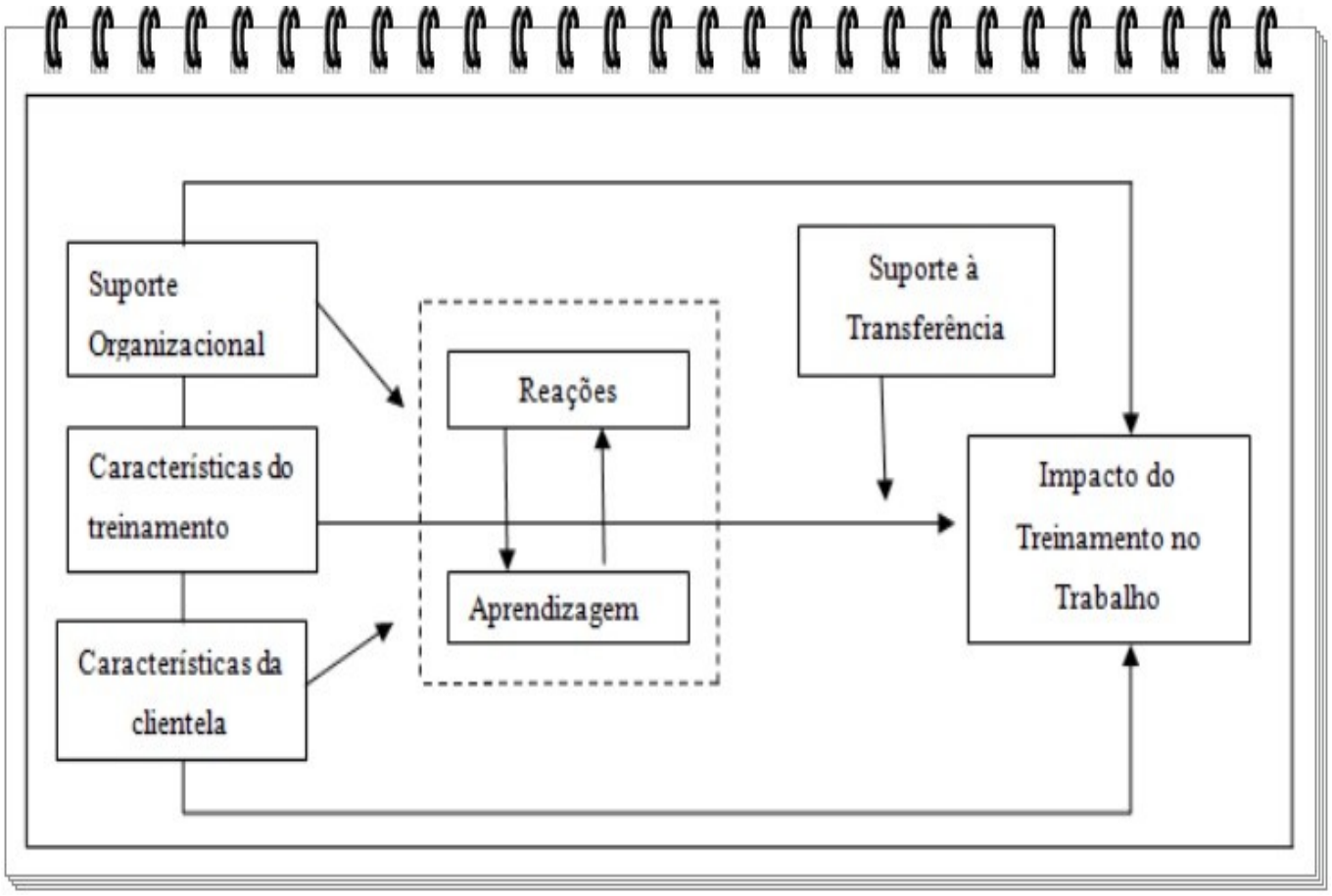

Figure 4: Training Evaluation Model (IWTIE)
Source: Abbad et al. (2012, p. 28)

Learning initiatives in the organizational environment need attention to work performance. Performance is defined as an association of behaviors that the individual presents regarding the tasks, roles, norms, organizational expectations, goals, standards of efficiency and effectiveness established.

Competent performance requires the individual to be motivated and supported by the organization. This support can be psychosocial, material, performance-related, etc. The absence of this support may make unfeasible positive effects of training.

In the impact component of training, training is evaluated about the effects produced by learning concerning performance, motivation, self-confidence, and adaptation to changes in the organizational environment.

Integrated Evaluation and Training Effectiveness Model – IETE

According to Andrade (2006) and Gonçalves and Mourão (2011) the model created by Alvarez, Salas, and Garofano in 2004, measures four levels of assessment: the needs analysis (subdivided into content and training project); changes in participants and organizational demands; the reactions; the transfer and the results. Alvarez, Salas, and Garofano (2004) differentiate the concepts related to training evaluation and effectiveness. Regarding the training evaluation, the measures found were cognitive learning, training performance and learning transfer performance. Regarding effectiveness, the identified factors were: self-efficacy, pre-training, experience, orientation for post-training application, learning principles and post-training interventions.

2.6 The Impact of Training at Work

For Abbad et al. (2006) the impact of job training concerns job behavior, analyzed by Kirkpatrick (1976) and Hamblin (1978). To assess the transfer of knowledge received by the individual after learning events, the individual needs to be motivated as well as have a favorable environment for the application of what they have learned.

Pilati and Abbad (2005) analyzed concepts related to the consequences of training at work (Figure 5). According to the authors, the acquisition refers to the initial stages of the learning process that is related to the central and immediate result of the training in the individual, being a condition for the others. It is the evaluation of a basic process of apprehension of knowledge, skills, and attitudes, developed in learning and not a result of training.

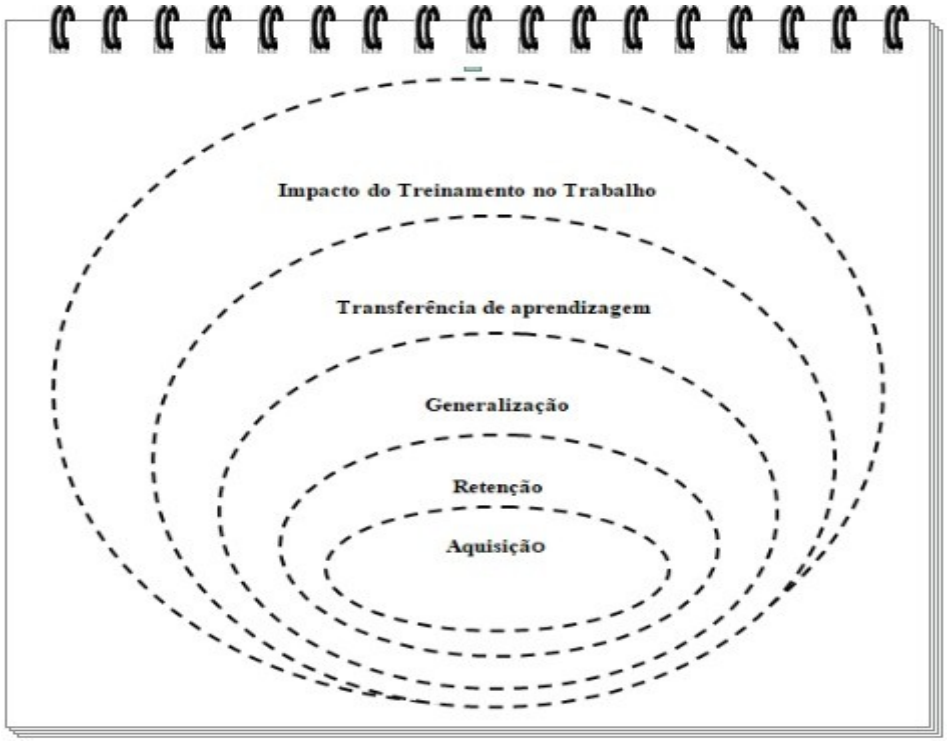

Figure 5: Conceptual Impact Model of Work Training
Source: Pilati and Abbad (2005, p. 44)

Retention is the long-term storage of knowledge in the individual's memory that can be reactivated at the desired time. For some authors, the long term period can be considered in terms of minutes or hours. In contrast, other authors evaluate the time frame in terms of days, months or years after training.

