# Model of Linking Organization Goals to Employee Competence Management for Formal and Non-Formal Education Providers

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**Abstract.** This paper presents an approach to describe the impact on competence management in organizations under the assumption that all competence management should be goal-oriented and serve the organization's interests in reaching the goals. Ontology-based model is proposed to represent the interaction of goal setting and competence management. The related concepts of the model are described introducing development goals as a link between organization goals and competence management. The algorithm for integration of competence management into goal setting is proposed. The paper also explores the possibilities for formal and non-formal education providers to provide competence management linked to goal setting as a process of double-loop learning to help organizations become learning organizations.

**Keywords:** Competence management, Organization goals, Model, Organizational learning

## 1    Introduction

Goal setting has been proposed to be used in organizations as a tool to align the activities of the employees with the objectives of the organization. It is used both for organizing the work and motivating the employees [1]. Goal setting helps to achieve integration of individual and organizational interests which is important for successful management of an organization [2]. Balance of individual needs and institutional expectations is essential for promoting productive work environments [3].

Competence management has been established as a way to manage human resources that are available to the organizations. There are best practice examples analyzed to improve competence management in organizations [4]. Linking organization goals to the existing employee competences may increase benefits from both processes. One of the main tasks or education providers is to provide competence development or competence management in general. Linking competences to organization

goals can act as an additional incentive for the customers of education providers to seek their services.

The goal of this paper is to describe the process of linking goals to employee competences in a way that can be accepted by both formal and non-formal education providers by using ontology based approach so that it may benefit both types of providers to recognize their respective niche and allow them to apply best practice from one another. Ontology based approach can also be further exploited to address an issue with processing the fairly large amounts of data that need to be processed when managing the process of linking goals to employee competence management by building a goal-oriented competence management system. Such a system should be based on a competence management model that complies with the need to align competence management with goal setting. The paper also offers a viewpoint on how such a goal-oriented competence management system can be integrated more successfully if the members of an organization collaboratively and continuously re-examine the fitness between goals and competences.

## 2  Linking Goals to Competences

### 2.1  In Formal Education Organizations

In formal education organizations like schools employees (mainly teachers) are directly involved in competence management. Teachers teach students and help them achieve their goals. At the same time teachers achieve their own goals by using their competences [5- 9].

Formal education providers perform appraisal of their employees on regular basis. Appraisal includes evaluation of individual and organizational goal met. Those goals also include increase of students' competences. Teacher appraisal is theoretically considered more value-added when it is linked to achievement of their student goals [10- 18]. However, there is limited evidence that formal education organizations in Latvia are linking their employee competences to the employee goals [19].

### 2.2  Linking Goals to Competences in Formal Education Organizations Through Double-loop Learning

Linking employee competences to goals in formal education providers facilitates continuing learning process or in this case competence management. Evidence shows that although some competence management practice is present in formal education providers a systematic integration of organizational goals and employee competences is not fully established [20, 21].

Competence management in formal education providers often takes form of single-loop learning when inability of reaching a goal is addressed on case-by-case basis by changing the goal or improving the competence on that particular occasion. Double-loop learning provides the organization with the opportunity to adjust the underlying policies when goals are not reached due to lack of employee competence [22].

Stoll *et al* [23] describe single and double-loop learning as interaction of action, outcome of an action and inquiry and re-examination of a procedure. In case of interaction of employee competence and a goal, outcome of an action is a goal that is not reached, action is change of a single competence related to a goal, and inquiry of the procedure is the change of competence management principles to one better aligned to goals.

Also, since the education providers develop competences in their customers they can act as agents of change for improvements of goal-oriented competence management in their customers or organizations they represent. This should diminish the negative effects of process changes in organizations [24].

### 2.3    Linking Goals to Competences in Non-Formal Education Organizations

Formal education providers are similar to non-formal education since they use the competences of their employees to reach their own goals and help developing customer competences to reach customers' goals. The difference is usually in the level of social maturity of the customer, sense of real goals and the time when competences are expected to be applied [25].

In short, non-formal education in the individual level is concerned to develop competences for reaching a learner's goal. These education areas are mainly defined and analyzed in broader terms, for example, who counts as an adult educator, what is the purpose and content of such education or how does non-formal education influence individual personality, or the quality of workforce or the wider society and economy (for a review see [26, 27]).

Non-formal education providers often see themselves as organizations that have similar goals and problems as their existing and potential customers.

