A Methodology for Discovering Goals at Different Organizational Levels

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Abstract. Goals discovering approaches suggested in the requirements engineering (RE) discipline debatably assume that organizational goals are homogeneous in nature and complexities. However, this assumption is contradicted by some streams of research in organizational literature. Additionally, several of the goal discovery approaches arguably adopt a single, abstract, and unidirectional perspective. The consequences of this perspective include a discovery of goals that may be incomplete, non-representational, inconsistent and weak in context. While there may be no 'silver bullet' in resolving these issues, we attempt in this paper to address some of the challenges by proffering an approach for eliciting organizational goals from the operational, tactical, and strategic levels. Drawing on the richness of multi-disciplinary research (Strategy, MIS, and RE) we developed three approaches for discovering goals at different organizational levels. We integrated the three approaches into a single approach, which spans the entire organization. The usefulness and usability of this approach was tested in an organization with a newly developed information system and the lessons learned were reported.

1. Introduction

The importance of goals in requirements engineering (RE) saw the emergence of over a dozen goal-based frameworks (e.g., GBRAM, KAOS, EDK, CREWS-*L'Écritoire*, i*, NFR). These frameworks serve different purposes within the RE domain (e.g., elicitation, specification, negotiation, validation, and alignment with business strategies [17]). Often, goals in these frameworks are identified through scenarios, use cases, interview transcripts, mission statements, policy statements, corporate goals, workflow diagrams, and through asking 'how', 'why', and 'how else' questions [2, 24]. The *'how'* questions are used to identify lower-level goals; the *'why'* questions to discover objectives, rationales and ascertain higher-level goals; and the *'how else'* questions to find the alternates for satisfying higher-level goals.

While conducting an earlier study [21], we found that the current methods for discovering goals are inadequate in addressing the multitude of complexities in the organization. We suspected that the different levels (strategic, tactical, and operational) within the organization, and the distinctive context and purpose that

goals serve at these levels are reasons attributing to this inadequacy. Building on this premise, we proposed in this paper a systematic approach for discovering goals at different organizational levels. In developing the approach, we drew on the affluence of goal representations in multi-disciplinary research. The literature in these disciplines revealed that goals are diverse in its context and purpose both within and across the different organizational levels.

The remainder of the paper is organized as follows. Section 2 examines the challenges of the current methods in discovering goals. Section 3 provides the theoretical foundation for developing a solution. Section 4 discusses a methodological approach for discovering goals. Sections 5 and 6 present a case study and discuss the lessons learned. Section 7 concludes with directions for future research.

2. Challenges for discovering goals using current methods in RE

The complexities of goals at the different organizational levels include (i) stakeholders having varying degrees of *interpretation and understanding* of organizational goals [26], (ii) stakeholders not knowing how organizational goals may *contribute* to realizing the organization's vision, (iii) stakeholders not knowing how to *set* tactical and operational goals that accurately reflect the strategic goals [7], and (iv) stakeholders not knowing how to *define* goal attributes (for example specificity, difficulty, acceptance, and commitment). An analysis of the challenges and complexities of understanding, interpreting and discovering goals result in the following questions:

1. How do we know that the stakeholder's *interpretation* of goals, which he/she provide to a system analyst, are similar to the goals assigned explicitly or implicitly to him/her?
2. How do we know that the goals that system analysts elicit from managers are indeed a 'true' *operationalization* of the strategic goals?
3. How do we know that the stakeholder has an *accurate and deep* understanding of the goals assigned to him/her?
4. How do we know that the set of goals elicited goals by analysts are a *complete* set that if achieved will guarantee the realization of the organization's vision?

Arguably, the current methods for discovering goals lack the capabilities of answering the aforementioned questions. The consequences to a lack of answers for these questions include system analysts eliciting inaccurate, inconsistent, and incomplete goals, which may potentially result in the implementation of a failed IT system.

Adopting Regev and Wegman goal elicitation summary [19], we classified the current goal discovery methods under the categories of interviewing, searching for keywords, and asking how, why, and how-else questions. Under these categories, we argue that the existing methods are restrictive in nature for the following four reasons.