Generalization refers to the degree to which behaviors acquired in training are exposed and applied to different situations in the workplace. This concept can be measured with tests, checking if the trained professional can solve problems similar to those experienced in training.

Learning Transfer is the effective application of the knowledge, skills, and attitudes obtained in training at work.

The impact can be measured in depth and amplitude. Depth Impact measures the training effects related to the content delivered at the training event. Amplitude Impact measures the effects of training on the overall performance of the organization. The Impact of training at work is the influence that the training event has on the training participant's overall performance, attitudes and motivation.

3. CGDP Profile and IFAM Procedures

Under Resolution No. 2 of March 22, 2011, which provides for the IFAM Rules of Procedure, in its Article 91, the General Coordination of People Development (CGDP) has among its objectives: to plan, coordinate, and evaluate actions that promote the development and improvement of the server, as well as elaborate the Institute's Annual Training Plan.

At the time the study was conducted, the CGDP adopted in its daily routines the following procedures to enable training requests:

Phase 1: Servers submit their requests by the formal document to attend CDGP training or training events, with the consent of their immediate superiors.

The choice of the course is the initiative of the server, which attaches to the request the basic information about the training event such as folders related to the desired course and proof of registration.

Phase 2: The evaluation of the request is made from some procedures such as analysis of the adequacy of the requested course, the position, and sector in which the requesting server is full.

If not, the request will be rejected, the server manager is verbally notified and the request is filed.

If this first evaluation is favorable, it is verified if the server has already participated in a similar course or even if he has already given up on his initiative of some training event. If so, your request will be rejected, the server manager is verbally communicated, and the request is filed.

After this step the coordinator will make the indispensable consultation to the Unified Supplier Registration System (SICAF), to verify if the company that will promote the training has federal, state and municipal tax regularity, economic and financial qualification. If there is any irregularity the coordinator will reject the request, informing the chief and filing the process.

Phase 3: Once the company is regularized, the request will be sent to PROAD for verification of financial allocation for the payment of daily and tickets, if there is no possibility of training to be given in Manaus. Besides, the financial endowment may also include the payment of registration for the training event.

Phase 4: If you do not have a financial endowment, PROAD will reject the request, notify the head of the server, and file the request.

If so, you will check which company will teach the course. In the case of a private company, it will request the legal opinion of the IFAM Attorney's Office, regarding the unenforceability of bidding for training.

Such consent is a requirement of the General Secretariat of the Union so that the Institute proceeds to release the funds for the event. For Public Schools, the application will be approved without bureaucracy.

4. Methodology

The research generated a master's dissertation in 2013, has an applied, descriptive nature and is a case study, which Yin (2001) classifies as an empirical analysis that investigates a current phenomenon of real life. The study was conducted in 2012 and 2013, with a combined approach to interpret the chosen variables. To achieve the objectives, the study was divided into the following steps (Chart 3) where steps as below:

Etapas da pesquisa	Período inicial	Período final
Levantamento bibliográfico	05.02.12	15.05.12
Planejamento da pesquisa	11.04.12	17.09.12
Coleta de dados	04.11.12	27.12.12
Apuração e digitação dos dados	10.01.13	20.02.13
Análise e discussão dos resultados	25.02.13	15.04.13
Proposta do modelo	20.04.13	02.05.13
Considerações finais	05.05.13	10.05.13
Elaboração dissertação	11.05.13	21.06.13
Defesa da dissertação	24.07.13	24.07.13
Melhorias da dissertação	25.07.13	22.08.13
Impressão final	30.08.13	30.08.13

Chart 3: Research Steps

Source: Author

In the bibliographic survey, nine models applied to the training were identified. Among them, the most interesting for this research were: Kirkpatrick generic models, proposed in 1976 and perfected by Hamblim in 1978, the Integrated and Summative Integrated Assessment Model (SIAM), created by Andrade in 1982, as well as the Integrated Workplace Training Impact Evaluate Model (IWTIE), prepared by Castro (1999).

For the construction of the data collection instrument (Questionnaire), some requirements of the referred models were considered adequate for the research, such as Impact on the Behavior in the Position, Learning, Performance, Support to the Transfer of Learning and the Job.

The questionnaire had 4 parts: the first consisted of 25 questions, organized into 5 requirement groups with 5 items each, to measure the impact of training on:

1.1) Behavior in office: measure changes in conduct and procedures based on the application of the information learned, detecting them through interviews and self-assessment (Kirkpatrick and Hamblim model);

1.2) Learning: an assessment of knowledge before and after the event through knowledge testing and interviews (IWTIE Model);

1.3) Performance: the set of behaviors that the individual presents about the tasks, roles, norms, organizational expectations, goals, established efficiency and effectiveness standards (PLUS Model);

1.4) Support for learning transfer: analyzes the support provided to the trainee to apply the newly acquired skills (IWTIE Model);

1.5) Impact at work: assesses the effects produced by learning concerning performance, motivation, self-confidence, and adaptation to changes in the organizational environment (IWTIE Model).

For this block of questions, for each statement, respondents used the Likert Scale: 1-2 = Strongly Disagree; 3-4 = Disagree; 5-6 = Neither Agree nor Disagree; 7-8 = Agree; 9-10 = Strongly Agree.

The second section contained an open-ended question to identify the main difficulties for administrative technicians to participate in IFAM-funded training;

The third section consisted of a list of courses funded by IFAM in 2010 and 2011 to assess their effectiveness in the trainee's view from the following Likert scale: 1-2 = Not Effective; 3-4 = Ineffective; 5-6 = Regular; 7-8 = Effective; 9-10 = Very effective; DK = Don't know; NAC = Not Attended the Course;

The fourth and last section comprised the personal data of the servers.

At IFAM, in 2010, it was found that 35 administrative technicians participated in the training. Of which 16 servers took new courses the following year. However, it is noteworthy that a rectory servant left the analysis for not accepting to be part of the research, making a total of 34 technicians that year. In 2011, it was found that about 8 technicians were the first participants in the courses funded by IFAM/CGDP, making a total of 42 technical-administrative staff.

At this stage of the study, to test the data collection instrument, a pilot test was performed to verify the comprehensibility and reliability of the questions, thus avoiding ambiguous, superfluous questions, or those that need complementing. (MARCONI AND LAKATOS, 2007).

The pilot test was performed with 4 IFAM / CMC servers (10% of the population), from November 4th to 11th, 2012, and no changes were required.

However, at this moment the need to insert 15 chiefs of technicians was identified, to know also the managers' opinion regarding the impact of training on their subordinates, measuring the existence of significant differences or not, between the perceptions of the respondents. So, the survey focused on 42 technical-administrative and 15 chiefs, totaling a sample of 57 employees.

The collection instrument was then applied in its entirety during the period from November 5 to December 27, 2012, and all participants answered correctly.

The Cronbach's Alpha Coefficient (2004), presented by Lee J. Cronbach in 1951, adopted as one of the

reliability estimates for questionnaires applied to research (OLIVEIRA, 2010) was used to analyze the instrument.

