Training and skills/career management:
Case of involvement in the ERP dynamics Nav 2015

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Abstract—**Human resources activities have experienced a new dimension with the emergence of E.R.P. (Enterprise Resources Planning), platforms which main role is to manage all the resources of a company including human resources management, payroll management, production management, etc. The developers opted for the use of ERP in order to design and build innovative applications that eases company's resource management through standardization and data sharing. In this context, some Tunisian organization used Dynamics NAV 2015: a fairly comprehensive and well-thought ERP developed by Microsoft. However, the human resources module related to this solution did not cover all activities commonly found in current ERP. This research paper aims to study the importance of the training and skills management in firms and to present a technical solution to integrate the modules cited previously in the ERP Dynamics NAV 2015. The training management and career/skills management will be implemented as two fully-fledged operations in the ERP 2015 Nav.**

Index Terms—**Skills management, Career Management, Human Resources, E.R.P. Dynamic Nav 2015.**

I. INTRODUCTION

The information system (IS)[1] within a company is responsible for the flow of information between various departments, directions, units and entities as well as the conveyance of information [2] to the right person at the right time. The IS facilitates the design and implementation of the firm's policy and strategy [3] [4], as well as to ensure the proper monitoring of activities. It is, mainly , designed and implemented from the needs and requirements of the job ,from established process and from a set of resources (software, hardware and human)[3] in order to group, store, process and regulate the flow of information [3]. Among the tools used in the IS, we cite the "Enterprise Resource Planning" (ERP) [7]. Microsoft Dynamics NAV 2015 is one of the existing solutions constantly evolving in the ERP's market , besides a friendly ergonomics, this management software allows quick access , easy handling and reliability thanks to the presetting of 21 rules, allowing each employee access information that is relevant to him.

This article consists of the design and implementation of the training management and skills/careers management using Dynamics NAV 2015. First, we will present a literature review on E.R.P. Second, we will present the case study through a general idea about the firm in which we have made the study and the part related to the design. Finally, we will present the realization and the final product.

II. HUMAN RESOURCES MANAGEMENT

The value of a company depends on its human resources [6]. To ensure its durability and performance, it is essential for the firm to develop its human capital and optimize it, through motivation, valorization and skills development [7]. This is achieved through several elements as continuous training, planning for the evolution of the firm's structure, identification of career plans, etc. In this article, we focus on three main modules of HRM. For instance, knowledge management skills [8], career management [9] and the training management [10]through Dynamics NAV 2015 [11].

A. Skills management

Define abbreviations and acronyms the first time they are used in the text, even after they have already been defined in the abstract. Abbreviations such as IEEE, SI, ac, and dc do not have to be defined. Abbreviations that incorporate periods should not have spaces: write "C.N.R.S.," not "C. N. R. S." Do not use abbreviations in the title unless they are unavoidable (for example, "IEEE" in the title of this article).

B. Carrer management

Career management informs about the staff's skills within the firm[9]. It is implemented in human resources

management software's and software packages. Career management can track the information that is directly related to the career of the employee recovered since her/his recruitment into the company. Career management helps redefine the firm's structure while making sure that their evolution is in line with the future needs of the firm[12].

C. Training management

Training Management is one of the major axis at the HRM [10]linking different nodes involved in the system. We are going to focus in this article, on three major actors: the human resources manager, the head of training and the finance manager[13].

The human resources manager: with all information involved with his department, the HR manager can perform different tasks, for example: training-applications management; Management of the training officers; training management; Training's Cost Management.

The head of training: using the appropriate software, the head of training manages the registration and validation of the training entry form. The mission entrusted to him is to manage the demands of training made by the HRD (create, edit, validate, delete).

The finance manager is in direct contact with the human resources manager. He insures budget management and training's costs management and Budgets and cost assessment.

III. ENTREPRISE RESOURCEPLANNING (ERP)

The constantly evolving environment, the need to make decisions at the right time and the important size of the data to stock , to recover and to manage, pushes companies to use tools and to manage techniques based on technical and automatic control of the resources[14][15]. This later can be human, tangible or intangible related to the production, finance, accounting etc. The importance of controlling and monitoring the activities of a company lead to the emergence of information systems which main purpose is the management of the database of different departments within a firm or within the database of different companies within the framework of a corporate network. Among the technologies used in IS we quote the ERP[16][17](Enterprise Resources Planning) or the PGI "Progiciel de Gestion Ingéré" [18]. The ERP is a software package that manages all the processes[19]related to the company, through the integration of several management functions such as inventory management, cost accounting, sales[13]. To use an ERP, the literature review present the possibility to buy a ready use ERP or to have a direct access through the open source ERP. In fact, the ERP market is characterized by a high competition between free ERP and the priced ones. Although the uses differ from one context to another, free ERP is breaking through the market. Both types of ERP present differences. Indeed, a priced ERP requires a paid license that can be quite expensive mainly for small and medium companies while free ERP are free and are subject to change to ensure that ERP is customizable. However, for the maintenance, the two types of ERP involves and require costs and charges that are higher and more important when it involves priced ERP. Concerning data migration and training, they can take weeks or months, depending on the situation. Free solutions are commonly used by SMEs (due to lack of resources) while priced solutions are almost indispensable for large corporations and multinationals.

IV. COMPARATIVE ANALYSIS BETWEEN MAJOR PRICED ERP

Nowadays, the ERP market present an essential axis for IT service providers. It quickly became the fastest growing IT market. Getting the license for a new business management software is in itself an important decision that should be carefully made, especially when competition between ERP is rude. Table 1, presents a comparison between three solutions, commonly used in the Tunisian market, designed for small and medium enterprises (SMEs).