First, systems analysts normally are not experts in the business domain [22], and for a variety of cognitive, communicative, and motivational reasons, the information received and understood by analysts is generally incomplete [9]. These findings allowed us to conclude that the methods of interviewing and searching for keywords would not necessarily help in finding answers to the questions mentioned above.

Second, the approach of asking how, why, and how-else questions assumes namely an operational level perspective. Dardenne and colleagues [11] stated that asking 'why' questions drive composition of system goals. This mechanism, according to Anwer and Ikram [3], provides a solid rationale for each elicited requirement, and it allows to identify requirements that fail to contribute to higher level goals. Asking 'how' questions drive the identification of sub-goals, which is a non-trivial task under the control of the system analysts [11]. In general, these methods are useful for IS development and have been used for nearly two decades in the RE discipline. However, we found that the approaches of asking how, why, and how-else questions for eliciting strategic level goals are restrictive due to it's high level context and the abstractness of business strategies.

Third, we contend that validating goals through the process of asking how, why, and how-else questions are unidirectional in nature. Analysts adopting the 'why' and how-else approach are likely to start at the lowest level (operational level) and progress until they reach the highest level (strategic level) of the organization (i.e., a bottom-up approach). Likewise, if analysts adopt a 'how' and how-else approach, they are likely to start at the top level (strategic level) and move downwards to the bottom level (operational level) of the organization (i.e., a top-down approach). Discovering goals through either of these approaches are posited to inherit the limitations and disadvantages of unidirectional mapping. For example, in the top-down approach, executives of upper-level management are far removed from the day-to-day activities. Scholars stated that goals defined and decomposed from this level are sometimes overly ambitious and unrealistic. Conversely, goals discovered through the bottom-up approach are not always in line with the organization's vision. Organizations that adopt a bottom-up approach often lack clear directions and focus [4] during goal propagation. Applying any of the approaches independently and cross validating with the reverse approach will result in possible tautologies. Asking a 'why' question to an already discovered goal from a 'how' question will more likely result in conforming to the discovery the same goal.

Fourth, van Lamsweerde [25] in evaluating the current goal discovery approaches raised questions for example: What is a high-level goal? Who says it is high-level? One person's high-level goal is another's implementation detail. How do we know that the identified goals are really the right goals to be designing the system for? In the ATM (Automatic Teller Machine) example, the high-level goal of the ATM is considered as the cash delivery. This goal is a high-level goal for the ATM but not necessarily for the user. Though the answers are imperative for implementing aligned IT system, many of these questions with similar types of issues are still unresolved.

An analysis of the four issues mentioned above, allowed us to conclude that while the current RE approaches are adequate for IT system development they are limited in heuristics and lack pragmatism in broader context such as business-IT alignment. Recognizing the importance of developing aligned IT system, we attempt to address some of these issues by presenting a systematic approach that anchors in multiple disciples. We are also hypothesizing that the approach will aid in addressing and resolving issues relating to goal complexities, abstractness of business strategies, and inefficiencies of unidirectional goal discoveries. We relied on two theoretical foundations presented in the following section as a way to resolve the above-mentioned challenges and formulating a solution.

3. Theoretical Foundations

3.1 Three different organizational levels

According to Hoffer and colleagues [14] organizational goals are categorized into three distinct levels namely, the strategic, tactical, and operational levels. Strategic level goals are broadly defined to support the mission statement and are set by and for top management of the organization. Tactical level goals support the strategic level goals and are set by and for middle managers. Goals at this level focus on how to operationalize the strategic goals and, indicate the levels of achievement necessary in the departments. Operational goals are determined at the lowest level of the organization and are set by and for low-level managers to support the tactical goals. At each level, the goals are defined with different degrees of abstraction, inherit varying complexities, and serve different purposes. For example, at the strategic level, goals are abstractly defined with the aim of supporting the mission and vision statements. At this level, there are no clear directions of how the goals will be realized. At the tactical level, department heads define goals for each department relative to the strategic goals, and while the directions of achievement may be clearer, the goal definitions are sometimes restrictive to the department. At the operational level, goals are determined for realizing the outcome of specific processes. These goals may be realized individually or by stakeholders working on the same process.