Applying the Cronbach's alpha coefficient to the answers of the administrative technicians generally obtained the coefficient of 0.97 and with the managers, the coefficient was 0.98 (Table 1). Thus, it was found that the level of responses mostly has a very high coefficient index, which is quite satisfactory.

It was found that about technicians and managers, the highest consistency of the questionnaire was about performance. It was observed that one of the requirements (impact of training at work) obtained the same reliability estimate between the groups (0.90).

Table 1: Cronbach's Alpha Coefficient applied to the responses of 42 Technicians and 15 Chiefs

Requisitos	Técnicos	Chefias
Total geral do questionário	**0,97**	**0,98**
Comportamento no Cargo	0,89	**0,93**
Aprendizagem	0,86	**0,97**
Desempenho	**0,91**	**0,98**
Suporte à Transferência da Aprendizagem	0,88	0,90
Impacto do treinamento no trabalho	**0,90**	**0,90**

Source Author

5. Results

The analysis and discussion of the results took place from February 25 to April 15, 2013, and were organized according to the topics: 5.1) server profile and 5.2) training impact.

5.1 Respondent's profile

Regarding gender, of the 42 respondents classified as administrative technicians, it was found that 59% are male, while 41% female. Regarding the 15 chiefs, the predominance was male (64%), to 36% female.

Regarding age, the respondents were between 25 and 70 years old. In general, the age of the technicians was higher between 26 and 40 years, while the heads had higher incidence from the 41 years.

Regarding the training of technicians and managers, the level of education varied from high school to doctorate level. It was noticed that among the administrative technicians the greatest incidence was in the formation of specialists, coinciding with the chiefs.

Regarding the length of service at IFAM/CMC, it was observed that among technical and administrative staff, the highest incidence occurred at 10 years, while in the case of senior management, the highest incidence of admissions to the Institute was over 20 years.

5.2 Overall Impact of Training

The overall impact assessment was based on data obtained from the 57 (42 technicians and 15 supervisors) participating in the study, adopting the Likert Scale: 1-2 = Strongly Disagree; 3-4 = Disagree; 5-6 = Neither Agree nor Disagree; 7-8 = Agree; 9-10 = Strongly Agree.

For the analysis, we used the mean value and standard deviation of the variables, comparing the perceptions of the two groups.

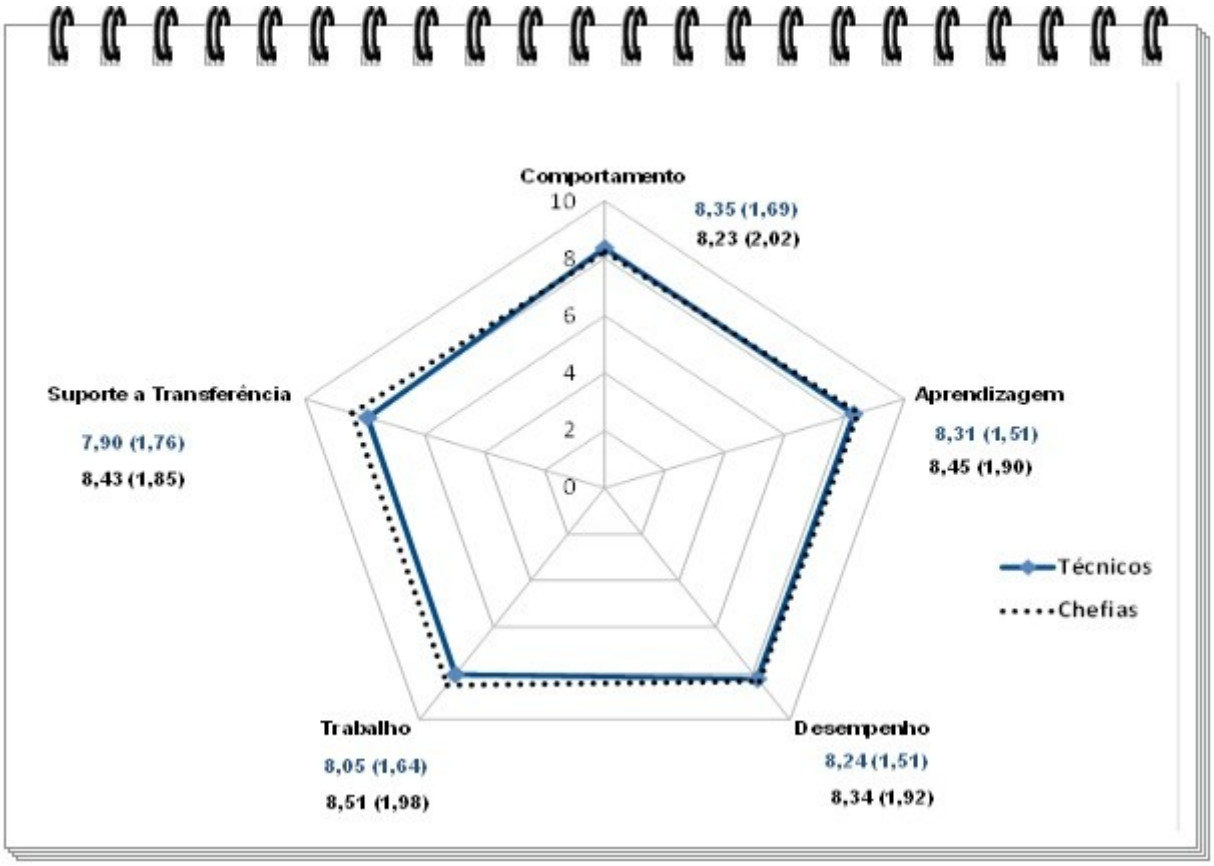

Figure 6: Technicians and chiefs' perceptions of the overall impact of training (2010 and 2011))
Source: Author

Figure 6 shows that there is no significant difference in the average perception of Technicians (full blue line) and leadership (black dotted line) on the overall impact of training conducted in 2010 and 2011. Overall, the technicians' opinions showed a less dispersion in the responses, which may demonstrate a uniform tendency of their opinion.

The requirement most evaluated by the administrative technicians was the Impact on Job Behavior (X = 8.35; S = 1.69) indicating that for technicians, training is important to bring about changes in their daily activities with quality.

Leaders chose to better assess the Impact of Workplace Training requirement (X = 8.51; S = 1.98). The managers' opinion regarding the analyzed requirement demonstrated that the training enables the servers to increase self-confidence and greater investment in self-development.

On the other hand, the requirement that obtained the lowest evaluation by the technical-administrative analysis was related to Learning Transfer Support (X = 7.90 and S = 1.76), indicating that knowledge sharing should be better structured through adequate equipment, time availability and other aspects to be reviewed. For managers, the Impact of Training on Behavior in Position obtained the lowest overall average (X = 8.23; S = 2.02).

Freitas (2004) defines the above requirement as improvements in the performance of trainees in the workplace considering the course participant's behavior, before and after undergoing training, because of applying the knowledge acquired in training.

Pantoja et al. (2001) points out that the desired result after training is not just about the completion of the course, but acquiring and developing new knowledge, as well as presenting a new behavior that proves the effectiveness of learning.

The dimensions well evaluated in the opinion of the technicians were respectively: job behavior, learning, performance, work impact and transfer support. On the other hand, the managers presented a slightly different order: impact on work, learning, transfer support, performance and job behavior.

5.2.1 Impact of Training on Job Behavior

This section presents an analysis of the impact of training on each requirement investigated. To perform this evaluation, the data provided by the respondents were organized into two groups (technicians and managers), and for each item evaluated the differences between the frequencies related to the level of agreement were found, determining the largest and the smallest impact of the training.