## 3    Ontology of Linking Goals to Competences

Competence management is a complex process that involves different positions in an organization and may require the management of large number of individual competences. This justifies a development of a competence management system. However, since the system is intended for use at education providers it should be able to accommodate the needs of customers of education providers. That is why an ontology should be used as a basis for requirements of the competence management system.

Two sources were used to define the concepts of ontology; a comparison of concepts used in the documents describing competence management and goal management in education provider organizations, and a set of semi-structured interviews performed asking the managers of the organizations to describe how they set goals and manage competences. The concepts were analyzed and compared to each other for similarities.

Employee goals are similar in meaning to agent goals that Lopez-Lorca et al use [28]. While goals in general are used in a similar way as Sterling and Taveter [29] who describe them as a functional requirement of the system. In this case a goal is a requirement of a competence management system that acts as justification for compe-

tence management, e.g. competence management is only done for those competences that correspond to employee goals.

We consider a problem of linking goals to competences as a problem of an education provider being able to forecast competence assessment and competence development needs before the customer fails to reach their goals because of lack of employee competences that have not been recognized on time and/or have not been developed enough to facilitate the reaching of set goals.

The main concepts of to define ontology of linking employee goals to competences are `OrganisationGoal`, `EmployeeGoal`, `DevelopmentGoal`, `GoalForecast`, `GoalAssessment`, `GoalAssessmentMethod`, `EmployeeCompetence`, `CompetenceAssessment`, `CompetenceAssessmentMethod`, `CompetenceDevelopmentPlan` and `CompetenceDevelopmentMethod`.

Fig. 1 represents the visual depiction of main concepts with respective relationships between themselves. Rectangles represent concepts of the ontology that may influence each other. Arrows represent the relationships between concepts. Arrowheads are used to indicate which concepts are considered inputs to the respective concepts the arrowhead is pointing to. Names of the relationships are used with arrows to describe the type of relationship. The following descriptions of relationships are used in the figure:

- *Is part of* – indicates that a concept towards which the arrowhead points is considered to consist of the concept that the arrow originates from;
- *Is used by* – indicates that the concept towards which the arrowhead points is using the concept that the arrow originates from as an input, but the later concepts does not change the individual instance of former concept itself;
- *Produces* – indicates that the concept towards which the arrowhead points is created as a result of the concept that the arrow originates from;
- *Evidences* – indicates that the concept from which the arrow originates is used as a proof that the concept has been managed successfully.
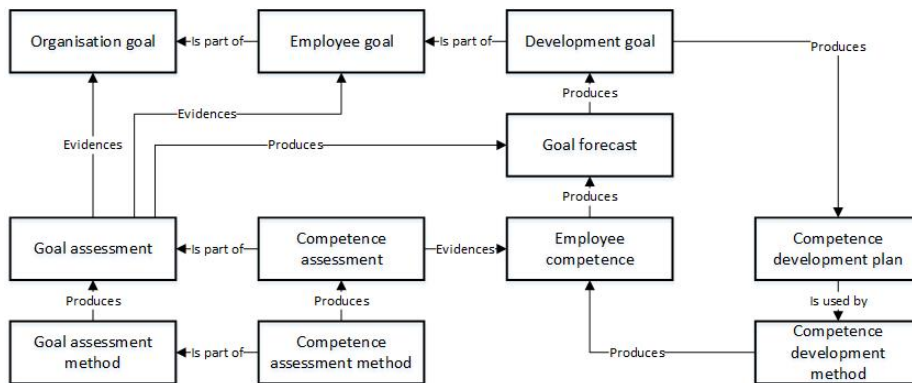


**Fig. 1.** Concepts of ontology of linking goals to competences

More detailed descriptions of the concepts follow further in the text using informal definitions of the concepts.

`OrganisationGoal` describes an objective the organization is set to achieve. `OrganisationGoal` requires for the `EmployeeGoal` to be achieved. `OrganisationGoal` has a set due date when the objective needs to be completed and set interim evaluation dates when progress towards the objective is evaluated and `GoalForecast` for the remaining part of objective is created.

`EmployeeGoal` describes an objective that is part of `OrganisationGoal` and is assigned to a specific employee. `EmployeeGoal` has a set due date and set interim evaluation dates. `EmployeeGoal` is assigned based on `EmployeeCompetence`. Progress towards `EmployeeGoal` is evaluated and `GoalForecast` for the remaining part of objective is created.