V. REAL CASE STUDY

Company Presentation: Created in 1993, the company in which we have conducted our study is specialized in software engineering and integration of integrated management solutions and ERP enterprise management solutions. The company is certified ISO 9001. It operates on the European market by carrying out projects in subcontracting or delegation skills with project management expertise and a certified quality approach AFAQ (French Association for Quality Assurance). The company's main activities are: the integration of ERP business management solutions, software development and outsourcing. The integration of management solutions is available depending on the size of companies and their needs for medium and large industrial enterprises, CMMS (Computer Assisted Maintenance Management) PRO API FRONTEC. The Sage management solution for SMEs / SMIs and cash solutions and concept of reconciliation for medium and large enterprises.

The integration of business management solutions includes organizational consulting and process support to the implementation of ERP in a certified methodology and any specific developments in the integration of ERP.
- IT development includes developing unique turnkey solutions from specifications on behalf of partners and European customers in advanced technological environments (Java, Progress 4GL, .net)
- Outsourcing enables companies to rationalize their IT investments while ensuring the reliability of information, data security and availability of the systems set up (hardware and software). It concerns systems engineering, consulting, hardware and software support and administration of the various software packages marketed.

NAV [11]is a software package for integrated management (ERP / PGI), it is designed for organizations with 20 to 500 employees, independent companies and subsidiaries of groups, industry sectors, trading and services. Fast to deploy, adapt, enhance and connect, Microsoft Dynamics NAV has a global network of partners, to implement various powerful solutions that meet the needs of SMEs in a wide range of very specific industries. Microsoft Dynamics Navision enables customers to have a clear, comprehensive or detailed and maintain total control over the various activities of their companies and through the various features offered.

The Dynamics NAV 2015 release offers new features [20],to help SMEs to develop their activities in the mobile-first world, cloud-first.

B. Description of the existing and presentation of the problem

Dynamics Nav provides several functional granules available grouped into functional domains in a company [11] [18]. By clicking on "Human Resources" from the "Department" menu, we access to the Human Resources menu, which present the standard features with business scenarios, employees and products. This department provides efficient management of human resources activities of a business, consolidate and follow the relevant employee information and organize data on the latter according to different types of information such as experience, skills, education, training and union membership. The Human Resources department in Microsoft Dynamics NAV 2015 does not support clearly with a part or entire way the employee training and their skills and careers. With the adoption of laws on the IRT (Individual Right to Training) in France and throughout Europe progressively, it is likely that this law be adopted in African countries in the coming years, including in Tunisia and particularly in a context in which

A. Software used in the company : Microsoft Dynamics NAV 2015

Microsoft Dynamics

TABLE I
COMPARATIVE ANALYSIS BETWEEN ERP SOLUTIONS

Solutions	Microsoft Dynamics NAV	Sage X3	QAD
Price	by user	by user	by user
Platforms	Unix, Linux, Windows	Unix, Linux, Windows	Unix, Linux, Windows
Activity area	All sectors	All sectors	Automobile, Industrial Production
Implementation schedule	4 to 6 months	5 to 9 months	6 to 9 months
Interoperability	All products Microsoft (Excel, Word, etc.)	Nil	Nil
Financial management	Easy to adapt to the Tunisian standard	Easy to adapt to the Tunisian standard	Easy to adapt to the Tunisian standard
Implementation of new modules	Adaptation and specific development	Narrowed to standard	Narrowed to standard
Mobile solution	MobileNav, solution on smart-phones and tablets	Sage Mobile Sales	QAD mobile
Agile Workflow	optimized Workflow	optimized Workflow	optimized Workflow
The use	Easy ergonomic use	Tricky use	Easy use

more companies seeking to employ versatile employees. Indeed, training is a frequent activity in all companies with a complex process and needs to be managed and storied in an automated manner to facilitate skills management, career employees, budget and value costs in order to integrate them into the payroll module thereafter. Business demand regarding the cited modules increases and it is concrete, thus the contribution of a new solution in the ERP Dynamics NAV 2015 is a necessity more and more obvious. Being absent from Dynamics NAV 2015, we plan to provide a first solution to manage basic modules of training and skills and careers. Since these modules are present in the solution "Sage RH pays" we will, therefore, contact the team wise SMEs / SMIs to inspire the process set up in 'Sage'. We will then generate our own design and create a scenario following the logic of Dynamics NAV 2015. Our solution will then ensure the management of the two-targeted modules.

C. Requirements

The functional and non-functional requirements of our application are presented as follow:
- The ability to create a training request with the necessary information.
- The creation of a new training from an existing request in advance.
- The addition of costs to specific training.
- The management of training sessions through their creations until closing.
- Participant management in training.
- Archiving training.
- The management of qualification repository.
- The update of the participants' skills to training following the archive.
- The addition of diplomas for employees.
- The management scorecards.
- Management of interviews.
- Publishing of various documents related to the management of training modules and career management skills.

For non-functional requirements, our application has to offer:
- Maintainability: the application code must be readable and understandable to ensure its evolutionary state and extensible to the needs of the following sprints.

We applied the nomenclature standards entities and interfaces handled in the development environment defined by the development language used.
- Ergonomics: Graphical interfaces must be pleasant and easy to handle and following the logic of what is standard in the application.
- Safety: Safety is implemented during the integration phase and uses Windows authentication or may be based on roles previously created encompassing a number of relevant authorizations to a particular actor.

VI. METHODOLOGY

We applied a "research-intervention practice"[21] as a research methodology. To choose the appropriate approach to manage our project, we adopted a comparative analysis between different agile (XP, Scrum) and non-agile methods (RUP, 2TUP) in order to identify the main convergences in table 2.

According to the comparative table, we have eliminated the RUP which neglects the technology and the technical constraints presenting a large part of our project. We also eliminated the XP, which neglects the functional study and the capture of functional and technical needs. Moreover, great importance is given in 2TUP to technology and the reunification of the two technical and functional branches is rather tedious. We then opted for the SCRUM methodology, which is incremental and iterative as well as adaptable to functionality changes. In fact, the Agile Method is based on the autonomy of persons involved in the different step of the process, which are specification, production and continuous testsfor validation. The Agile approaches allow designingsoftware productstaking into account the evolving needs of the customers. In addition, this approach helps to evaluate and optimize costs, time and the risks related to the project. Finally, the agile approaches improves the added value concerning the customer andthe quality level of the delivered product.

