

# Case study – Implementing ERP for Educational purposes

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## Abstract

This study is exploring how small department in relatively small University succeeded with almost no funding to implement ERP major system and integrate it in it's IS curriculum. We try to explore the steps towards this change, the difficulties and the solutions, the strategy and the recommendations for similar departments to successful implementation. This case is especially interesting since the implementation is of Oracle Applications, and not SAP (as most case studies published). We present initial finding, showing that with no pre-defined strategy, almost no budget and miniscule staff but with vision and persistence, BGU IE&M succeeded to built in-house ERP capacities, with it's own server and upgrade it's IS curricula.

## 1. Introduction

ERP systems were implemented in the late 90's and in the beginning of the 21st century in Israel, as in the in the entire world. As the ERP systems are being deployed successfully in many industries and by many large and small companies, the market for people who can work with these systems, implement these systems, and understand how these systems transform organizations is strong, and growing. Many consulting firms recruit from graduate and undergraduate programs at Universities around the world to fill sizable gaps in their ERP consulting staff [1]. The BGU IE&M experienced a significant shift in the type of careers available to students. Even though a significant and growing proportion of IS graduates will be integrally involved with the design, development, implementation, operation, support and management of standard enterprise software systems, ERP systems remain largely absent from it's IS programs. This gap was expressed in informal talks with graduates and in concerns of new students. In the department there was a semi-ERP system, aimed to introduce the students with concept of ERP system.

## 2. Literature Review

Bradford et al [2] state the challenges to integrate ERP into business curricula. They name the following:

- Funds - A successful ERP implementation, even for academic users, involves a significant investment in time and resources [3]. Training is always a cost that needs to

be considered [4]. Estimation of Stedman [5] shows that the training budget can be 10% of the total project budget.

- Teaching Materials - Another challenge is the lack of teaching materials suitable for classroom use [6]. Some ERP vendors provide a limited amount of teaching materials, but others do not. Bradford et al [2] found that SAP and Peoplesoft provide access to resources appropriate for higher education, whereas Oracle does not provide teaching materials for their E-Business Suite. Therefore there is need for preparation of teaching materials. Such development is not only time consuming but requires intimate knowledge of a complex program.

- Knowledge-sharing among faculty, who are developing their own material, is also been a problem because the same ideas are constantly re-invented, according to Bradford et al [2]. In 2000 however, SAP and Peoplesoft started few programs that began setting up mechanisms to share pedagogical materials developed by business faculty with other members of the alliance. [7; 8]. Oracle has not initiated a formal mechanism so far.

- Software administration – Similarly to successful ERP implementations in the business world, the presence of strong leadership and support is one of the most important factors in enabling ERP integration into curricula [9]

- Support staff - Since ERP skills are highly valued in the marketplace, it is often difficult for schools to find adequate IT support staff if they want to implement locally. Therefore, some schools hire a consultant to train internal support staff on a weekly basis [2]. A growing number of schools are moving towards an outsourcing option, thus circumventing the need for major technical support. In 2003, SAP and Peoplesoft started to offer an outsourcing model in USA. Oracle is not offering this model.

- Training - Because of the complexity of ERP systems, training is an issue that must be addressed by all adopting schools. Faculty must be trained in both technical and functional aspects of ERP.

- Conservatism - Many administrators and faculty do not see the relevance of ERP in the classroom. Changing this perception can be a challenge for proponents of ERP adoption. For example, some administrators and faculty may not realize that ERP concepts are applicable to any size organization, as evidenced by recent entrances into the business software market for SME and industry-specific solutions [2]

According to Esteves and Pastor [10], which analyzed refereed publications in the ERP area, although several

ERP systems are in the market, the majority of case studies analyze SAP systems. They refer to this point and wonder about the rezones and implications.

### 3. Methodology

#### 3.1 Why case study?

There have been numerous situations where a case study has been brought into an ERP research situation ([11]-[19]). According to Yin [20], case studies are preferred research methods when the investigator has little control over the events and when focusing on a contemporary phenomenon within some real-life context. This is precisely what this research will be undertaking, to define the related issues regarding implementation of ERP system for educational purposes.

Yin ([20], p. 9) found some examples of “poor research results with case studies” and that they “take a long time to complete”. Another potential limitation when selecting a case study method is that the research can have inadequate resources to gather data in order to select a research site to conduct the case study, something that can affect the quality of the research site selection process [21].

Overall, a case study approach has been selected due to the fact that it will be the most appropriate research method based on the nature of the research question. In addition, a case study method is a well-known research method in the field of study and has been used before during similar research projects. The appropriateness of a case study method is shown in the table below (Table 1). The table outlines the key characteristics of a case study (Benbasat et al. [22]) and maps key characteristics to the proposed research. The table shows the usefulness of adopting a case study research method for this research project and the questions the research attempts to address.