`DevelopmentGoal` describes a need and commitment to improve `EmployeeCompetence` when the need is identified at `CompetenceAssessment` by using a `CompetenceAssessmentMethod`. `DevelopmentGoal` is set at the creation of `EmployeeGoal` or `GoalForecast`.

`GoalForecast` for the purpose of this research is essentially a function of `EmployeeGoal`. It represents a set of planned tasks that still need to be finished and a set of newly identified tasks that are needed in order to reach `EmployeeGoal`.

`GoalAssessment` is a business management process that evaluates the progress of achieving `OrganisationGoal` or `EmployeeGoal`. `GoalAssessment` is performed at due date and at interim evaluation dates when it produces `GoalForecast`.

`GoalAssessmentMethod` is any method that is available to the organization and is deemed appropriate by the organization to receive `GoalAssessment`.

`EmployeeCompetence` is used in this model as a measurement unit that describes an employee. Each employee may have a set of several `EmployeeCompetence`.

`CompetenceAssessment` is a process that uses `CompetenceAssessmentMethod` to evaluate `EmployeeCompetence`. The result of `CompetenceAssessment` indicates if `DevelopmentGoal` should be created. `CompetenceAssessment` is part of `GoalAssessment` when evaluation of EmployeeGoal is made based on the `EmployeeCompetence` required to reach `EmployeeGoal`.

`CompetenceAssessmentMethod` is any method that is available to the organization and is deemed appropriate by the organization to receive `CompetenceAssessment`. `CompetenceAssessmentMethod` can be used as part of `GoalAssessmentMethod` where organizations consider `EmployeeCompetence` being a factor that influences the reaching of `EmployeeGoal`.

`CompetenceDevelopmentPlan` is created after `DevelopmentGoal` has been identified.

`CompetenceDevelopmentMethod` is used to develop `EmployeeCompetence`. `CompetenceDevelopmentMethod` treats

`CompetenceDevelopmentPlan` as an objective of which `EmployeeCompetence` to develop.

### 3.1 Goal-Oriented Competence Development in Education Providers

The link between goals and competences described in Fig. 1 apply to education providers and to their customers. In addition there is a link between the competences of employees of education providers and the goals of their customers. Fig. 2 describes the impact of linking customer organization's goals to competence management on the education provider's link of goals to competence management. For simplicity only most significant concepts of previously proposed ontology are included in the figure.
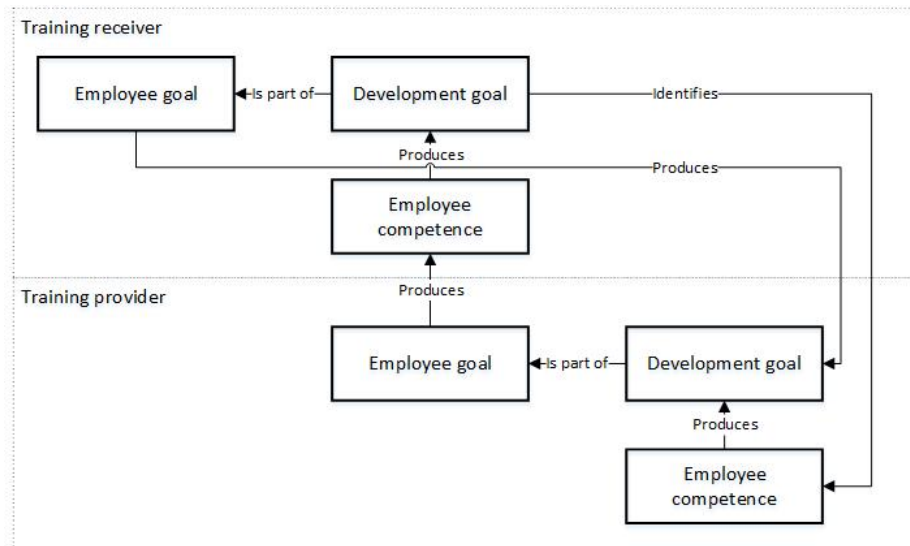


**Fig. 2.** Impact of education provider's and customer's procedures

Fig. 2 indicates that education provider can use the same processes descriptions for linking employee goals to employee competences as would its customer organization. However, there is an interaction between the concepts of ontology between the two organizations. The figure intentionally displays the same concepts twice to show that goal-oriented competence management can be the same in two organizations but has impact on other organizations.