Agile approaches are based on 4 key values[22]:
- Interaction with people rather than processes and tools.
- An operational product rather than a plethora of documentation.
- Collaboration with the client rather than contract negotiation.
- Responsiveness to change rather than follow-up of a plan.

A. The Agile SCRUM method

In the Scrum method the teamfocus on a limited and controllable part of the functionalities to realize(increments)in fixed duration (between one to four weeks, called sprints). The Product Owner fix different aims for the different sprints. From aims, we choose the functionalities to be implemented in the different increment. The ScurmMaster is responsible for training the product manager and the different members of the project with the Scrum method.

Organization

The Scrum method involves three main roles[22]:
- The Product Owner: the Director of "Navision activities" at the company X.
- The Scrum Master: the project manager, whose role is to enable the team to work independently while guiding the members to remain within the perimeter of the design and identified requirements.
- The team: The team is composed of Navision developers and university researchers.

Product Backlog

The "Product Backlog" represents the starting point of the project, it is specified by the "Product Owner" and refers to a list of priority functionalities to be implemented at the various meetings

Decomposition in Sprints

By working with Scrum, each of the sprints aims to achieve an object related to a point that works (and not just on documents), which requires work in all development activities during a sprint. Since sprint0 is a sprint of initiation and analysis, the realization of ourproject is spread over 3 Sprints ranging from Sprint1 to Sprint 3 as shown in the following figure.

Fig. 1. Sprints

The first sprint will focus on the first part of the process of this first module ranging from the creation of training requests to the acceptance of the costs of the corresponding training through the creation of the latter as well as its financial management. This module will include the creation of the responsible training actor, the overall financial management including budget management. The second sprint will concentrate on the logistical aspect of the training, namely the organization of the training sessions, the groups, the management of the participants and the management of the trainers. The third sprint will focus on the management of skills and careers aimed at identifying the state of mind of the employees by giving them the opportunity to express their wishes and expectations about their professional lives. This is reflected concretely in the creation and management of the interviews during which the manager can define, evaluate and record on the interview sheet that we produce, the needs and prospects of the employee regarding his training and the objectives of the person. This module takes into account the identification, updating and management of the skills present as a result of the archiving of the different training courses and the diplomas and certifications held by the staff.

Some relationships link the tree sprints. Indeed, by respecting the smooth running of the training management process, the second sprint cannot begin if the process of the previous sprint has not yet succeeded. In fact, this latter is the starting point of the logistic management of the first module. The relationship between the first two sprints with the third is an updating relationship. The completion of the sprint process 1 and 2 (and therefore of the training management process in its entirety) will result in an update in the module management of the careers and competences managed in thesprint 3 and following the archiving of a training. In addition, an update of the qualifications acquired by the participants will be generated. The most important aspect of this sprint is the management of interviews subject to assure controls in order to be consistent with the training management module. It should be noted that during the three sprints we will be able to produce various printing documents called "States".

TABLE II
COMPARATIVE ANALYSIS BETWEEN AGILE AND NON-AGILE METHODS

Method	Key points	Characteristics	Imperfections
RUP (Rational UnifiedProcess) XP (ExtremeProgramming)	- Full model of tool-assisted software development. - Well-defined role. Development reduced by customer, small team, developers in pairs, daily construction. Development reduced by customer, small team, developers in pairs, daily construction.	-Business modeling, tool support. - Suitable for large projects that generate a lot of documents -Refectoring :Need to redesign the system to improve its performance and its ability to respond to changes.	- Costly to personalize. Little room for code and technology. Individual practices are well adapted in several situations, but management and general viewing practices are less attentive. Individual practices are well adapted in several situations, but management and general viewing practices are less attentive.
2TUP (Two Tracks Unified Process)	Focuses mainly and proposes a cycle of development in Y. Targets projects of different dimensions. Focuses mainly and proposes a cycle of development in Y. Targets projects of different dimensions.	Iteratively, it focuses heavily on technology and risk management. Defines stakeholder profiles, deliverables, schedules, prototypes Iteratively, it focuses heavily on technology and risk management. Defines stakeholder profiles, deliverables, schedules, prototypes	Does not propose standard documents. It does not support the conceptual changes during the development phases, particularly after the reunification of the two technical and functional branches Does not propose standard documents. It does not support the conceptual changes during the development phases, particularly after the reunification of the two technical and functional branches
Scrum	Independent small teams with automatic organization of development, cycles of 30 days. Independent small teams with automatic organization of development, cycles of 30 days.	Transfer from "defined and repetitive" to Scrum's new product development view. Transfer from "defined and repetitive" to Scrum's new product development view.	Scrum specifies in detail how to manage the 30-day cycles but integration and acceptance testing are not detailed. Scrum specifies in detail how to manage the 30-day cycles but integration and acceptance testing are not detailed.