Table 1: Key characteristics of a case study with relevance to this research.

Phenomenon is examined in a natural setting	This Research?
Phenomenon is examined in a natural setting	Yes
Data are collected by multiple means	Yes
One or few entities (person, group or organization) are examined	Yes
The complexity of the unit is studied intensively	Yes
Case studies are more suitable for the exploration, classification and hypothesis development stages of the knowledge building process; The investigator should have receptive attitude towards exploration.	Yes
No experimental controls or manipulation are involved	Yes
The investigator may not specify the set of independent and	Yes

dependent variables in advance	
The results derived depend heavily on the integrate powers of the changes in the site selection and data collection methods could take	Yes
Case research is useful in the study of why and how questions because these deal with operational links to be traced over time rather	Yes
The focus in on contemporary events	Yes

#### 3.2 Site Selection

BGU IEM department was chosen as the target site for this case-study research for the following reasons. First, Ben-Gurion University of the Negev (BGU) is developing rapidly, fairly new (was established 30 years ago) but an internationally recognized institution of higher learning. BGU actively promotes hi-tech industry, agriculture, health services and education in the region. At BGU more than 15,000 students (According to it's official web site). This University – relatively young and developing, has impressive rate of growth, in measures as number of students, donations, building rate and research grants.

Second, the Department of Industrial Engineering and Management (IE&M) has approximately 1,200 students (according to its web site), and in the past years was the seed to various new programs and departments – 10 years ago grew of BGU Business School, then the Department of Information Systems Engineering, and few innovative programs such as the Air Force Academy (in conjunction with the IAF-Israeli Air Force). This background is impressive and promising regarding the implementation of new ideas and new challenges.

Another contribution to the site selection is the opportunity of the researcher to be part of the team in the IE&M department, that was dealing with IS curricula and development and therefore, to document the process and receive the necessary assistance and data. In this sense it is a convenience sample [20].

#### 3.3 Data Collection and Analysis

Data collection took place in years 2002-2005. It involved a variety of techniques including unstructured and semi-structured interviews, documentation, participant observations, published sources, physical artifacts such as forms, company documents and follow-up e-mail and telephone interviews [20]. Data collection and gathering is still being done on those days. The researcher was part of the team that led the changes in the University.

Semistructured interviews lasted from 40 minutes to 2 hours and were recorded. In addition to ongoing field notes, where the investigator tried to record what was going on without specific focus [23], more targeted interviews and document collection focused on research questions, as defined next section. The data collection was iterative: as data was collected, major themes were identified to guide further data collection, which then modified or built on prior themes and concepts (Glaser

and Strauss, [24])

As suggested by [23] and [25], we broke down data analysis into overlapping phases resulting in three different types of case write-ups. We started with a broad definition of the problem, which was sharpened through analysis of relevant literature, on-site data collection, and discussions with academic colleagues and external experts. This was followed by an open-ended and generative discovery of main themes, patterns, and propositions from interview transcripts and case notes [24], which led to additional data collection. The initial analysis resulted in a case write-up, or what Pettigrew called analytical chronology (level 1 output), incorporating multiple levels of analysis.

In the next phase, we focused on current strategic concerns of the department involved in the study in order to write a diagnostic case (level 2 output per Pettigrew). This iterative process allowed for further development of the analytical framework.

The final phase was to create an interpretive/theoretical case (level 3 output per Pettigrew). Here we further interpreted the narrative developed in prior phases and linked it to conceptual ideas derived from the data and to wider theoretical debates in the literature. In this phase, we relied on content analysis techniques to develop the analytical abstraction from multiple sources of data [26]. By this time, we had developed major conceptual themes.

## 4. Research questions

During the first stages of the research, as the results of the case were uncertain, the research questions defined. During the research, as we documented the occasions, the research questions were refined and rephrased, and finally the results are:

- How small department in relatively small University implemented with almost no funding major ERP system?
  - What were the steps towards this change?
  - Can we outline the difficulties and the solutions?
  - What was the strategy?
- How to integrate it in IS curriculum?
- What is the effect of the chosen solution (Oracle Applications)?
- What can we recommend, according to this knowledge, for similar departments to successful implementation?

## 5. Case Details

### 5.1 Introduction

The Higher Education Sector in Israel has gone through a series of stages in the last 5 years and there exist a continuing struggle for the individual university to

sustain a competitive edge and gain more funding, as the government has decreased the funding offered to the sector. Furthermore, the blossom of Collages, offering competitive degrees (8 Universities, 8 universities' extensions, and 26 Colleges in 2005, excluding institutes for preparation of teachers), has sharpen the needs of the Universities to offer competitive tracks and courses.