The first requirement studied dealt with the impact of training on job behavior (Chart 4) consisting of meeting demands, commitment to the work team, operationalization of tasks, compliance with standards and importance of the job in the company's development.

The results of this analysis showed that there are some disagreements regarding the positioning of the groups about the requirement. The biggest divergence (19.05% difference) was concerning the importance of the position in the development of the company, where the technicians had a slightly less favorable view than the chiefs, assuming that the subordinates still need a better understanding. the contribution of the exercise of the position in organizational development.

It was noted that compliance with the rules presented the second major disagreement (16.66%), demonstrating that their internalization in the daily practices of the servants is indispensable, which can be achieved through training and recognition over time.

The item with the lowest disparity (0.03%) in the answers was satisfying the demands, indicating that participation in training can have a positive impact on the interaction of the work environment and the improvement of the service provided.

According to Gonçalves and Mourão (2011), the impact on job behavior level focuses on the result of training on the performance of the trainee in the context of work. It is the first visible indicator of results for professionals who are not directly involved in T&D (Development Training) actions. For the authors, this requirement can be explained as the acquisition and application of expected attitudes at work.

Itens	Avaliadores Técnicos (42) Chefias (15)	Concordo ou Concordo totalmente (%)	Diferenças nas avaliações (%)	Não concordo Nem discordo (%)	Discordo ou Discordo totalmente (%)
Atendimento às demandas	Técnico	90,50	0,03	4,80	4,80
	Chefia	90,47		4,76	4,80
Comprometimento com a equipe de trabalho	Técnico	90,47	7,14	7,14	2,39
	Chefia	97,61		-	2,40
Operacionalização das tarefas	Técnico	90,47	2,38	2,39	7,14
	Chefia	92,85		4,76	2,40
Cumprimento das normas	Técnico	80,95	16,66	14,29	4,76
	Chefia	97,61		-	2,40
Importância do cargo no desenvolvimento da empresa	Técnico	73,80	19,05	23,81	2,39
	Chefia	92,85		2,40	4,76

Chart 4: Impact of Training on Job Behavior
Source: Author

5.2.2 Impact of Training on Learning

The second requirement assessed was the impact of training on learning (Chart 5) consisting of motivation to apply knowledge, results of professional practice, the practice of skills acquired tools for improving the quality of service and more positive attitudes at work.

In general, the technicians evaluated the items showing agreement around 84% in most items. Contrary to the opinion of the managers, it was quite satisfactory in their evaluation, with a favorability of around 95% of agreement. Thus, there were divergences between the opinions of the respondents that should be highlighted.

The most relevant disagreement was regarding the most positive attitudes at work (19.04%), with only 76% of the technicians agreeing that the learning acquired in the courses develop this behavior. In contrast, about 90% of managers admitted the existence of such conduct to their subordinates. The other important disagreement (11.90%) was regarding the tools to improve service quality.

The item with the lowest difference in respondents' perception was related to the motivation to apply knowledge, indicating that after training, which is why managers need to create strategies for applying knowledge in daily work activities, right after the training.

Itens	Avaliadores Técnicos (42) Chefias (15)	Concordo ou Concordo totalmente (%)	Diferenças nas avaliações (%)	Não concordo Nem discordo (%)	Discordo ou Discordo totalmente (%)
Motivação para aplicar os conhecimentos	Técnico	88,16	7,07	11,90	-
	Chefia	95,23		2,40	2,40
Resultados da atuação profissional	Técnico	88,09	7,11	11,91	-
	Chefia	95,20		2,40	2,40
Prática das habilidades adquiridas	Técnico	85,72	9,51	14,28	-
	Chefia	95,23		-	4,77
Ferramenta para melhoria da qualidade do serviço	Técnico	83,33	11,90	14,28	2,39
	Chefia	95,23		2,40	2,40
Atitudes mais positivas no trabalho	Técnico	76,19	19,04	21,43	2,39
	Chefia	95,23		2,40	2,40

Chart 5: Impact of Training on Learning
Source: Author

5.2.3 Impact of Training on Performance

The third requirement assessed regarding the impact of training was performance (Chart 6) consisting of: motivation in professional performance, increased suggestions for improvement, better use of resources, problem-solving initiative, and improved service punctuality.

The major disagreement detected refers to the improvement of punctuality in services (14.25%), in which the view of managers was slightly more optimistic than that of TAEs.

For Parolin and Albuquerque (2011), organizational performance is of high relevance, and employees must be fully convinced of what results the company expects from each other.

The other divergence presented (13.25%) was about the problem-solving initiative, in which the opinion of the technicians presented a lower percentage of agreement than that of the managers.

The internalization of performance-related values contributed to the fact that the improvement in professional performance was the item best evaluated or with less variation in the responses of the groups.

The results showed that the impact of the most significant training on the performance of TAE's was on improving professional performance and increasing suggestions for improvement.

This result may point to the need for the training system to be allied with the organization's process improvement system.

Itens	Avaliadores Técnicos (42) Chefias (15)	Concordo ou Concordo totalmente (%)	Diferenças nas avaliações (%)	Não concordo Nem discordo (%)	Discordo ou Discordo totalmente (%)
Melhoria no desempenho profissional	Técnico	95,24	0,04	4,76	-
	Chefia	95,20		2,40	2,40
Aumento de sugestões de melhorias	Técnico	92,86	2,34	7,14	-
	Chefia	95,20		2,40	2,40
Melhor utilização dos recursos	Técnico	83,34	11,86	16,66	-
	Chefia	95,20		2,40	2,40
Iniciativa para solucionar problemas	Técnico	81,95	13,25	18,05	-
	Chefia	95,20		2,40	2,40
Aperfeiçoamento da pontualidade nos serviços	Técnico	80,95	14,25	19,05	-
	Chefia	95,20		2,40	2,40

Chart 6: Impact of Training on Performance
Source: Author

5.2.4 Impact of Training at Work

The fourth requirement assessed was the impact of training at work (Chart 7) consisting of the following: increased self-confidence in performing tasks, investment in self-development, responsiveness to work changes, professional motivation and interpersonal relationships at work.

This requirement presented one item with the highest disagreement between the perceptions of the technicians and the manager, regarding the ability of the training to have an impact on the interpersonal relationship of the administrative technicians (28.58% difference), and further research is needed to check in more detail the real causes of this difference of opinion.

Another difference of perception (18.86%) occurred with the item receptivity to changes in work, in which the chiefs are more optimistic than the TAE's.

Investment in self-development and professional motivation were the smallest, respectively, with equal percentages of 7.14% and 7.21%, meaning that there is considerable agreement that training could provide a willingness to invest in improvements that add value to the server's personal development.

It is worth noting here that the Impact of Training at Work is defined as the indirect influence exerted by training or instructional action on the integral performance, attitudes, and motivation of training event participants. This magnitude is fundamental, which presupposes that training spreads in different aspects of people's work (PILATI; ABBAD, 2005).

Itens	Avaliadores Técnicos (42) Chefias (15)	Concordo ou Concordo totalmente (%)	Diferenças nas Avaliações (%)	Não concordo Nem discordo (%)	Discordo ou Discordo totalmente (%)
Aumento da autoconfiança na execução das tarefas	Técnico	88,09	9,51	11,91	-
	Chefia	97,60		-	2,40
Investimento no autodesenvolvimento	Técnico	80,96	7,14	19,04	-
	Chefia	88,10		9,52	2,40
Motivação profissional	Técnico	78,57	7,21	19,05	2,38
	Chefia	85,72		9,52	4,76
Receptividade às mudanças no trabalho	Técnico	76,38	18,86	23,82	-
	Chefia	95,24		-	4,76
Relacionamento interpessoal no trabalho	Técnico	64,28	28,58	35,72	-
	Chefia	92,86		7,14	-

Chart 7: Impact of Training at Work
Source: Author

5.2.5 Impact of Training on Learning Transfer Support

The fifth requirement assessed for the impact of training was support for learning transfer (Chart 8) consisting of improved knowledge exchange, improved communication with colleagues, improved communication with management, the information needed for the execution of tasks and availability of equipment for knowledge transfer.