TABLE III
COURSES OF SPRINTS

Planning sprints

ID item	Title	Importance	Description of functionality	Reviews
0	Initiation and analysis phase	1	Functional documentation and development of general diagrams for the different modules.	Functional study of the modules involved in the project and identification of standard processes.
1	Training Management (Analysis & Realization) Part 1	2	- Manage the process of creating training within a company starting from the creation of the need for training up to the management of the costs of the latter	This task contains in itself several stages ranging from the conception, which must be exhaustive, the implementation of the interfaces of each intervening actor, its roles and rights up to the tests of each stage of realization.
2	Training Management Part 2	2	This part manages the logistical and organizational phase following the acceptance of the training in terms of costs up to the end of the training	This phase consists of several tasks such as creating and managing training sessions, managing groups, registering and managing participants, etc.
3	Skills and Career Management	3	This part will be responsible for managing employees' qualifications, diplomas and producing and managing interviews with employees	This phase includes several tasks such as adding qualifications or diplomas to employees and managing interviews from creation to validation and editing of the corresponding documents

The table 3 describes the different sprints as well as the objectives to be achieved during each step.
The Figure 2 presents the different tables we have created in Dynamics Nav to ensure the completion of sprint 1 and 2 ranging from the creation of a training manager to the validation of the training.
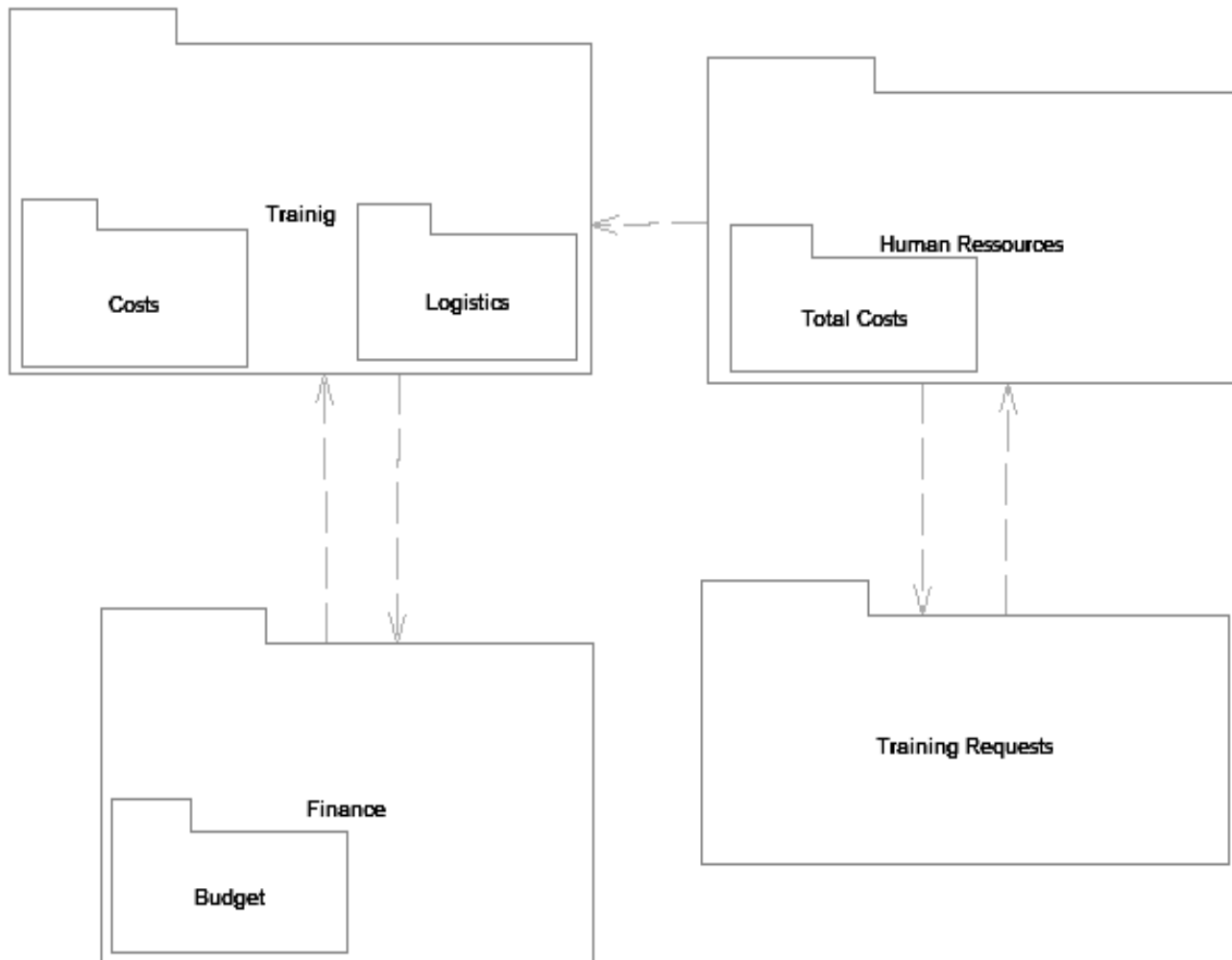

Fig. 2. Creation and validation training

The role of each part is explained in the following table:

<div align="center">TABLE IV

DESCRIPTION OF ENTITIES SPRINT1</div>

Table	Description
Human Resources	Includes information about the human resource entity of a company.
Training Manager	Represents the table identifying a training manager including his personal information as well as the various requests and their corresponding training that he could have created.
Training Application	This table is used by the training manager and stores the information entered by the latter to make a training request. A request initiated can only correspond to a single training
Training	This table represents the center of the training module, it almost interacts with all the other tables and stores information necessary for the smooth running and respect of the process in place
Training Budget	This table is used to calculate the different costs for different types of training. It also stores information on the current budget
Costs	This table lists the estimated and actual costs of each training.
Session	Inherits some corresponding training information such as end and start dates, interacts primarily with the tables group of participants, participants and trainer
Participating Group	Firstly, to register the participants of the training in a new list, in other words it allows to divide the participants in groups, interacts with the participating table and is added in the session table
Participant	Contains several information inherited from the standard "Employee" table and other information added in order to allow interaction with the participating training and group table
Former	Represents the table containing information about the trainer, for example personal or salary, interacts with the session table.