3.2 Assigned Goals vs. Interpreted Goals

Research in several disciplines (e.g., Human Resource Management, Personnel Psychology, and Management Strategy) makes a clear distinction between the goals that stakeholders interpret and understand, and the actual goals of the organization. McDonald et al. [18] argued that stakeholders often have varying difficulties seeing the link between what they do and how it contributes to the organizational outcomes. The variation of difficulties is sometimes attributed to the stakeholder's abilities. Boswell et al. [6] categorized these abilities into four quadrants, namely – (i) deep and accurate, (ii) deep and inaccurate, (iii) shallow and accurate, and (iv) shallow and inaccurate. The authors elucidate that stakeholders may believe they understand the organization's objectives and are effective contributors, yet they may be wrong in that assessment. There are also those who may accurately understand the objectives of the organization, but they may not understand precisely how to contribute toward those objectives. Yet there may be other stakeholders, who neither understands nor precisely know how to contribute toward the organization's objectives. These classifications were exemplified earlier by George [13] who stated that there is an implicit assumption that stakeholders will behave in a way congruent with the organization's goals. The degree of congruence however, is dependent on their perception of the goal.

Given the different abilities, stakeholders can take different actions when they are given assigned goals implicitly or explicitly. These actions vary from totally accepting without changing, to redefining or reinterpreting, to totally rejecting the assigned goal [10, 12]. The variations depend on stakeholders' characteristics such as level, experience, functional area [23], ability, past success, task complexity,

performance constraints, and perceived importance of the job [15]. In many instances, the employers are unaware of these actions.

4. Guidelines for Discovering Goals

This section presents a methodological approach for discovering goals. In presenting the method, we offer a set of guidelines that system analysts can use for discovering, verifying, and validating goals at the different organizational level. The method is grounded on the premise that different disciplines focus on different organizational levels, and a combination of these disciplines will provide richer context than a single discipline when trying to understand the complexities at all levels. We drew from the strategy discipline for goals that relate to the strategic level, the RE discipline for goals that relate to the operational level and the management information systems (MIS) discipline for goals that relate to the tactical level. Detailed guidelines for discovering goals at the strategic and operational levels have been presented elsewhere [21]. In this section, we elaborate on the guidelines for the tactical level, and combine the three sets of guidelines into a single approach.

4.1 Discovering Goals at the Strategic Level

Not all organizations have corporate executives or relevant documentation that will provide clear descriptions of the high-level goals. Even if they are, not all provide descriptions that illustrate coherence among the goals. The strategy disciplines proffer several frameworks (e.g., BGR Model and Balance Scorecard) for representing strategic level goals. However, the literature offers little guidance in eliciting business strategies and strategic goals. To provide the context and guidance for eliciting strategic goals, we developed a questionnaire using the Boardman Comprehensive Strategic Analysis Framework [5]. The questions were developed and validated (Kappa score 0.88) with two independent researchers. Examples of questions include *"What is the firm's current short-, intermediate- and long-term strategy?", "Are these strategies amenable to the external industrial environment and internal firm characteristics?"* A complete set (18) of questions for eliciting strategic level constructs and goals can be found in [21].

4.2 Discovering Goals at the Operational Level

Lower-level tasks and activities generally are structured in nature and can easily be mapped using existing approaches in the RE discipline. Exploiting on this advantage, we proposed for goals at this level to be elicited using formal modeling approaches, and represented using a consistent view (e.g., Rolland et al. [20]) approach. Object Oriented Enterprise Modeling (OOEM) [27] is one such approach that may be used for modeling low-level constructs. The OOEM represents interactions between objects/agents in form of requests/response. A request is defined as an object asking another object to perform some service. The requested object may then perform the service entirely or may designate parts of the service to other objects. When the service is completed, a response is provided to the requestor. Goals are discovered for every service in every object by: analyzing the service name, request that triggers the