The availability of equipment in knowledge transfer was the second item with the largest perception difference between the manager and the technicians, reaching 23.81% points of difference.

The other divergence between the answers referred to the information necessary for the execution of the tasks, in which the technicians differed from the chiefs by 18.99%, suggesting that the support regarding the transfer of instructions to perform tasks is still precarious and needs to be further discussed;

The smallest discrepancy (7.15%) was regarding the improvement of knowledge exchange, indicating that in the opinion of the technicians and chiefs this assumption is generated through training.

According to Abbad et al. (2012) have correlations between support and impact, suggesting that the transfer of learning is, in part, due to the support that the organization (chiefs and colleagues) offers the trainee to apply new knowledge in the workplace.

Itens	Avaliadores Técnicos (42) Chefias (15)	Concordo ou Concordo totalmente (%)	Diferenças nas avaliações (%)	Não concordo Nem discordo (%)	Discordo ou Discordo totalmente (%)
Melhoria na troca de conhecimentos	Técnico	85,71	7,15	14,29	-
	Chefia	92,86		2,40	4,76
Melhoria da comunicação com os colegas	Técnico	83,34	11,90	16,66	-
	Chefia	95,24		-	4,76
Melhoria da comunicação com a chefia	Técnico	80,95	14,25	16,66	2,39
	Chefia	95,20		2,40	2,40
Informações necessárias para execução das tarefas	Técnico	78,62	18,99	21,43	-
	Chefia	97,61		-	2,40
Disponibilidade de equipamentos na transferência do conhecimento	Técnico	66,67	23,81	30,95	2,38
	Chefia	90,48		4,76	4,76

Chart 8: Impact of Training on Learning Transfer Support
Source: Author

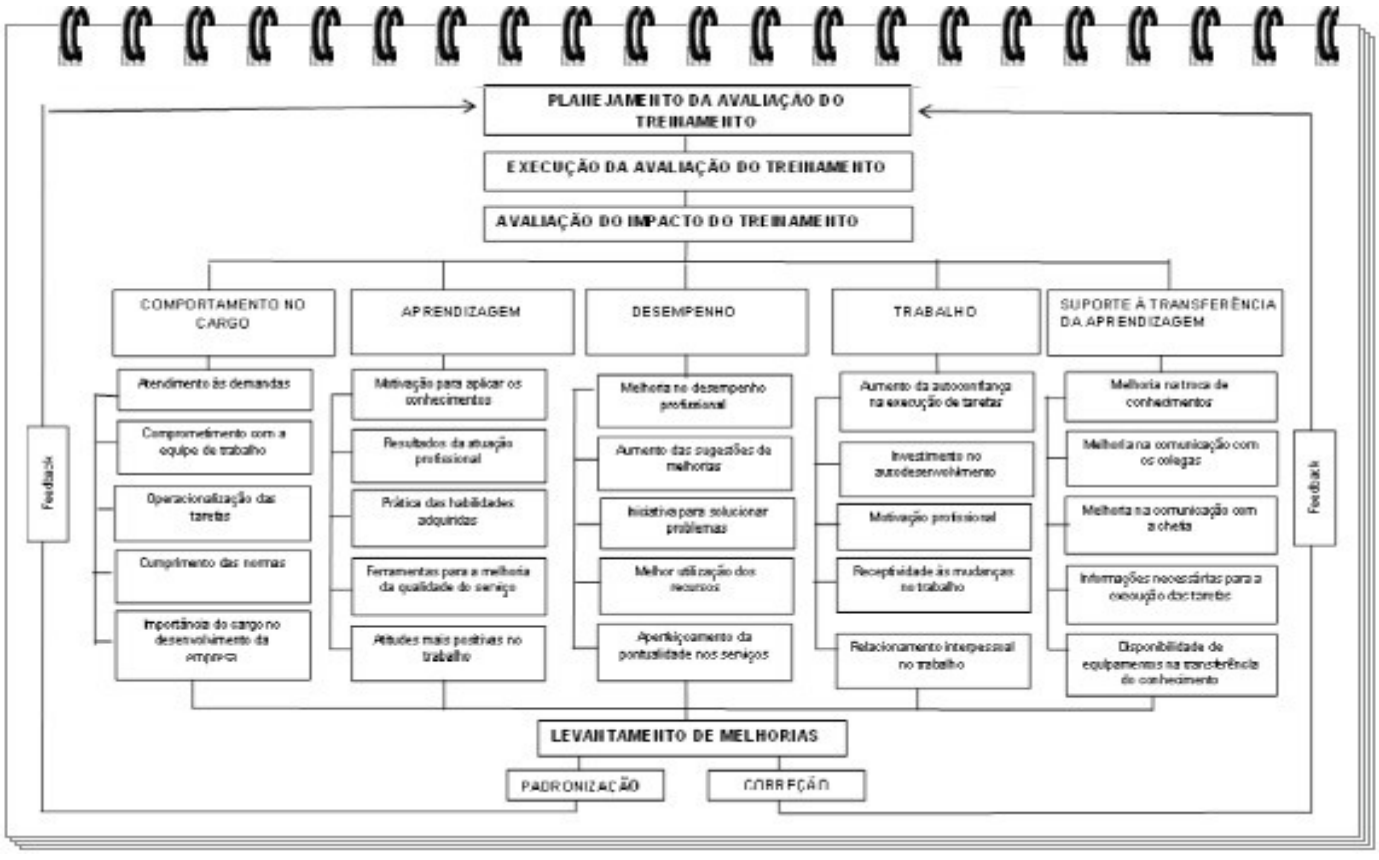

Figura 7: Proposed IFAM Training Impact Evaluate Model
Source: Author

6. Model Proposed

After reviewing the literature and analyzing the results, it was possible to construct a model (Figure 7) to verify the impact of IFAM-funded training.

The model is conceptual and was called the "IFAM Training Impact Evaluate Model" which was built from the TAE's point of view.

The analysis of the technicians considered that the requirements that contributed most to the impact of training, respectively, were related to job behavior, learning, performance, work and learning transfer support.

The operating phases of the model have been adapted to meet the stages of the PDCA organizational learning cycle (Plan, Execute, Check, and Act), a quality-oriented continuous improvement cycle.

According to Kemczinski et al. (2001), in planning (plan) the training needs, the target audience, the didactic and pedagogical strategies, the standards and procedures and the way of knowledge transfer are defined. In (do) execution, processes shall be executed according to established standards. The check allows the verification of the application of the determined standards through process quality control items, where trainee reaction evaluations will be made in various aspects of the training. The last step is the action in which the faults are repaired by identifying the necessary changes and revisions.

Currently, CGDP performs some procedures to meet the training demand requested by the servers. For the proposed model to be implemented effectively, the following steps are recommended: training evaluation planning, training evaluation execution, training impact assessment and improvement survey.

