

An Evaluation Model for Project Management Training Programs

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Academia can benefit greatly from collaboration with training companies with a proven track record for developing, delivering and evaluating project management training programs. Because corporate clients demand cost effective as well as measurable outcomes, some training companies have developed sophisticated models and tools to assess PM training programs. This unique perspective is important to academic research in the assessment of cost-effective PM education and training practices. Over the past two years, the authors and Educational Services International, Inc. (ESI) have been engaged in assessing ESI's project management core courses, but also in creating process models to provide a framework for project management solutions. As part of one study, two versions of the Learning Outcomes Template (LOTTM) were created to validate the learning outcomes of the curriculum, one to assess the outcomes, the other to baseline performance levels. These two tools could then be used to assist clients to customize curriculum as well as evaluate participant performance. The education and training evaluation model (ETEM) presented in this paper incorporates information from these studies and research in current best practices as well as several financial models (BCA, ROI, ROE). In this way, the model provides both quantitative and qualitative assessment tools.

Key Words: Training evaluation models, Project management training models, Course effectiveness, Training assessment, Project management practices model

Introduction

Project Management Core Courses Validation Study

It is instructive for academia to collaborate with, learn and benefit from some of its commercial counterparts who are also trying to accomplish progress toward the application of more effective project management practices. Over the past two years, Educational Services International, Inc. (ESI) has been actively engaged not only in validating and assessing its project management core courses but also in creating process models to provide a framework for project management solutions. In 1998, ESI commissioned the authors to perform a validation study of the Project Management core courses. This study utilized several models, including Anastasi and Kirkpatrick to accomplish the validation. As part of this study, an ESI Learning Outcomes Template (LOTTM) for the PM Core Courses was created, which would assist in the evaluation

of these courses as well as in the assessment of performance levels achieved in the courses. (Auchey, 1998).

ESI's Project Management Practice Model of Effective Project Management

In addition, early in 1999 a study on Project Management Practice produced a model, which delineates six essential elements of effective project management. The model implementation approach focuses on integrated enhancement of project management capability throughout an organization. The goal of this PM Practice Model is to improve and transfer knowledge and skills, use best industry practices, incorporate current practices and processes, where appropriate, as well as build on current practices, capability, and individual competency. (ESI, 1999). The graphic presentation of this model takes the form of a pyramid, which indicates the importance placed on education and training as the foundation of an effective PM practice model. Figure 1 below depicts the six components of the PM Practice Model of Effective Project Management.



Figure 1. Project Management Practice Model

Each of the elements has specific key factors to assist user clients in the establishment of effective project management practices. Of the six essential elements of this PM Practice Model, the foundation is Education and Training. According to the study, when training is linked to specific business goals, is relevant to the organization and the attendees, has strong sponsorship, offers a variety of training options (including distance and on-line) and is well advertised, the programs are not only more appropriate to adult learners, but also more likely to succeed in the organization. (ESI, 1999) In addition, the participation of related populations (e.g. executives and project team members) can have significant impact on program success.

Table 1 below presents these elements and delineates the key factors to consider in the assessment of that element of the Practice Model.

Table 1

Six Elements of the Project Management Practice Model

ELEMENT	KEY FACTORS
Strategic Oversight	Determines current executive support and corporate policies to support project selection/termination Examines project management in organization Conducts continuous improvement and planning
Center of Competence	Identifies support needs Determines Project Management Office structure, responsibility, staff Establishes Project Management Office capability
Project Execution Support	Identifies resources and team: project mentor support, project needs, project manager placement Manages and controls project management process facilitation
Methodology Deployment	Identifies current state of process, role of PM in organization, interface with current organizational methodologies, PM technique development Develops process to support process, i.e. Rollout Model Monitors implementation, value added, and user feedback
Maturity/Capability Assessments	Evaluates current status of PM Performance, strategic involvement of executive and state of Project Management in organization Baselines for project manager capability Plans short/long term quality improvement
Education and Training	Links training to business goals and client needs Determines level of sponsorship/participation Varies delivery strategies

ESI's Clientele Input

Over the past several years, many of ESI's key clients, including Novartis Pharmaceuticals, Sprint and its University of Excellence, and Motorola have been engaged in evaluating on-going as well as new training programs. These and other clients can provide important input into the development of an appropriate as well as effective education and training evaluation model for project management programs. This resource is critical in the development and review of the ETEM Model.