service, the attributes relating to the service, neighboring services that relate to the fulfillment of that service, response to the request, and constraints (e.g., time, completeness, accuracy). The elicited goals are formalized for consistency in representation by using the Rolland et al. approach, which states that a goal should include a verb and at least one of four parameters (i.e., target, direction, way, and beneficiary). The example in Figure 1 illustrates two goals relating to the services provided by the university to a student requesting to attend a course.
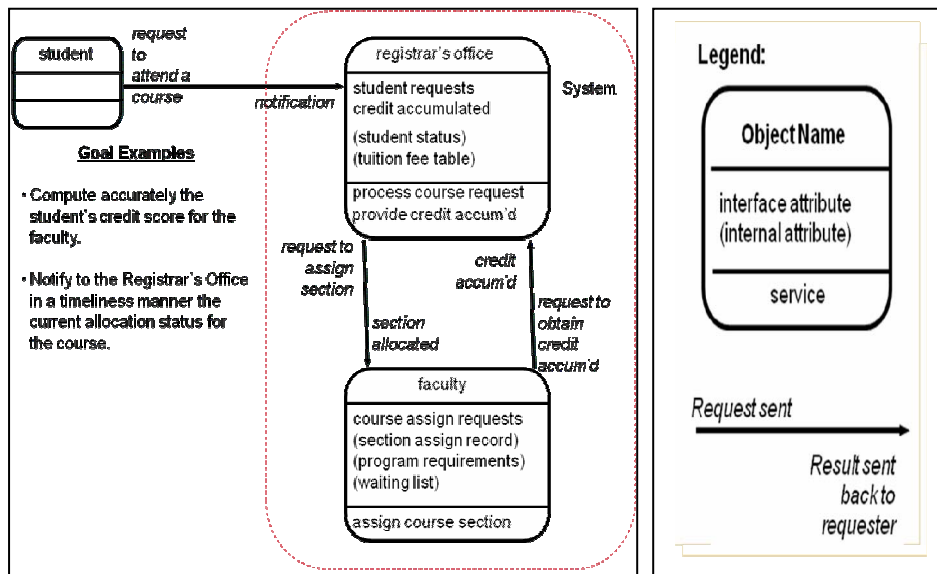

Fig. 1. Eliciting Goals at the Operational Level

4.3 Discovering Goals at the Tactical Level

Managers use tactical goals as a means to streamline high-level strategic goals into low-level operational level goals. Tactical goals are decomposition of strategic goals that are operationalized by middle managers at the departmental level, and serve mainly as performance indicators for departments. In the RE discipline, Briand and colleagues [8] stated that tactical goals lead to measurement goals. The Balanced Scorecard [16] is an example of a tool used in the strategy discipline for evaluating tactical goals. This tool focuses on broader organizational perspectives (finance, internal processes, customers, and learning and growth). The Balanced Scorecard is refined to an IT domain by Alter [1], who proffers a set of indicators (Table 1) that serve as a starting point for a Work System. The metrics for the indicators are calculated or estimated numbers that summarize specific aspects of performance during a particular time interval. The author emphasized that the indicators of this scorecard are applicable to a work system rather than to the entire organization.

Adopting the performance indicators (PI) concept as suggested by Alter [1], we proposed to elicit tactical goals by defining PIs for operational level goals, categorized the PI, and then discover goals (subjectively using Rolland et al. [20] goal definition as a guidance) for each category relative to the strategic level goals.

For example, at the operational level, goals may be grouped by a criterion (e.g., department types). Under each criterion, a set of PIs (e.g., accuracy, quality of decisions, completeness of understanding) are identified. Operational level goals are then grouped under each PI category relative to its context. Following the groupings, and based on the context of goals in each category, emergent goals (tactical goals) are defined, which are relative to the strategic level goals.

Given that the PIs at the operational level are relative measurements to the strategic goals, the proposed approach for eliciting tactical goals forces for an equivalency between assigned goals and interpreted goals. By setting the PIs this way, the approach has the advantage of taking assigned goals and interpretation of assigned goals into consideration without having explicitly to capture them. The resulted tactical goals also provide the link to align operational and strategic level goals.

Table 1. Performance Indicators in a WorkSystem Scorecard [1]			
Customers		**Products & Services**	
• Customer Satisfaction • Customer Retention		• Cost to the customer • Quality perceived by the customer • Responsiveness of the customer • Reliability • Conformance to standards • Satisfaction with intangibles	
Work Practices			
For Business Processes & Work Practices • Activity rate • Output rate • Consistency • Speed • Efficiency • Error rate • Rework rate • Value Added • Uptime • Vulnerability		For Communication • Clarity of message • Absorption of message • Completeness of understanding • Signal to noise ratio For Decision Making • Quality of decisions • Degree of consensus attained • Range of viewpoints considered • Satisfaction of different interests • Justifiability of decisions	
Participants	**Information**		**Technologies**
• Individual or group output rate • Individual or group error rate • Training time to achieve proficiency • Job satisfaction	• Accuracy • Precision • Age • Believability • Traceability • Ease of access • Access time	• Relevance • Timeliness • Completeness • Appropriateness • Conciseness • Ease of understanding	• Functional capabilities • Ease of Use • Uptime • Reliability • Maintainability • Price/performance