6.1 Step 1: Training Evaluate Planning

In the proposed model, the planning for the training impact assessment was composed of the following actions:

a) Elaboration of the Annual Training Plan containing in its structure: thematic axes, competences, course duration, capacity building and estimated public and investment, which can be done at the beginning of the year to map all the training needs of the servers.

b) Workshop with the servers to identify training demands;

c) Forming partnerships with government schools, corporate universities, public and private institutions;

d) Survey of human and financial resources for the execution of the Training Plan;

e) Survey with the training providers about the courses that will be offered during the year;

f) Broad dissemination of course offerings to servers:

g) Identification of the strategies that will be used for the reception and release of course demands;

h) Preparation of a schedule with the consent of the managers, to enable the completion of the intended courses seeking to address the needs of the sectors;

i) Disclosure of the training to the selected servers;

6.2 Step 2: Perform Training Evaluation

a) Follow the guidelines contained in the Annual Training Plan;

b) Monitor the training of the server with the service provider;

c) Inform the server of the need for post-training evaluation to identify its impact on the work environment;

6.3 Step 3: Training Impact Evaluation

a) Conducting quarterly evaluation, based on Salorenzo's (2000) training evaluation model, to confirm improvement in productivity and work performance. This can be verified through questionnaires, reports, interviews or self-assessment of results focusing on changes in participant performance that contributed to the improvement of the organizational environment.

b) Consider the requirements and items analyzed in the research that address issues of the impact of training on job behavior, learning, performance, transfer and job support.

6.4 Survey of Improvements

a) Correction of actions

In the survey of improvements will be identified possible failures occurred in the training process to overcome them through sharing, discussion of results with managers and servers involved in training programs through meetings, workshops, and workshop; identification of training effectiveness, and a scale can be established to evaluate the course average according to the trainee's opinion.

Deficiencies or nonconformities should be corrected and systematically reported to training planners and training providers for improvement.

b) Standardization and dissemination of good practice

Best practices should be documented for standardization purposes and then communicated to course planning managers and training providers. These good practices should be disseminated to the managers and executors involved.

After the completion of the steps for the operation of the model, the process feedback should be made through constant feedback to the responsible managers and other decision-makers. In this sense, it is important to develop a good communication system between the parties involved.

7. Final Considerations

The research aimed to develop a model to assess the impact of training provided to the active administrative technicians of IFAM/CMC and Rectory in 2010 and 2011. To this end, nine training evaluation models were studied, which allowed the development and application of a questionnaire with 42 technicians and 15 managers. In this sense, it was identified that the most appropriate models to reach the objectives were the classic models of Kirkpatrick (1976), perfected by Hamblin (1978), the Summative Integrated Assessment Model (SIAM), built by Andrade (1982), the Integrated Model for the Assessment of the Impact of Training at Work, elaborated by Castro (1999).

After analyzing the results, the main conclusions were:

First) The questionnaire tested with 42 servers and 15 managers is considered reliable;

Second) From the overall requirements analysis, the overall average of the responses showed no relevant differences. However, by doing the individual analysis of the items of each requirement, it was possible

to verify the existence of some differences in the evaluations, especially in the items: interpersonal relationship at work, availability of equipment in the knowledge transfer, the importance of the position in the company's development. , more positive attitudes at work and responsiveness to changes at work. On the other hand, there was good alignment of perception between managers and technicians about the impact of training on meeting demands, improvement in professional performance, operationalization of tasks, increased suggestions for improvement and motivation to apply knowledge;

Third) the evaluation of the managers was more positive than that of the technicians. This result may provoke attitudes favorable to training events, allowing greater commitment of managers in the implementation of the structure necessary for the dissemination of learning, since the impact of training on work and learning was the best evaluated by managers;

Fourth) the model proposal can serve for managers to assess the impact of training on IFAM over time. It is noteworthy that the proposal was generated based on the opinions of the servers, based on the impact of training on their personal and professional development. Due to the scarcity of time, the model was not tested to verify its effectiveness.

Fifth) the research identified the difficulties pointed out by the technicians to participate in training funded by the Institute. The main issues were the offer of training and the release for these events. Such difficulties can be overcome by conducting training allied to the strategic objectives of the organization.

7.1 Suggestions for the Model Improvement

To deepen the reflection on the theme, it is recommended:

a) expand the participation of the research population including teachers;

b) review and approve the model with the managers responsible for the personal and professional development of the IFAM/CMC servers;

c) use training evaluation measures that enable the identification of the return to the institution of the results presented in the activities of the employees, as well as in the financial level;

d) the continuation of a continuous evaluation process on the execution of the plan, with the effective participation of the segments involved in the training process of the Institute;

e) wide dissemination of the offer of training events for IFAM employees;

f) encouraging the participation of on the job training to reach the largest number of servers.

7.2 Research Limitations and Suggested Further Studies

The limitations of the study concern:

a) the model cannot be applied due to the scarcity of time;

b) the small size of the population, due to the low participation of technicians in training events in 2010 and 2011;

c) use of only one source of information about the training needs provided by the server itself; isolated training, making the number of courses taken individually disproportionate since a small portion of the technicians were part of two or more courses;

d) lack of organizational documents reporting the history of training at the Institute, which could enrich the research;

e) about the model steps proposed in the research, in the improvement survey phase, it would be necessary to have evaluated the variables that can be standardized or corrected, which is important in all phases of the model, to avoid failures in the training process.

As suggestions for further studies, we propose the development of more comprehensive methods of performance evaluation in the organizational environment, involving psychology specialists, to perform more accurate monitoring of the server after training.

8. Acknowldgments

We would like to thank the 57 IFAM employees for their support and answers, as well as Doctor Elaine Ferreira for her contributions during the UFAM Industrial Engineering Master Course Examining Board when the dissertation was defended in 2013.

9. References

[1] ABBAD, G. S. Um modelo integrado de avaliação de impacto de treinamento no trabalho–IMPACT. Brasília, DF. Tese de Doutorado em Psicologia, Universidade de Brasília, 1999. Disponível em <http://portal2.tcu.gov.br/portal/page/portal/TCU/comunidades/educação_corporativa/avaliação_eventos/tese_gardenia.pdf>. Acessado em 15 de julho de 2012.

[2] ABBAD, G. S.; LACERDA, E. R. M. Impacto do treinamento no trabalho: Investigando variáveis motivacionais e organizacionais com seus preditoras. Revista de Administração Contemporânea, Curitiba, v. 7, n. 4, p. 77-96, out./dez. 2003. Disponível em<http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1415-65552003000400005>. Acessado em 10 de julho de 2012.

[3] ABBAD, G. S.; ZERBINI, T., CARVALHO, R. S., MENEZES, P. P. M. Planejamento instrucional em TD&E. In: ANDRADE, B. J. E.;ABBAD, G. S.; MOURÃO, L. e colaboradores. Treinamento, Desenvolvimento e Educação em Organizações e Trabalho: fundamentos para a gestão de pessoas. São Paulo: Artmed, 2006. cap. 15, p. 289-321.

[4] ABBAD, G. S.; MOURÃO, L.; MENESES, P. P. M.; ZERBINI, T.; BORGE-ANDRADE, J. E.; VILAS-BOAS, R. (Orgs). Medidas de Avaliação de Treinamento, Desenvolvimento e Educação: ferramentas para Gestão de Pessoas. Porto Alegre: Artmed, 2012.

[5] ALVAREZ, K.; SALAS, E.; GAROFANO, C.M. An integrated model of training evaluation and effectiveness. Sage Journals, Flórida, p. 385-416, Dec. 2004. Disponível em ANDRADE, R. J. F de; RODRIGUEZ, M. V. R. O processo de análise do retorno sobre investimento em treinamento. In: CONGRESSO NACIONAL DE EXCELÊNCIA EM GESTÃO, 5, 2009, Niterói, Anais eletrônicos... Rio de Janeiro: SRRNet-Social Responsibility Research Network, 2009. Disponível em <http://www.excelenciaemgestao.org/Portals/2/documents/cneg5/anais/T8_0117_0485.pdf.>. Acessado em 06 de abril de 2012.