B. Activity management process of training management:

The following figure represents a global view of the different activities through which the training management process passes and the entities or actors involved in the proper sequencing of the training, ranging from the formulation of the request and its launch to the creation Training, its acceptance and the closure of the training.
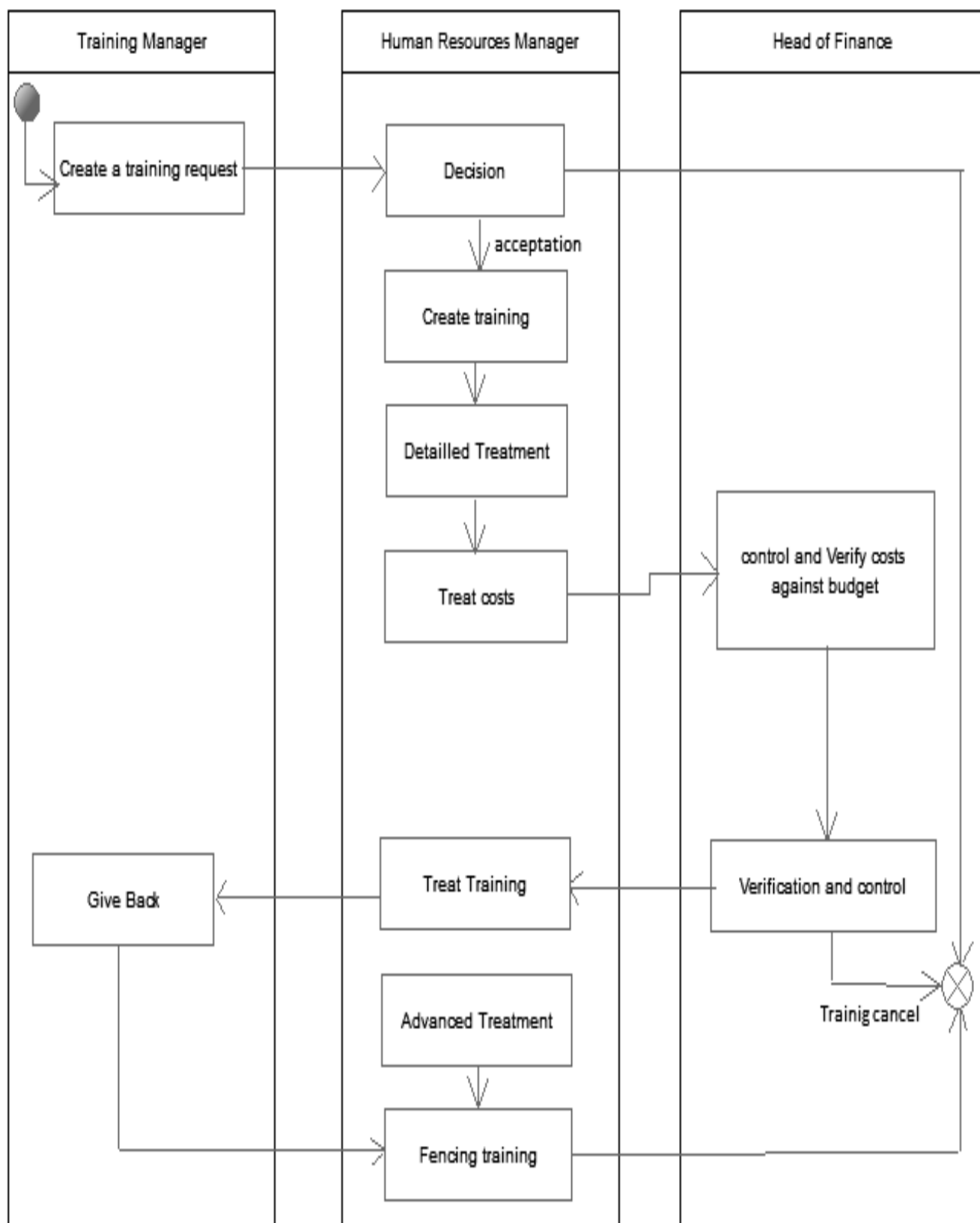
Fig. 3.training management activity

Figure 3 presents the transition state diagram describing the internal behavior of training, which is the center of the training management module. We have specified the status "archived" as factored status since any training will be archived regardless of the previous steps that it will have followed.
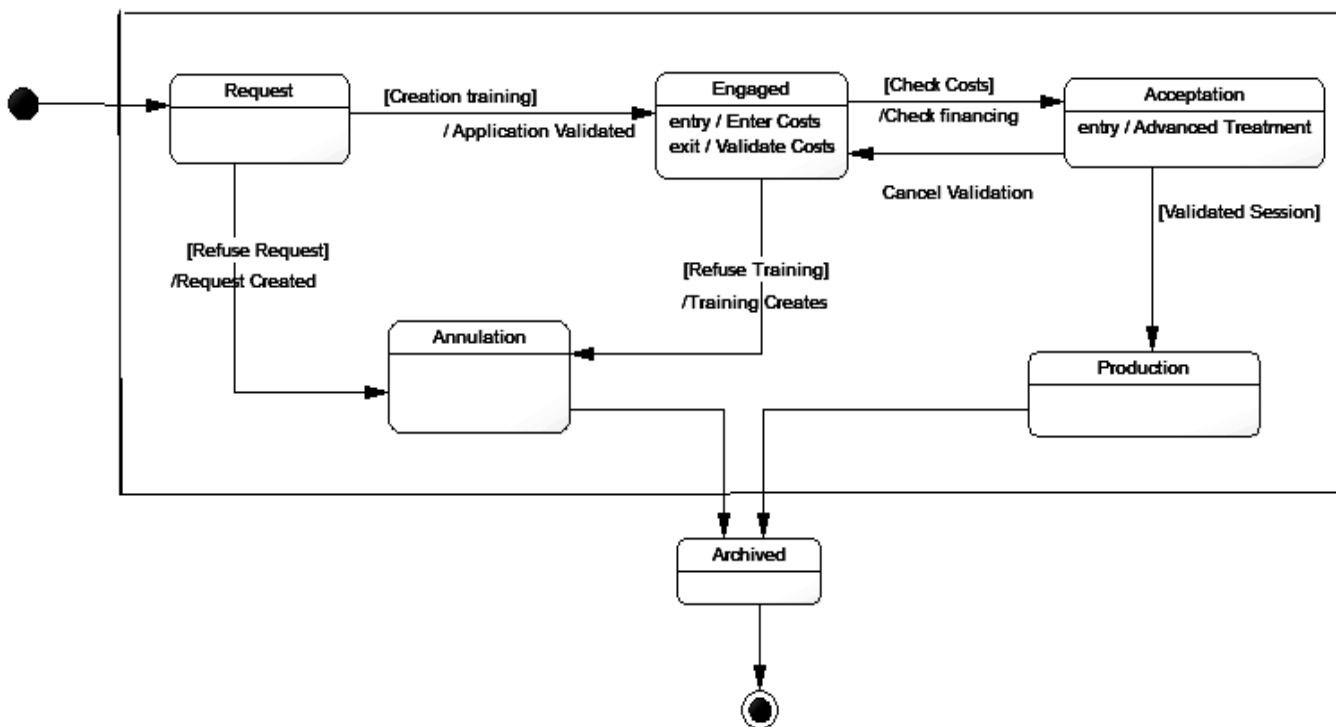