This section presented the highlights and rationales for three goal discovery approaches that were adopted from multiple disciplines. In ensuring consistency in its application, we integrated the three approaches into a single unified goal discovery method (Table 2). The unified approach is noted for encompassing bidirectional mapping, which allows for discovering strategic goals through a top-down approach, operational goals through a bottom-up approach, and tactical goals through a

combination of top-down and bottom-up methods. Discovering tactical level goals through the hybrid approach and using PIs as guidance create the opportunity for detecting alignment/misalignment between assigned goals and interpreted goals.

Table 2. Guidelines for Discovering Strategic, Tactical and Operational Goals	
Organizational Level	**Guidelines for Eliciting Goals Across the Different Organizational Level**
Strategic Goals (Discovery)	**Elicit strategic constructs through questionnaire [21] Identify:** 1. Products and Services; 2. Long Term, Intermediate and Short Term Strategies; 3. Long Term, Intermediate and Short Term Goals;
Operational Goals (Discovery)	**Elicit Operational Goals by:** 4. Mapping operational activities through a formal modeling approach (e.g. OOEM); 5. Elicit Goals by analyzing the-: service name; request that triggers the service; internal and interface attributes relating to the service; neighboring services that relates to the fulfillment of that service; the response to the request; constraints (time, completeness, accuracy); 6. Formalize the goals for a consistency in representation by using the Rolland et al. approach (e.g. target, direction, way, and beneficiary);
Tactical Goals (Discovery)	**Elicit Tactical Goals by:** 7. Identify the overall objectives for the tactical goals (e.g. Sales, Hiring) 8. Categorize operational level goals (OG) based of a predetermined criteria (e.g. departments); 9. Identify a set of key performance indicators (PI) for each criterion using the Work System Method (**Table 1**); 10. Map each OG under a PI criterion relative to its goal context; 11. Determine new PIs if needed, and categorize OGs accordingly; 12. Identify the Short-Term Strategic Goals (business and IT); 13. By using the Short-Term Goals as a guideline, and the Rolland et al. method of writing goals, define a set of Tactical Goals; 14. Define other Tactical Goals by evaluating goals across the criteria (e.g. departments) set in #1; 15. Define time frames for categorizing (short, intermediate, long-term) Tactical Goals; 16. Categorize elicited Tactical Goals under these time frames;
Validate Goals with (Business Executives and Business Managers)	17. Validate elicited goals for consistency in representation; 18. Resolve conflicting goals; 19. Discover hidden goals; 20. Refine goals that are redundant and/or synonymous 21. Define new goal set, and categorize goals according to the organizational level and the stakeholders at each level.

5. Case Study

The case discussed in this section is adopted from a previous work [21], and examines mapping of low-level IT system goals with business strategies. The

objectives of this study include assessing the methodological approach (guidelines proposed in Table 2), and its ease for discovering and integrating goals.

The case examines the recruiting process of support staff at a university. By 2010, the university's vision is to improve its rankings among the top universities in North America. The business executives defined a framework for realizing this vision. Inclusive in the framework is the objective of implementing a web-based system that supports the hiring of potential applicants. A high-level overview for hiring a support staff is as follows: department (dept.) determines the need for staff → dept. prepares details for an Ad → applicant applies for position → through a matching algorithm; the system prepares a list of potential applicants for the dept. → dept. forms an interviewing committee → applicants are interviewed → best candidate is selected → hiring manager acknowledges the selection → selected candidate is provided with an employee ID and enter into the payroll system.

We summarize in the following two paragraphs the processes that were applied in the previous case [21] for eliciting strategic and operational level goals. Strategic level goals were elicited by administering a strategic form [21] to the business executives. The responses were analyzed, and executives were contacted to clarify those responses that were either ambiguous and/or inconsistent. Clarified and consistent responses were validated by the executives and summarized (Table 3).