[6] ASSOCIAÇÃO BRASILEIRA D E NORMAS TÉCNICAS. NBR ISO 10015 – Gestão da qualidade – diretrizes para treinamento. ABNT/CB-25/Comitê Brasileiro de Qualidade, Rio de Janeiro, RJ, 30 maio 2001. Disponível em <http://www.planningconsultoria.comresources/NBR%20ISO%2010015%20-%202001%20-%20Diretrizes%20para% 20Treinamento%5B1%5D.pdf.>. Acessado em 11 de agosto de 2012.

[7] AXONS, A. J. D. Best practices in planning and performance management- Radically Rethinking Management for a volatile word. 3th ed. New Jersey: John Wiley &Sons, 2010.

[8] BARZAGAR, N.; FARJAD, S. A study on the impact of on the job training courses on de staff performance (a case study). Procedia – Social and Behavioral Sciences, Iran, v. 29, p. 1942-1949, 2011. Disponível em <http://www.sceicedirfect.com.scienc /article/pii/S1877042811029119>. Acessado em 07 de abril de 2012.

[9] BIO, S. B. Sistemas de Informação: em enfoque gerencial. São Paulo: Atlas, 1996.

[10] ANDRADE, B. J. E. Por uma competência técnica nos treinamentos. Psicologia, Ciência e Profissão, Brasília, v. 6, n. 2, p. 9-17, 1986. Disponível em <http://dx.doi.org/_10.1590/S1414-98931986000200004>. Acessado em 05 de maio de 2012.

[11] ANDRADE, B. J. E. Avaliação integrada e somativa em TD&E. In: J. E. Andrade, G. S. ABBAD,

G.S.; MOURÃO, L. (Orgs.). Treinamento, desenvolvimento e educação em organizações e trabalho: fundamentos para Gestão de Pessoas. Porto Alegre: Artmed. 2006. p. 343-358.

[12] ANDRADE, B. J. E. Avaliação de TD&E In: ENAP. Palestra na 6ª reunião da Mesa-redonda de Pesquisa-Ação, 2008, Brasília. Disponível em <http://www.enap.gov.br/index.php?option=content&task=view&id=254>. Acessado em 07 de março 2012.

[13] BRANDÃO, H. P.; GUIMARÃES, T. A.; ANDRADE, B. J. E. Gestão de Competências e gestão de desempenho: tecnologias distintas ou instrumentos de um mesmo construto? Revista de Administração de Empresas, São Paulo, v. 41, n. 1, p. 8-15, jan./mar, 2001. Disponível em < http://rae.fgv.br/sites/rae.fgv.br/ files/artigos/10.1590_S0034-75902001000100002.pdf>. Acessado em 07 de março de 2012.

[14] BRASIL. Lei nº 11.892, de 29 de dezembro de 2008. Institui a Rede Federal de Educação, Profissional, Científica e Tecnológica. Diário Oficial da União, Brasília, DF, 30 dez. 2008. Disponível em <http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2008/lei/l11892.htm.>. Acessado em 02 de abril de 2012.

[15] BRASIL. Decreto nº 5.707, de 23 de fevereiro de 2006. Institui a Política e as Diretrizes para o Desenvolvimento de Pessoal. Diário Oficial da União, Brasília, DF, 24 fev. 2006. Disponível em <http://www.planalto.gov.br/ccivil_03/_Ato2004-2006/2006/Decreto/D5707.htm.>. Acessado em 02 de abril de 2012.

[16] BRASIL. Ministério do Planejamento, Orçamento e Gestão. Subsecretaria de Planejamento, Orçamento e Administração. Plano de Capacitação 2012-2015 – Brasília: MP/SPOA, 2012. Disponível em <http://www.governoeletronico.gov.br/biblioteca/>. Acessado em 20 de maio de 2012.

[17] CAMPBELL, J. P. Personnel training and development. Annual Review Psychology. Michigan, v. 22, p. 565-602, Feb. 1971. Disponível em <http://www.annualreviews.org/doi/abs/10.1146/annurev.ps.22.020171.003025>.
Acessado em 19 de março de 2012.

[18] CAMPOS, J. P.; GUIMARÃES, S. Em busca da eficácia em treinamento. São Paulo: Associação Brasileira de Treinamento e Desenvolvimento, 2009.

[19] CARVALHO, R. S. Avaliação de treinamento à distância: reação e suporte à transferência e impacto do treinamento no trabalho. Brasília, DF. Dissertação de Mestrado em Psicologia Social e do Trabalho. Instituto de Psicologia da Universidade de Brasília, 2003. Disponível em <repositorio.unb.br/handle/10482/1286>. Acessado em 10 de junho de 2012.

[20] CASTRO, G.A.O. Um modelo integrado de avaliação do impacto do treinamento no trabalho – IMPACT. Brasília: UNB/IP, 1999. Tese de Doutorado.

[21] CERTO, S. C.; PETER, J. P.; MARCONDES R. C.; CESAR, A. M. R. Administração estratégica: planejamento e implantação da estratégia. 2. ed. São Paulo: Pearson Education do Brasil, 2005.

[22] COSTA, R. S.; JARDIM, E. G.M. As cinco principais dimensões do diagnóstico operacional. Net, Rio de Janeiro, 2010. Disponível em <http://trilhaprojetos.com.br/home/sites/default/files/cincodim.pdf>. Acessado em 10 de janeiro de 2012.

[22] CRONBACH, L. J. My Current Thoughts on Coefficient Alpha and Successor Procedures. Sage Journals, Los Angeles, p. 391-418, June 2004. Disponível em

<http://epm.sagepub.com/content/64/3/391. full.pdf+html>. Acessado em 25 de junho de 2012.

[23] DAFT, R. L. Teoria e Projetos das Organizações. 6. ed. Rio de Janeiro: LTC, 1999.

[24] FILHO, A. D. M. Modelo relacional entre modernização organizacional, práticas inovadoras de treinamento e satisfação no trabalho. Belo Horizonte, MG. Tese de Doutorado em Administração, Universidade Federal de Minas Gerais-UFMG, 2004. Disponível em <http://antiga.cppd.ufsc.br/capacitacao/MODELO_RELACIONAL_ENTRE_MODERNIZACAO.pdf.> Acessado em 08 de junho de 2012.

[25] FLEURY, M. T. L. A gestão de competência e a estratégia organizacional, In: FLEURY, M.T. (Coord.). As Pessoas na Organização. São Paulo: Gente, 2002.

[26] FREITAS, I. A.; Andrade, J. E. Efeitos de treinamento nos desempenhos individual e organizacional. Revista de Administração de Empresas, São Paulo, v. 44, n. 3, p. 44-56, julho/set. 2004. Disponível em <http://repositorio.unb.br/bitstream/10482/6069/1/EfeitosTreinamentoDesempenhos.pdf.> Acessado em 06 de abril de 2013.

[27] FREITAS, I. A.; BRANDÃO, H. P. Trilhas de aprendizagem como estratégia para desenvolvimento de competências. In: ENCONTRO DA ASSOCIAÇÃO NAICONAL DE PÓS-GRADUAÇÃO E PESQUISA EM ADMINISTRAÇÃO–EnANPAD, 29., 2005, Brasília. Anais eletrônicos... Brasília: ANPAD, 2005. Disponível em <www.anpad.org.br/diversos/trabalhos/EnANPAD/.../GPRA316.pdf >. Acessado em 07 de fevereiro de 2013.

[28] GIL, A. C. Gestão de Pessoas: enfoque nos papéis profissionais. 1.ed. São Paulo: Atlas, 2006.