Fig. 4. Transition State Diagram

VII. GENERAL DESIGN

The technical architecture of Microsoft Dynamics NAV 2015, is a 4-tier architecture consisting of:
- Client: A computer with internet browser.
- Web Server: A computer running Internet Information Services (IIS) to a minimum.
- Microsoft Dynamics NAV Server: A Windows service based on Microsoft.NET Framework which manages communications and provides a layer of security between clients and the Microsoft Dynamics NAV databases in SQL Server
- Database: SQL Server 2012 Database.

General class diagram

The feature class diagram shows the structure of various tables implemented in the system, including the properties and optionally the methods provided by each table. Including the different relationships and the cardinality between them. This diagram remains the most widespread in the UML specification.

- Training management
Concerning the class diagram, we identified the various tables describing the diagram after analysis of the application requirements and a comprehensive study of the processes that must respect it while identifying different logical entities involved in the smooth running of the different tasks and the interactions between them.
- Skills and Career management
The diagram below shows the different entities classes implemented and used in the sprint 3. We wish to point out that the class entity "Employee" is a standard feature in the ERP.We have added, with precaution, modifications and additions in terms of fields but also in features, it was necessary to achieve the desired interaction with the other entities of this part especially for data exchange, the search for information or to set up to date. The feature classes in question are "Qualification", "Theme", "training", "DRH", "Employee", "Maintenance" and "Diploma". They manage the skills and achievements concerning training of employees, and are responsible for managing interviews with them.

VIII.REALIZATION

We present in this section the implementation part by relying on prints screens entities interfaces of the two modules and explain the features of the use cases we have detailed above.

A. Create a training

The following figure shows the creation of a new training, to realize this requirement, human resources should click "Start Training", then a message will appear indicating the creation of a new training, and the code of the application on which training will be created.
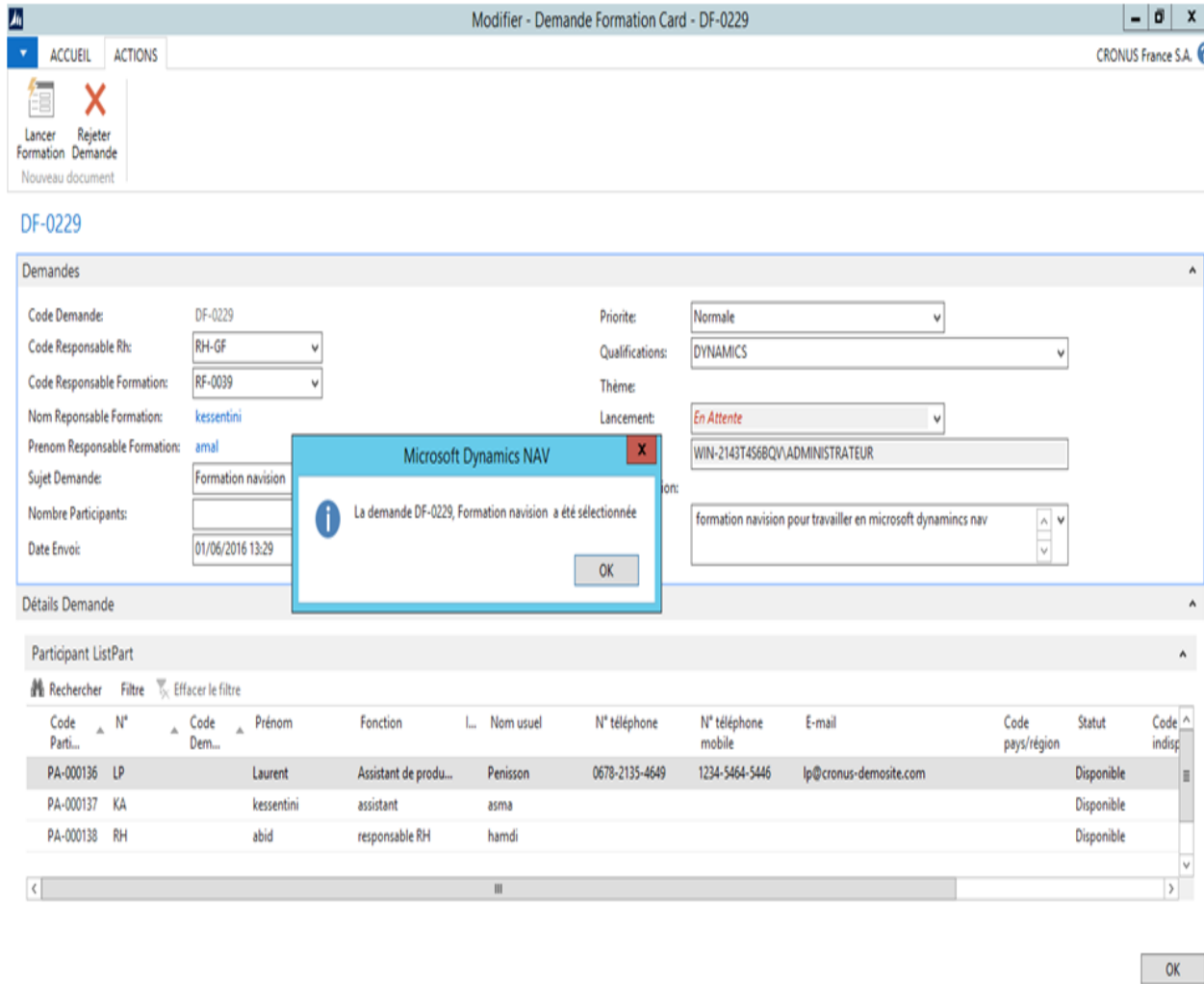