A trainer's `EmployeeCompetence` is used to reach trainer's `EmployeeGoal` and customer's `EmployeeCompetence` is used to reach customer's `EmployeeGoal`. But trainer's `EmployeeGoal` is also to produce customer's `EmployeeCompetence`. In turn, customer's `DevelopmentGoal` is used as an indicator for the required trainer's `EmployeeCompetence`. If a trainer is assigned to develop customer's `EmployeeCompetence` and the trainer does not have the

necessary trainer's `EmployeeCompetence` the trainer needs trainer's `DevelopmentGoal`.

## 3.2 Competence-Based Goal Setting Algorithm

The model of linking goals to employee competence may act as a basis for the creation of competence management system that includes management of concepts related to employee competence assessment and development. When build on the basis of ontology based model the system is more likely to serve the needs of various organizations providing formal and non-formal education. To support the model several algorithms for managing various concepts need to be developed.

Based on empirical evidence gathered [19] we propose one of the needed algorithms. For example, an organization has an employee. The organizations assigns a goal to the employee and identifies a competence needed to reach the goal. The organization then conducts competence assessment for the employee and realizes that the competence is not sufficient to reach the goal successfully. The organization sets a development goal and prepares a competence development plan for the employee to improve the competence.

Using the previously defined concepts of ontology, first `EmployeeGoal` is identified. Then `EmployeeCompetence` is identified from a list of competences that are related to `EmployeeGoal`. `EmployeeCompetence` is assessed by using `CompetenceAssessmentMethod`. If `EmployeeCompetence` is not present or not sufficient enough to reach `EmployeeGoal` a `DevelopmentGoal` is set and `CompetenceDevelopmentPlan` is created to improve `EmployeeCompetence`.

Table 1. Algorithm of Linking Employee Competences to Employee Goals

| **Algorithm A. Linking employee competences to employee goals** |
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| Inputs: `EmployeeGoal, CompetenceAssessmentMethod` |
| Outputs: `EmployeeGoal, DevelopmentGoal, CompetenceDevelopmentPlan` |
| 1.  Create `EmployeeGoal` |
|     1.1.  For each `EmployeeGoal` identify `EmployeeCompetence` required to reach `EmployeeGoal` |
| 2.  Perform assessment of `EmployeeCompetence` |
|     2.1.  For each `EmployeeCompetence` select an appropriate `CompetenceAssessmentMethod` |
|     2.2.  Perform assessment of `EmployeeCompetence` using `CompetenceAssessmentMethod` |
| 3.  Create `DevelopmentGoal` |
|     3.1.  For each `EmployeeCompetence` create a `DevelopmentGoal` |
|     3.2.  For each `DevelopmentGoal` create `CompetenceDevelopmentPlan` |

# 4    Conclusion

Linking goals to employee competences provides the managers of various organizations with a tool that provides the means to forecast the ability of employees to reach the goals and to act upon competence gaps that may be identified at the start of goal setting period or during it. Education providers may benefit from goal-oriented competence management in the customer organizations since it provides them with a justification for setting their own goals and managing their own employee competences.

Formal and non-formal education providers may differ in their perception of their own procedures regarding goal setting and employee competence management but evidence suggests that there are similarities to be exploited so that both sides can learn from each other and improve their effectiveness of participation in competence management of their customers.

A model describing the linking of goals to employee competences could improve the ability of education providers to offer a quality service for their customer but in order for the model to be used it has to be described in terms that both formal and non-formal education providers can relate to. Ontology based model so far as it describes the concepts of the model in a language that is less prone to interpretation seems to be a solid choice.

The model proposed in this paper defines the main concepts that are included in the model and are recognized by formal and non-formal education providers. It links the results of competence development and competence assessment that are fully or partially conducted by education providers with the employee and organization goals that are set by various organizations. This allows for transfer of expertise gathered in education providers about goal-oriented competence management irrespective of their field and still leaves the room for customization of tools and methodology used by specific education providers.

The model also acts as a basis for education providers to become the agents of guiding their customer organizations to overcome challenges that occur in changing environment where goals assigned to employees are prone to have frequents changes in the competences required for employees to reach the goals. Competence management linked to goal setting implies that organizational members need to inquire and re-evaluate into their procedures and capacities. Continuous collaboration is needed and education providers can help to guide organization members to develop competences for reaching organizational goals.

Ontology based model of linking goals to employee competences also provides the basis for developing a competence management system that can support the competence management process conducted by education providers in the future.

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