Table 3. Summary of Elicited Strategic Goals			
Vision The University aspires to be one of the world's best universities, by preparing students to become exceptional global citizens, promote the values of a civil and sustainable society, and conduct outstanding research.			
	Strategy	**Strategic Goals**	**IT System Goals**
Short Term	Enhance global influence by attracting top ranking faculty and staff	Recruit the best faculty and staff members for any available position.	Provide web-based tools to streamline recruiting processes for faculty & staff.
Intermediate	Promote a sustainable and healthy workplace	Provide the resources and conditions that will allow faculty and staff to fulfill their academic and professional goals	Develop a program, supported by funding, to which departments can apply to support healthy workplace initiatives
Intermediate	Enable students to become exceptional global citizens	Define and support the very best practices in undergraduate, professional and graduate teaching and co-curricular experiences.	Communicate about and promote opportunities for the application of IT in teaching, learning, research, and administration.
Long Term	Emerge as a global leader by retaining top ranking faculty & staff and attracting stronger students	Provide diverse learning opportunities for students, a rich environment for research and a base for service to the alumni and wider community.	Promote IT planning and foster cooperation within and between academic and administrative departments throughout the university

The 'primary' stakeholders of the system were determined following a review of existing documents, and talking to business managers. The identified stakeholders

were interviewed on the tasks they perform. Existing documents (e.g., job descriptions) and some brief observations of the stakeholder's daily work assisted in supplementing the task description responses. The stakeholders, tasks (services), and interactions among stakeholders were then modeled using the OOEM approach. By adopting the method as described in Section 4.2, goals were elicited for each 'service name' in the OOEM diagram. A total of 28 services and goals were elicited. Due to the page limit, we present in Table 4, a summary of the stakeholders (agents), the services the stakeholders perform, and the discovered goals for each service.

Table 4. Summary of Elicited Operational Goals			
ID	**Agent**	**Service Name**	**Goal**
2	Admin	Process request to advertise available position	Prepare details for Ad that accurately reflect the requirements for the position.
3	Dept. Comm.	Establish guidelines and selection criteria for hiring new staff.	Determine specific and credible set of guidelines for recruiting high-quality applicants.
4		Interview shortlisted candidates	Identify the best candidate who has the most experience, most qualified and who best fits the culture of the department.
8	Hiring Manager	Evaluate candidate following the interview process.	Determine suitability for the posted position.
9		Negotiate salary and benefits with selected candidate.	Acknowledge and sign off a complete and accurate summary of the job
11	HR Admin	Prepare a negotiated package offer for selected applicant.	Complete the paperwork to communicate the offer to the successful candidate.
15		Arrange interviews for the applicants short-listed by the committee.	Ensure the successful candidate is chosen from the pool of candidates
18		Match position requirements with candidates profile for current position.	Provide information on mapping of applicants and current position.
20	Payroll	Process approved staff appointment forms.	Provide Employee ID for future administration.
24	System	Match candidates profile with the requirements of current advertised position.	Ensure that the candidate's profile corresponds at minimum with the current position selection criteria.
25		Post Ad for available positions.	Display accurately, the Ad generated by department head so that a potential applicant can view and apply.
27		Process candidate's request for applying for current available staff position	Obtain applicants profiles for current position by displaying available positions to applicants.

In the earlier study, we relied namely on the existing methods for discovering tactical goals. The elicited goals were described subjectively by stakeholders, and lacked cohesion and clear directions of contribution between operational and strategic goals. By applying the method proposed in this paper, we were able to add further context to tactical goals, which assisted in clarifying contributions and directions. In deriving tactical goals, the departments (e.g., Human Resource, IT, and Payroll) were

selected as the criteria for grouping operational level goals (guideline #8 in Table 2). Performance indicators such as accuracy, quality of decisions, completeness of understanding were selected for evaluating the operational level goals, and functional capabilities and ease-of-use were chosen for assessing the web-based system in the various departments. The operational goals were clustered under each category based on its context relative to the performance indicators (guidelines #9 – #11 in Table 2). Tactical goals were defined for every cluster relative to the short-term strategic goals (guidelines #13 – #16 in Table 2). Due to the page limit, we present in Table 5 a few examples of tactical goals that relate to the short-term strategic goal *'Recruit the best faculty and staff members for any available position'*.