[29] GONÇALVES, A.; MOURÃO, L. A expectativa em relação ao treinamento influencia o impacto das ações de capacitação? Revista de Administração Pública, ISSN 0034-7612, Rio de Janeiro, v. 45, n. 2, p. 483-513, mar./abr. 2011. Disponível em <http://dx.doi.org/10.1590/S0034-76122011000200009>. Acessado em 25 de março de 2013.

[30] HAMBLIN, A. C. Avaliação e controle do treinamento. São Paulo: McGraw-Hill do Brasil, 1978.

[31] IFAM. Resolução Nº 026, de 2006. Institui o Plano de Desenvolvimento dos integrantes do plano de carreira dos cargos técnico-administrativos em educação, CONDIR/CEFET-AM, Manaus, AM, 22 de dezembro de 2006.

[32] IFAM. Resolução Nº 2, de 2011. Institui o Regimento Geral do Instituto Federal e Educação, Ciência e Tecnologia do Amazonas. Diário Oficial da União, Brasília, DF, 2 de maio de 2011. Disponível em <http://www.in.gov.br/visualiza/index.jsp?jornal= 2&pagina=14&data=02/05/2011>. Acessado em 05 de maio de 2012.

[33] KEMCZNSKI, A.; KERN. V.; CASTRO, J. E. E. A engenharia de requisitos no suporte ao planejamento de treinamento. Revista Produção, Santa Catarina, v. 1, n. 1, p. 1-10, out.2001. Disponível em <producaoonline.org. br/rpo/article/download/596/635>. Acessado em 23 de junho de 2013.

[34] KIRKPATRICK, D. L. Evaluation of training. Em R, K, Craig (Org.) Training and development handbook. New York: McGraw-Hill, 1976.

[35] LIMA, M. A. M. Avaliação de programas nos campos da educação e da administração: ideias para um projeto de melhoria do Modelo de Kirkpatrick. REICE- Revista Eletrônica Iberoamerica sobre Calidad, Efcacia y Cambio em Educación, Madrid, v. 5, n. 2e, p. 199-216, 2007. Disponível em <www.rinace.net/arts/vol5num2e/art13_por.htm. >. Acessado em 25 de março 2013.

[36] MARCONI, M. A.; LAKATOS, E. M. Metodologia científica. São Paulo: Atlas, 2007.
[37] OLIVEIRA, R. M. S. Engenharia de Produção: tópicos e aplicações. Belém: Eduepa, 2010.
[38] PALLADINI, E.P. Gestão da qualidade: teoria e prática. 2. ed. São Paulo: Atlas, 2010.
[39] PANTOJA, M. J.; LIMA, S. M. V.; Andrade, J. E. Avaliação de impacto de treinamento na área de reabilitação: preditores individuais e situacionais. Revista de Administração, São Paulo, v. 36, n. 2, p. 46-56, abr./jun. 2001. Disponível em <http://www.rausp.usp.br/download.asp?file=v36n2p46a56.pdf.>. Acessado em 16 de maio de 2012.
[40] PAROLIN, S. R. H.; ALBUQUERQUE, L. G. Gestão estratégica de pessoas para a inovação: o cada da Frimesa Cooperativa Central. Revista de Administração, Santa Maria, v.4, n.1, p. 105-124, jan./abr. 2011. Disponível em <http://cascavel.ufsm.br/revistas/ojs-.2.2/index.php/reaufsm/article/viewArticle/2468.> Acessado em 11 de agosto de 2012.
[41] PHILIPS, M. J. Handbook of training evaluation an measurement methods. Houston: Gulf, 1997.
[42] PILATI R.; ABBAD, G. Análise fatorial confirmatória da escala de impacto do treinamento no trabalho. Psicologia: Teoria e Pesquisa. Brasília, v.21, n. 1, p. 43-51, jan./abr. 2005. Disponível em <http://repositorio.unb.br/bitstream/10482/1300/1/ARTIGO_AnaliseFatorialConfirmatoria.pdf>.
Acessado em 13 de julho de 2012.
[43] PALACIOS, P. K. Depender ou não depender, eis a questão: um estudo multinível dos efeitos de padrões de interdependência na satisfação dos membros das equipes de trabalho. In: ENCONTRO ANUAL DA ASSOCIAÇÃO NACIONAL DOS PROGRAMAS DE PÓS-GRADUAÇÃO EM ADMINISTRAÇÃO, 17, 2003, Atibaia. Anais eletrônicos... Atibaia: Anpad, 2003. Disponível em <http://www.anpad.org.br/ evento.php?cod_evento_edicao=7>. Acessado em 14 julho de 2012.
[44] ROUILLER, J. Z.; GOLDSTEIN, J. L. The relationship between organizational transfer climate and positive transfer of training. Human Resource Development Quarterly, Maryland, v.4, n. 4, p. 377-390, 1993. Disponível em <http://onlinelibrary.wiley.com/doi/10.1002/hrdq.3920040408/abstract. >.Acessado em 15 de julho de 2012.
[45] SALLORENZO, L. H. Avaliação de impacto de treinamento no trabalho: analisando e comparando modelos de predição. Brasília: UNB/IP. Dissertação de Mestrado em Psicologia. Instituto de Psicologia da Universidade de Brasília, 2000. Disponível em <www.rausp.usp.br.>. Acessado em 08 de junho 2012.
[46] SANTOS, P. T. dos. Avaliação da satisfação, aprendizagem e impacto do curso introdutório à estratégia saúde da família: um aporte metodológico. São Paulo, SP. Dissertação de Mestrado em Enfermagem. Universidade de São Paulo – USP, 2012. Disponível em <www.teses.usp.br/teses/disponiveis/7/7140/tde-16022012-185757.>. Acessado em 20 de março de 2012.
[47] TANNENBAUM. S. I.; MATHIEU, J. E.; SALAS, E.; CANNON-BOWERS, J. A. Meeting trainees expectations: the influence of training fulfillment on the development of commitment, self-efficacy an motivation. Journal of Applied Psychology, Michigan, v. 6, n. 76, Dec. 1991. Disponível em <http://psycnet.apa.org/?&fa=main.doiLanding&doi=10.1037/0021-9010.76.6.759.>.
Acessado em 30 de março de 2012.
[48] VARGAS, M. R. M.; ABBAD, G. S. Bases conceituais em treinamento, desenvolvimento e educação – TD&E. In: Andrade, J. E.; ABBAD, G. S.; MOURÃO, L. e colaboradores. Treinamento, Desenvolvimento e Educação em Organizações e Trabalho: fundamentos para a gestão de pessoas. São

Artmed, 2006. cap. 7, p. 137-158.
[49] VASCONCELOS, J. E. A importância da área de treinamento dentro das empresas. 2010. Disponível em <http://rhportal.com.br.>. Acessado em 07 de abril de 2012.
[50] ZERBINI, T. Estratégias de aprendizagem, reações aos procedimentos de um curso via internet, reações ao tutor e impacto do treinamento no trabalho. Brasília. Dissertação de Mestrado em Psicologia Social e do Trabalho. Universidade de Brasília, 2003. Disponível em <http://www.dominiopublico.gov.br/.download/texto/me001424.pdf.>. Acessado em 08 de junho de 2012.
[51] ZERBINI, T.; ABBAD, G. Qualificação profissional à distância: avaliação da transferência de treinamento. Ribeirão Preto: Paidéia, v. 20, n. 47, p. 313-323, set./dez. 2010. Disponível em <www.scielo.br/pdf/paideia/v20n47/a04v20n47.pdf.>. Acessado em 21 de março de 2012.
[52] YIN, R. K. Estudo de Caso – planejamento e método. 2. ed. São Paulo: 2001.