Thus, based on these initial studies and resultant models as well as on client needs assessment, it is clear that an Education and Training Evaluation Model to assess present and future training efforts is needed. The proposed model will build on these previous efforts to design an evaluation process as well as develop appropriate tools. The ETEM Model will use the LOT™ to ensure there is a match between the Project Management Core Course learning outcomes and client project manager competencies, roles and responsibilities. In addition, it will integrate with the PM Practice Model to insure fit between program evaluation and key project management capabilities. Further, the ETEM Model will use industrial partners in the development and evaluation phases of the project to ensure industry appropriateness and application. In this way, the ETEM Model, with its flexible process and applicable tools, will help industry address emerging as well as future training issues. (see Figure 2)

Academic Foundation and Approach for Model Development

This section presents the theoretical and practical foundations for the development of the ETEM Model.

Background

Since the early 1970's, industry, government agencies as well as accrediting bodies have been requiring greater accountability for education and training programs in both the private and public sectors. This accountability requirement, in turn, has precipitated research into and development of a reliable means to measure learning outcomes (rather than just learning objectives) as well as evaluate institutional effectiveness (Derlin, Solis, Aragon-Campos, & Montoya, 1996; Julian, Chamberlain, & Seay, 1991; Clark, 1999).

The Kirkpatrick Assessment Model

At present, the most often cited evaluation model used to assess training programs is the Kirkpatrick Model, albeit The Bell System Approach, The Result-Oriented HRD model, the Parker Model and the CIRO models have also been utilized (Phillips, 1991). However, assessment still occurs primarily at Kirkpatrick's Level 1 (Reaction), which is participant assessment based on satisfaction with training, typically done at the end of the course or event. These evaluations usually ask participants to rank or grade the training program, instructor, facilities, etc.

However, most program evaluations are also participant biased and based on several assumptions, including that participants are open and ready to learn, have the proper background or experience to evaluate the effectiveness of the program, have willingly attended the workshop, have personally identified specific needs, are able to assess the practical implications of the training and, finally, can evaluate program effectiveness before testing it personally in their work environments. Also, there is often the assumption made by the learner that the trainer is in the active role and the participant is in the passive (Merwin, 1992).

Given these assumptions, effective evaluation of Level 1 would include pre- and post-tests (diagnostic instrument), participant and trainer self-evaluation, participant and trainer evaluation of each other, content and facilities assessment by participant and trainer, and, finally, follow-up evaluation (Merwin, 1992). The first and last items have significant impact on the actual measurement of learning before, during and after the program. The pre-and post tests can determine individual change and the follow-up evaluation can measure program effectiveness and impact on the job. Employee action plans are an important vehicle for establishing the criteria to measuring training success in the workplace. In this way, data (both quantitative and qualitative) are generated before, during and after training using measurable set criteria.

Level 2 (Learning) is usually accomplished by post-training examinations or evaluation. Using a variety of testing methods is the key to successful evaluation., e.g. tests, portfolios, case study work-ups, reports, checklists or matrices, anecdotal documentation, to name a few. However, it

is most important to remember two evaluation concepts: validity and reliability. The former assesses whether the method used actually measures the objective; whereas, the latter addresses consistency over time (Anastasia, 1988).

Levels 3 (Behavior) and 4 (Results) are done to a must lesser extent (Parry, 1996; Phillips, 1996). To date, assessment of the impact of training on the job or on organizational objectives rarely occurs (Clark, C. 1996; The Conference Board, 1997). In fact, results based on the examination of the monetary value of the cost of training/learning, although desirable, have been difficult if not impossible to obtain (Parry 1996; Phillips, 1991; Todesco, 1998). In his attempt to address this challenge of monetary evaluation of training, Phillips proffers an additional level to the Kirkpatrick model, i.e. Level 5: Return on Investment, and presents a model for determining ROI.

To summarize the Kirkpatrick Model and its application, Phillips suggests percentages of programs to be evaluated at the different Kirkpatrick Levels:

- Levels 1 (Reaction) and 2 (Learning): Target 100% of the workshops--because it is fairly easy to assess participant reactions and evaluate performance.
- Level 3 (On-The-Job): Target 30-50%--because it involves more time and expense to conduct.
- Level 4 (Business Results) and Level 5 (ROI): Target 5-10%--because these evaluations require significant resources and budgets.