Table 5. Summary of Elicited Tactical Goals		
Short-Term Strategic Goal Recruit the best faculty and staff members for any available position.		
ID	**Performance Indicator**	**Tactical Goals**
1	Completeness of understanding	Ensure that the stakeholders in each department have a clear understanding on the guidelines, and expectations for hiring candidates.
2	Quality of decisions	Hire candidates whose background and personality is optimal to the experience, qualification, and culture for the advertised job.
3	Accuracy	Improve hiring process by ensuring the job posting details, the guidelines for hiring, and the contractual paperwork for the selected candidate is accurate.
4	Training time to increase proficiency	Support the advancement of recruitment by providing education and support to selection committees and others responsible for hiring faculty and staff.
5	Ease-of-use of the web-based system	Ensure that the web-based system is easy to use by both applicants and university stakeholders.
6	Functional capabilities of the web-based system	Assure that the web-based system is functionally capable for attracting candidates globally; Assure that the web-based system is functionally capable for accepting and processing complete applications; Assure that the web-based system is functionally secure.

This section presented the summary of goals elicited from the case, using the guidelines proposed in Table 2. Table 3 summarized the people (i.e. staff, faculty and students) aspect of the strategic goals that relate toward achieving the vision of becoming one of the best universities in world. Table 4 reviewed the operational level goals that relate to the process of hiring the best people (support staff). Table 5, provided a description of goals which emerges as means for linking Tables 3 and 4.

In concluding this section, we present an example as a means of exemplifying the links between Tables 3, 4 and 5. At the operational level, goals for example *'Identify the best candidate who has the most experience, most qualified and who best fits the culture of the department'* (Goal ID #4 in Table 4) was mapped to performance indicators (PI) *'completeness of understanding'* and *'quality of decisions'* (ID #1 and #2 in Table 5) at the tactical level. At the strategic level, strategic goals for example, *'Recruit the best faculty and staff members for any available position'* were associated to the PIs (e.g. *'completeness of understanding'* and *'quality of decisions'*)

at the tactical level. By analyzing expectations of the strategic goals that are mapped to the PIs at the tactical level, and the operational goals that are mapped to the same PIs we were able to derive goals for the PIs at the tactical level. For example, we concluded that in order to '*Recruit the best faculty and staff members for any available position*', the following tactical goal '*Ensure that the stakeholders in each department have a clear understanding on the guidelines, and expectations for hiring candidates*' must be defined for each department. Similar analyses were conducted on other PIs (e.g. quality of decisions) at the tactical level which was related to the strategic goal '*Recruit the best faculty and staff members for any available position*'.

6. Discussion

One of the valid tests for a practical method is its use on several projects. While the work reported here does not yet provide that level of validation, it does provide some insights and conformation. In this section, we discuss the lessons learned in the light of the case study reported above.

6.1 It is easier to relate IT system goals with business strategy via an integration of the proposed approach with previous approaches.

In the earlier study, we elicited tactical goals relative to the proposed IT system by interviewing managers, asking 'how', 'why' and 'how else' questions. While mapping the elicited tactical level goals with the strategic business goals, and operational level goals, we found unaccounted goal variances (e.g., #6, and #7 in Table 6) which were unrelated to the IT system. A possible explanation to this deviation is the fact that departments encompass several business processes, which may or may not be related to the IT system. When stakeholders are asked to describe the tactical goals, they tend to encapsulate all the processes collectively in their definitions. The challenge then arises in determining which operational goals are relative to the IT system and justifying the contribution towards the tactical goals.

Table 6. Tacitcal Goals Derived from Current Goal Discover Methods
1. Advance the recruitment and hiring of members of equity groups by providing education and support to those responsible for hiring faculty and staff.
2. Analyze data annually on recruitment issues at both campuses in order to address "hot spots", (i.e. finding prospective hires, future needs and developing strategies).
3. Analyze data at appropriate intervals on compensation salaries, benefits and leaves for faculty and staff to ensure that the university is not falling behind the relevant markets.
4. Ensure that the university culture is maintained by promoting activities that foster inclusion on staff and faculty members.
5. Continue to provide and, wherever possible, increase funding for professional development, finding the balance between the needs of faculty and staff.
6. Celebrate achievements, individual or team-based at the department & institutional level.
7. Support events that enhance social interaction among faculty & staff within or with other units.