Fig. 5. Interface creation of new demand

B. Add Costs for training

Figure 4 shows the step of adding the estimated costs related to training. This step is done after providing details of estimated costs. The total estimated cost is automatically calculated based on the information entered. Each cost has its proper code, the code of the training to which the cost belong, a particular type, and the estimated costs. By checking the check box "validation costs", a message appears to confirm or not the action of validation. By clicking 'yes' costs are validated and become available for processing used in the Financing Entity. In this case, the adding of other costs becomes impossible. By clicking "no" the check box "validation costs" is unchecked and the costs are notconsidered to be processed in the financing entity. In this case, there is a possibility to add new costs.
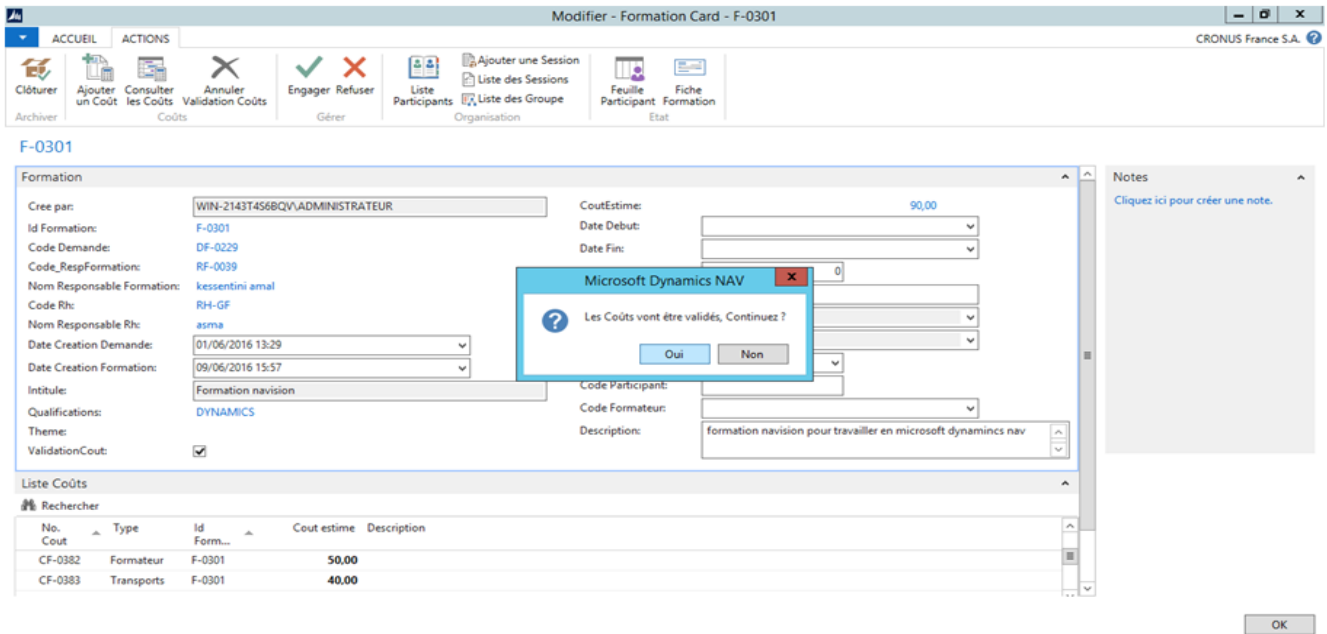
Fig. 6. Interface adding the estimated costs