Because of the importance placed on bottom-line profitability, the trend appears to be leading toward some form of monetary measures of training, including Return on Investment (ROI), Benefit Cost Analysis (BCA), and Return on Expectation (ROE), the foci for discussion in the next three sections.

Financial Assessment of Training

Return on Investment (ROI)

As most researchers point out, performance improvements may be linked to training; however, other factors may also be responsible for the changes (Phillips, 1991). Much of the research indicates that the better the planning is up-front, the greater the possibility there is for isolating and measuring some training factors, which can then be used to calculate Return on Investment (ROI) or Benefit Cost Analysis (BCA) (Parry, 1996; Phillips, 1996; Chase, 1999; ASTD, 1997). Phillips places particular importance on the up-front planning required to utilize any monetary measurement and the significance of focusing on the primary goals of any ROI, i.e. to convince the Human Resource staff that the process works and to show senior management that training can make a difference. Indeed, because monetary return on training is so difficult, research supports the use of various methods to evaluate training.

However, most research supports the establishment of a standard methodology for training evaluation that is supported by the organization (Parry, 1996; Phillips 1991; Chase 1999; ASTD,

1997). As well, since the methods used to monitor costs vary widely, standard cost data should be established as part of this overall evaluation methodology. This standard evaluation methodology, when supported by statistical analysis, can provide a level of confidence for corporate and senior-level decision-making.

For ROI to be determined, business results need to be converted to monetary benefits. Hard-data items such as productivity and time can be done relatively easily; however, soft items such as customer satisfaction are difficult. Phillips suggests using a variety of methods to gather data and prepare the evaluation design, including the following:

- Surveys. Questionnaires and interviews are designed to measure program value by participants and their managers. A comparison of the two entities provides data on the impact of training.
- Control groups. An experimental training design is implemented with one group receiving the training and the other not. After training, a comparison of the two provides performance data.
- Trend-line analysis. A line is drawn from current performance to future performance, assuming that the current trend will continue even without training. After training, the post-training performance is compared to their predicted performance, thereby, attributing any improvements to training.
- Forecasting. More analytical and mathematical than trend-line, forecasting uses a linear equation to calculate a value of the anticipated performance improvement.
- Estimations: Estimations of the impact of the training by various stakeholders, including the participant, supervisor, customer, top level management, and experts, are collected and compared.
- Focus groups: Focus groups are a structured form of interview. Eight to twelve participants in the training are assembled and asked specific questions about the training. Brainstorming and creative thinking among the participants can produce high-quality data, especially for Level 3 evaluations.
- Follow-up sessions: Training participants are reconvened 2-4 months after the training to report on their successes. As well, these sessions can be opportunities to refine new skills.
- Performance tracking: This is a common practice at many companies, and is often considered the most credible post-training evaluation approach. Performance tracking monitors department, work-unit, or individual performance after training in such areas as productivity, quality, cost, time and customer satisfaction.

Other methods to assess training can include follow-up assignments, surveys and questionnaires, interviews, focus groups, observations, and performance tracking (Phillips, 1996; BellSouth, 1997). Indeed, one of the most effective methods to gather data on soft items is the use of employee action plans, with the inclusion of performance contracts and tracking measurements (Parry, 1993; Phillips, 1996).

Once these measures are determined and standard cost data established, statistical analysis is much easier to perform. In fact, research indicates that ROI may be best utilized at the micro-level when the associated costs of training are allocated to specific, and often the most popular, training programs (Parry, 1993; Phillips, 1996). This data, in turn, can provide the foundation for

appropriate statistical analysis and subsequent corporate decision-making. However, a word of caution regarding micro-level assessment and statistical methods: if sample sizes are small, statistical results may be insupportable or even misleading.

In short, in order for an evaluation model to be effective, it should be designed as a standard methodology with standard cost data established for the organization and varied in its approach to evaluation, on-going in its assessment process, and appropriate to the needs of the organization. Further, it should incorporate employee action plans as well as updated performance contracts and tracking. As well, if statistical data with monetary assessment is requisite, ROI, BCC or ROE can be useful; however, because of the costs and time associated with ROI measurement, these measures should target 5-10% of the programs (Phillips). In addition, when using ROI, evaluation needs to isolate the effects of training, i.e. control the variables. Therefore, the use of control groups and/or the assessment of training programs at the micro level, perhaps linked to specific projects, may be advisable. Indeed, if resources including training are allocated on a per-project basis, the micro level may be the only option.