The proposed methodological approach allowed us to discover a set of tactical goals (Table 7) that are relative to both the operational and strategic level goals. The elicited goals illuminated clearer directions, rationales, and linkages when compared to those discovered through the 'how', 'why' and 'how-else' approach in Table 6.

Through the case study, we found that the proposed approach complements the previous approaches well. Tactical goals were specific to the IT system when they were derived from the proposed approach, and more specific to business strategies when they were derived from previous ones. For example, goal #4 in Table 7 showed contextual consistencies with goal #1 in Table 6. This complementary provided the potential for aligning IT systems and business strategies

Table 7. Tactical Goals Derived from the Proposed Goal Discovery Approach
1. Ensure that the stakeholders in each department have a clear understanding on the guidelines, and expectations for hiring candidates.
2. Hire candidates whose background and personality are optimal to the experience, qualification, and culture for the advertised job.
3. Improve hiring process by ensuring the job posting details, guidelines for hiring, and contractual paperwork for the selected candidate are accurate.
4. Support the advancement of recruitment by providing education and support to selection committees and others responsible for hiring faculty and staff.
5. Ensure that the web-based system is easy to use by both applicants and stakeholders.
6. Assure that the web-based system is functionally capable for attracting candidates globally;
7. Assure that the web-based system is functionally capable for accepting and processing complete applications; Assure that the web-based system is functionally secure.

6.2 Conforming the need for a multitier approach in discovering goals

The findings of the case study supported our earlier claim that different levels of the organization inherit varying complexities in representing goals. To address these complexities, especially from a RE perspective, system analysts will require multiple approaches (for example the one proposed in this study) for eliciting goals.

When discovering goals from the three organizational levels, we found it was easier to identify and relate goals to each other both within and across levels. This was attributed namely to the richness of the goal context, and the supporting processes and rationales, which anchored the goal derivation.

7.   Conclusions and Future Work

It is arguably assumed within the RE discipline that goals are homogenous in nature and complexities. According to organizational literature, goals are defined differently (at different abstractions), serve different purposes (strategic, tactical, and operational) and may non-uniform in distribution. The classifications of goals found in the RE literature (e.g., soft-goal, achievement goal, maintenance goal [19]) do not

explicitly reflect any of these inherent complexities and abstractness. Furthermore, in RE, little emphasis is placed on the strategic level goals and its supporting constructs.

A survey of the RE literature revealed few approaches for discovering goals. These approaches questionably, lack detailed systematic structures, are high level and abstract in nature (asking how, why and how else questions), or unidirectional in discovery. For these reasons, answers for questions such as, 'What is a high-level goal?' and, 'Who says it is high-level?' are still unclear, even after eliciting the goals.

In an attempt to address some of the limitations of the current goal discovery approaches, we presented in this paper a methodology for eliciting goals. By grounding in multiple disciplines, we made a clear distinction between goals that are defined by business executives, and assigned to stakeholders and goals that are interpreted by stakeholders. We developed and integrated three different approaches for eliciting assigned goals. The strategy discipline allowed us to develop a questionnaire for eliciting strategic goals and it's relating constructs, the RE discipline allowed us to formally and systematically map agents with tasks and then elicit goals for each task, and the MIS discipline helped us in identifying performance indicators to be used as a guiding foundation for defining tactical level goals. The resulted approach offers the following two main contributions: (1) a systematic bidirectional process of discovering goals at different organizational levels; and (2) a means (through structure and rich context) of understanding and explaining discovered goals. In addition, we posit that by defining specific tactical goals that relates to the IT system business managers will be in better positions to create specific measurements for assessing IT factors such as cost-benefit analysis, obstacles and risks.

This research was limited in that only one case study was used and it was in an academic environment, and for this reason, we were unable to report industry insights that may not be found in the academia environment. Secondly, the approach focused primarily on goals elicited from the system analysts' perspective and validated from the business executives and managers perspective, and for this reason, the elicited goals may lack pragmatism of the actual organizational processes.

Our future work will concentrate on testing the methodology on several other projects and seek formal measures to validate the usefulness and usability from the practitioner and research standpoints.

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