C. Accept training costs

The following figure shows the interface of the budget interface related to the financing entity. By selecting a training on clicking on "training code" the costs and the estimated total cost related to the training are displayed. To accept training, the user must simply click on the "Action" tab and click on "Accept training costs" tab, it will display a message to confirm the tab that the user choose. By clicking "Yes" training is accepted and its status becomes "Active". Automatically, the step of recalculating including the remaining budget and the total costs of accepted training will start. On clicking on « no » action is cancelled and there is no change in terms of training or in the budget.
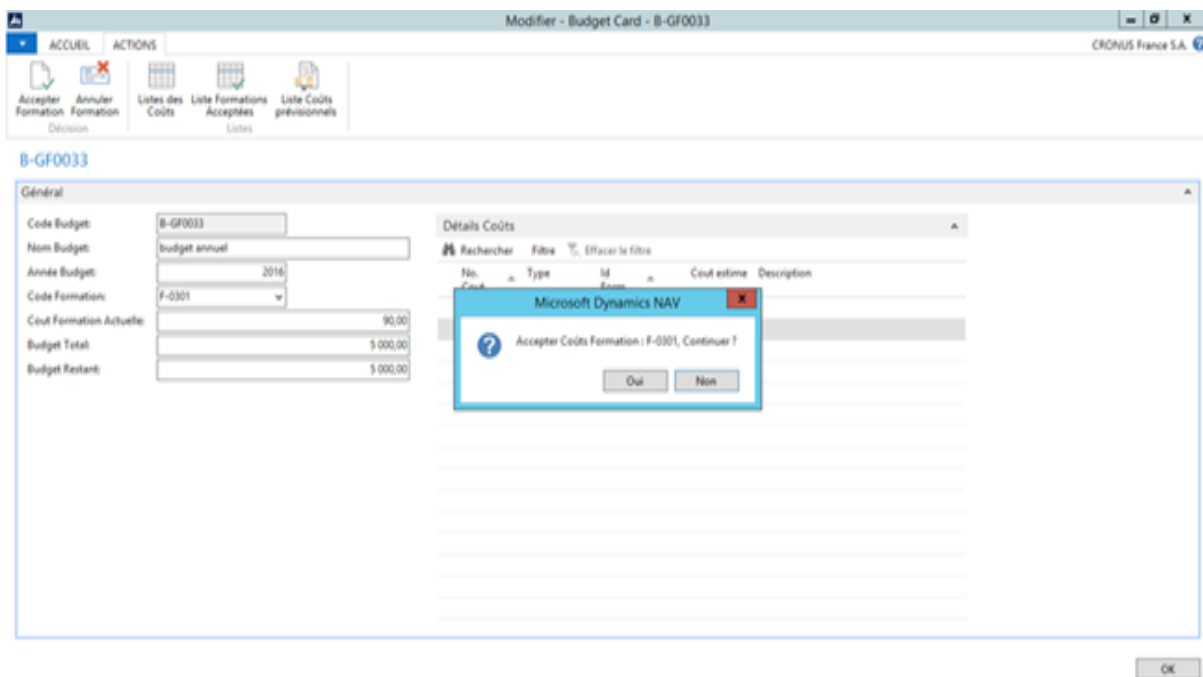

Fig. 7. Interface acceptance costs budget

D.Create A training session

To create a session to training, the user must first add the "start" and "end" dates and press the "Add Session" button as shown in figure 8:
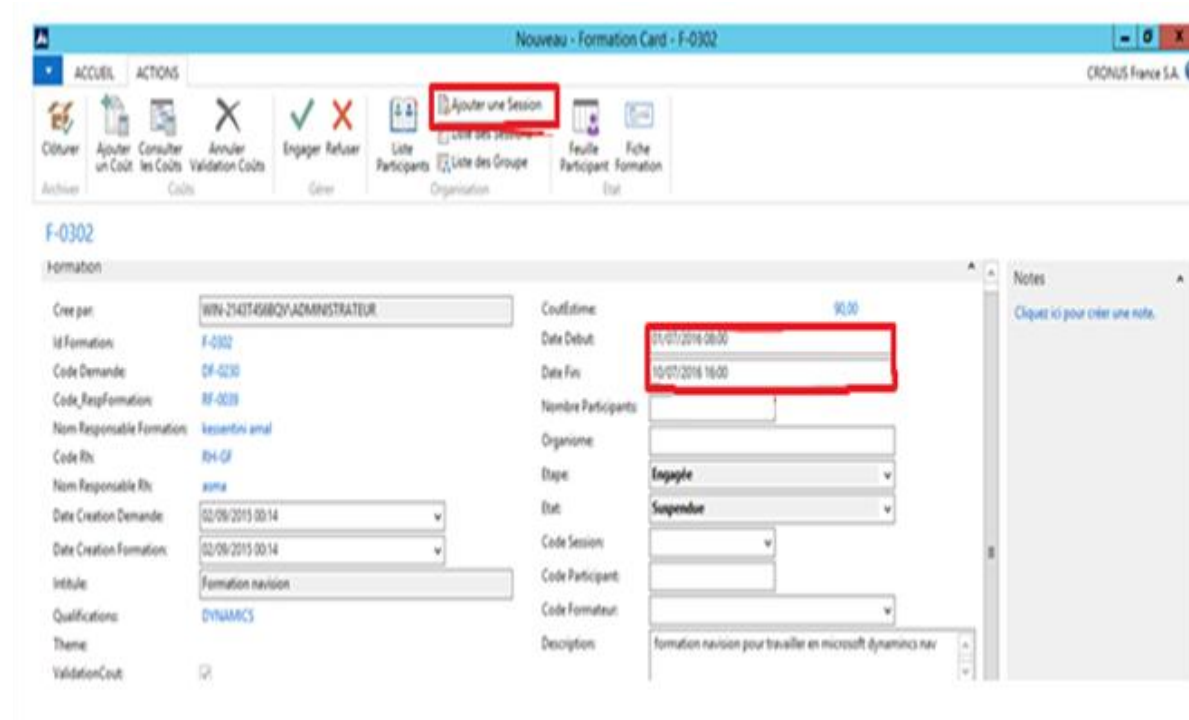

Fig. 8.Action create a new training session

Figure 8 shows the interface displayed after creating a new training session, at this stage the user has the opportunity to provide the information required before proceeding with the validation.

IX. CONCLUSION

Our article involves providing a training management module and a module on skills and career management for human resources department in the ERP "Dynamics NAV 2015". To achieve this aim, we started with a review of the literature on human resource management and specifically the management of skills, careers and training and a review of international practice to allow comparison between the existing ERP. We focused on the concepts specific to "Dynamics NAV 2015," development environment "C / Side" and its programming language "C / Al" in order to design and develop our solution. As proposed extension, several modules can be connected with the module training management including payroll management module to value the cost of training and integrating them into the management of business expenses. Through a relationshipwith the training sessions,the management module time can increase the availability management employees. We also aim to bring a module to manage the calendar of sessions of each course. For skills management module and careers, more features can be added as the organization chart of the company, position management, research vacancies and management of suitable profiles.

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