Benefit Cost Analysis (BCA)

In his article, "Measuring Training's ROI", Parry considers BCA a subset of ROI; that is "BCA is the most demanding way to calculate ROI, but also the most accurate." (p.75). He also provides a guide to establish the relationship between the costs (one-time, cost per offering, cost per participant) and the benefits (time savings, better quantity, better quality, personnel data). His eight observations, sample applications, and Benefit Cost worksheet provide strong support for the use of BCA in the context of a comparison model.

However, he adds a word of caution: be aware that benefits can accrue long after training. Therefore, human resource managers should calculate costs with benefits calculated by trainees and their managers "after they have had enough experience in the workplace to collect enough data to project the benefits over the playback period." (p.75) Then, the comparison of the total costs to the total benefits yields the ROI (Parry, 1996). Thus, a tool, which compares benefits and costs, may be useful in assisting managers not only in making high-level decisions regarding training but also in establishing appropriate parameters for areas and items requiring further analysis.

Return On Expectation (ROE)

As another subset of ROI, some organizations are measuring results based on Return on Expectation or ROE, which examines the perceived market value of training compared to program costs. This latter method may lend itself well in the initial attempts to evaluate training before, using a Feasibility Analysis, as well as after, using Cost-Benefit Analysis (Parry, 1996). Because the trend is to measure and assess activities, including training, with organizational objectives, organizational fit, accepted standards, competency profiles, learning outcomes, as well as budgetary considerations. ROE may be a better method or strategy to use. According to Todesco, "companies are striving to find simple, affordable, yet reliable ways of measuring the results of their investments." (p. 2) She deduces that the challenge is to bridge the chasm between "inconsequential reaction data" and "costly and time-consuming outcome data" as well

as insure adequate assessment of “soft training/learning” in a corporate climate of “weak management support for evaluation.” (p. 2-3) A tool, then, that can organize and present information that is both qualitative and quantitative would be extremely useful.

Current Industry Best Practices

Research indicates that awareness and sharing of the best practices in industry could be beneficial in creating a comprehensive training assessment model, especially since each organization considers different elements as critical to their business performance and practices (Phillips, 1993; Parry, 1996; Todesco, 1999). Keeping a list of ‘best practices’ by individual companies may provide key assessment elements for a comprehensive as well as flexible training evaluation model.

For example, Table 2 lists a sampling of organizations and their training assessment foci.

Table 2

Organizations and Assessment Foci

Organization	Assessment linked to:
RCMP programs	Performance, organizational competencies and core values rather than training.
Xerox	Standards that employees can upgrade (self-directed competency improvement).
Motorola	Transfer of knowledge and skills to the job.
Ernst and Young, Bell South	ROI carried out based on participant estimates attributed to learning
Imperial Oil (Esso)	Company’s strategic focus through competency gap analysis
Bank of Montreal	Learning Action Plans (LAP) and investment in extensive assessment of innovative learning events

(Based on information from Todesco, BellSouth, Parry, Phillips)

In each of these organizations, the impact the learning would have on the business organization and its employees was determined and then appropriate measures to assess that impact were created. For example, Bell South gathered information through post-program questionnaires, surveys and interviews, analyzed the data statistically and then determined ROI based on estimates attributed to learning.

Table 3, based on the Royal Canadian Mounted Police (RCMP) presentation “Measuring Problem-based Training” (1996), summarizes current, emerging and future assessment practices based on Levels of Assessment, Beneficiaries, Linkages, Focus, Orientation, and Drivers. Noteworthy is the importance placed on Level 3 and 4 assessment as emerging and future practices.

Table 3

Current, Emerging and Future Assessment Practices

	Current	Emerging	Future
Level of Assessment (Kirkpatrick):	Reactions, Some learning (Level 1, 2)	Behavior, On-the-job, Business impact (Level 3,4)	Competency for future requirements (Level 4)
Beneficiaries:	Training Departments	Functional and Senior Project Managers	Diffused in organization
Linkages:	To training course objectives	To business plan	To anticipated future needs
Focus on:	Prescribed needs	Performance and business objectives	Competencies that permit organizational adaptation and change
Orientation:	Process-oriented	Results-oriented	Future-oriented applications
Drivers:	Quality control for training	Improvement of business results	Anticipating future competencies

(Based on RCMP, 1996)

Summary

There is increasing interest in knowing and assessing the value of training as a strategic investment with benefits for the individual and the organization. Indeed, some researchers contend that, in the very near future, the value of a company's stock may be determined in part by the value of the company's intellectual capital (Conference Board, 1997). At present, most organizations engage in some form of Kirkpatrick's Level 1 (Reaction) and Level 2 (Learning) assessment of training programs; however, the use of pre- and post tests as well as employee actions plans are strongly recommended to establish reliability and validity. Because Levels 3 (Behavior) and 4 (Results) require more resources and time, only 5-10% of the workshops should be measured. If monetary measures of training (ROI, ROE or BCA) are used to quantify outcomes, it may be best to measure against specific projects. That is, when training budgets are allocated on a per project basis, the ROI, ROE or C/B could then be measured against the bottom-line profitability of that specific project (Conference Board, 1997).

Further, research indicates that an effective training assessment model should also:

- use formative as well as summative measures; that is, measure training effectiveness before (feasibility analysis), during (participant assessments) as well as after (Cost/Benefit) the training,
- determine management support for training and assessment as well as an organizational attitude that training is a beneficial investment in intellectual capital (IC),
- use pre- and post tests as well as employee action plans to assist in continual program assessment,
- employ various types of measures, both qualitative and quantitative; that is, focus on intangible (intellectual capital) as well as tangible measures (ROI or BCA),
- provide evidence of monetary impact both real (Benefit/Cost Analysis, ROI) and/or perceived (ROE), if deemed appropriate and feasible,

- assess criteria that are linked to organizational business objectives, established training standards, competency profiles, and employee action plans,
- provide user-friendly assessment tools to facilitate using the model throughout the organization.

In addition, industry partners should be involved in the development and assessment of the evaluation model so that best practices can be incorporated.

The proposed model, the Education and Training Evaluation Model, incorporates these attributes and, thus, provides a flexible yet comprehensive evaluation methodology for project management training programs.

The ETEM Model

Because the ETEM Model is the foundation of the PM Practice model, it will include data generated from initial client needs assessment, including an evaluation of each participant’s present level of understanding of project management, as well as information obtained from corporate business objectives and strategic plans. The model will also incorporate current best practices as well as information gleaned from other sources, including training questionnaires, pre-tests, interview questions, and client evaluation criteria. In addition, tools will be designed which can be customized for individual clients, e.g. LOT Comparison Tools (1 & 2) The model itself is a process that begins long before the actual training occurs and continues throughout the life of the training initiative(s).

ETEM Model Graphic

Figure 2 below is a graphic presentation of the ETEM Model:

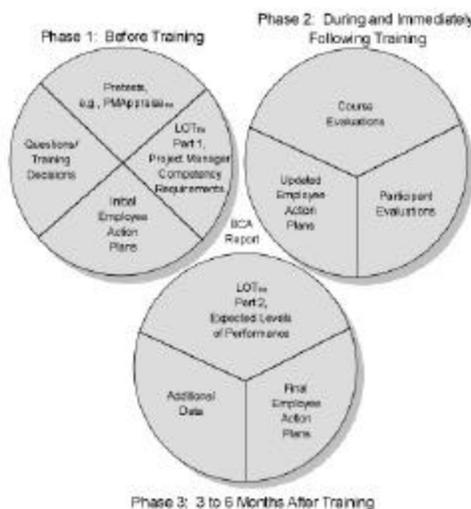


Figure 2: ESI’s Training and Education Model - ETEM

Description of the ETEM Model

Phase 1: Before the Training

Before the training occurs, the ETEM Model will assist clients in the identification of training outcomes within the context of the overall PM Practice Model and in conjunction with ESI's PM Core Course Learning Outcomes. The purpose is to match client expectations with training content as well as insure the training program fits with the organization's strategic plan for training.

- **Questions.** During needs assessment, as client concerns regarding training are communicated, a list of key questions would be posed, including “What part does Project Management play in attaining your company's business goals? How do you presently measure if these goals are being met? What do we, as training providers, need to set up to help you to measure training success?” These questions establish the purpose and the measures to be used to determine program success as determined by the strategic business goals. They are also key to designing an appropriate curriculum for each client.
- **Pre-Tests.** A project management diagnostic test can be administered to determine general project management skill levels. This test could be used not only as a diagnostic tool for the instructor(s) but also as a basis for statistical analysis of individual learning achievement.
- **LOT™ Comparison Tool, Part I--Project Manager Competency Requirements.** A key tool in the identification and quantification of training outcomes is the customized LOT™ Comparison Tool, Part I--PM Competency Requirements. This tool compares ESI's PM Core Course Learning Outcomes with client project management requirements, or their equivalent. The tool, a comparison matrix, is completed before training begins and provides the client and the employee with a basis to measure program as well as individual success.
- **EAP.** The Employee Action Plan would be developed for each participant prior to the onset of training. The EAP will contain the information gathered from all sources during the entire training process.
- **BCAR.** The information gathered from this phase is organized into a Benefit Cost Analysis Report, which will provide data for subsequent phases.

Phase 2: During and Immediately Following the Training/Workshop

During and immediately after the training, the ETEM will qualify and quantify, where possible, training program effectiveness.

- **Course Evaluations.** After each course, a course evaluation of content, facilities, and instructor will take place. Evaluations by instructors are to be included.
- **Participant Evaluation.** At the end of the training session, some form of evaluation of individual performance is needed. These can take various forms including exams,

portfolios, case studies, anecdotal instructor comments, etc. A statistical analysis of this post-test with the participant's pre-test can provide a measure of the learning accomplished (Merwin, 1992).

- EAP. The Employee Action Plan for training should be updated with the information gathered in this Phase.
- BCAR. The information gathered from phase 1 and 2 is organized into a Benefit Cost Analysis Report, which will provide data for the final report after Phase 3.

Phase 3: After the Training

After the training has occurred (anywhere from 3 to 6 months), the ETEM Model would evaluate training courses in the context of client business and training objectives and strategic goals, both qualitatively and quantitatively.

- LOT™ Comparison Tool, Part 2--Expected Levels of Performance. The LOT™ Comparison Tool, Part 2--Expected Levels of Performance compares ESI Expected Levels of Performance with Client Expected Levels of Performance or Participant Achievement, depending on the client needs. Both the participant and his/her manager should complete the instrument after the course to give the client a basis for comparing individual performance or achievement with the anticipated performance levels established by ESI. A comparison of the assessments is done to determine any differences in perceived or actual achievement. An important aspect of the tool pertains to the ability to perform, the opportunity to perform and the reasons for the responses. The tool also addresses the impact in terms of qualitative and quantitative results.
- EAP. A finalized Employee Action Plan for training is completed. This document, now a portfolio, would contain not only information on the training program completed but also plans for the future training and on-the-job applications. In addition, mentorships between new project managers and senior project managers are strongly encouraged to ensure application of the training.
- Other Sources. Additional information gathered from participants and their managers can provide excellent information for determining the benefit cost ratio. Some possible sources include:
 - control groups,
 - trend-line analysis,
 - forecasting,
 - estimations (participant, supervisor, management, experts),
 - input (customer and subordinate),
 - other factors (See Assessment Models Section, Return on Investment).
- BCAR Compilation and Assessment. The data generated from each of the previous phases and housed in the BCAR database is compiled, sorted, and analyzed. An assessment report is produced from this information.

Conclusion

The ETEM is designed to guide management and training managers in the development of appropriate training programs and/or customized training curricula in the context of overall effective project management practices. The tools recommended in this paper can be effectively used in CM education and training not just in post-secondary but also on the job. Further, not only are appropriate measures for evaluation determined early in the process, but budget and resources for training are allocated as well. In fact, the costs associated with training can be allocated on a per project basis, giving the project manager and training manager more control. In addition, assessment of training program effectiveness is on going and cumulative. Most important, however, the entire process would be developed to meet not only specific business goals and objectives for training but also the strategic plan for effective utilization of intellectual capital and long-term profitability (The Conference Board, 1997). In short, the goal of e-valuing training programs is to add value to the organization.

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