Ben-Gurion University of the Negev (BGU) was established 30 years ago in Israel's southern region. Today, BGU is an internationally recognized institution of higher learning. BGU actively promotes hi-tech industry, agriculture, health services and education in the region. At BGU more than 15,000 students (according to the web publications) and has campuses in Beer-Sheva and Sde Boker. The University includes four faculties: Engineering Sciences, Health Sciences, Natural Sciences and Humanities & Social Sciences.

The Department of Industrial Engineering and Management (IE&M) has approximately 1,200 students (according to its web site). The department faces rising demand in quality and in quantity of students wishing to study for the different degrees offered. The Department trains students for a wide variety of positions in industry and other organizations - positions which require the optimal utilization of human resources, information systems, equipment, and materials. In the year 2001 IE&M was not offering a course that was focusing in ERP curricula, but had established a relationship with local leading vendor of small to medium size ERP that agreed to install the system in the department's Labs, for academic use. The system was called "Priority", and few IE&M freshman courses were tiring to use it with students. We must add that in the past IE&M had two main majors - Production and IS. Around the year 2000 the major in production was cancelled and all students started to study IS as major (due to several reasons, no from the interest of this issue).

### 5.2 The need for ERP curricula

As introduction shows, ERP systems were implemented in the late 90's and in the beginning of the 21<sup>st</sup> century in Israel, as in the in the entire world. As the ERP systems are being deployed successfully in many industries and by many large and small companies, the market for people who can work with these systems, implement these systems, and understand how these systems transform organizations is strong, and growing. Many consulting firms recruit from graduate and undergraduate programs at Universities around the world to fill sizable gaps in their ERP consulting staff [1]. The BGU IE&M experienced a significant shift in the type of careers available to students. Even though a significant and growing proportion of IS graduates will be integrally involved with the design, development, implementation, operation, support and management of standard enterprise software systems, ERP systems remain largely absent from it's IS programs. This gap was expressed in informal talks with graduates and in concerns of new students.

This issue concerned Prof. N. Pliskin, the head of IS in

BGU IE&M. She also knew that Watson et al [1] argues that there are significant opportunities for using an ERP-based curriculum to enhance or redefine an IS program.

It is important to note that ERP systems can provide curriculum improvement opportunities for business, engineering, and computer science schools, according to Watson et al [1].

### 5.3 The Process

BGU IE&M actually faced 3 years process, with no pre-defined strategy. The vision was there, but no one could determine that in the end of the process this relatively small department (about 40 full-time Professors) will have its own capabilities of Oracle Applications' ERP server, with almost no support neither technical nor academic staff.

The process started while in the academic year of 2002 the department started to use small ERP system, developed by local vendor, called PRIORITY. This system was installed in IEM computer labs and was used to demonstrate issues to 1<sup>st</sup> and 2<sup>nd</sup> freshman students. In this year Prof. Pliskin succeeded to bring to IEM 2 department graduates, which were working as CIO in different companies, in order to build and teach a course dealing with ERP systems and applications in industry. This course was elective, to 4<sup>th</sup> year students (graduates). The course was major success and therefore, trying to make it better Prof. Pliskin approached the main ERP vendors in order to find better training platform.

This brings us to the second phase, in which Oracle Israel contributed an installation in BGU University server to this course. In this stage we can fairly show that similar request was send to both Ness (SAP local provider) and to Oracle Israel. Actually, the academic team preferred SAP R/3 system, due to few major installations in local (southern) industry, which was connected to the department in research projects, but Ness did not respond at the time to the challenge, while Oracle Israel was found as very supportive vendor, with strong willingness to be adopted by the Academy. As IEM department had no funds and server to support such project, they found together a server in BGU main computer services. It was not a dedicated server, nor very new one, but it was in the responsibility of talented technician, that had previous experience with Oracle Databases, and all parties thought it worth to try.

In the next semester, the same elective course was given, but the students (about 40) practiced on "real" ERP environment, Oracle Applications. IEM used the sample data (Sample organization) arriving with the software, and received all needed teaching material from the vendor (Oracle Israel). Few cases of errors in the system were taken care Ad-Hoc, with Oracle support team, Academic staff and BGU server technician.

On the summer between academic year 2002 and 2003 time there was so much demand to this course, that full summer course was open, and in parallel time was utilized to improve course academic content, to improve system

availability, to change the academic teaching staff and to review strong and week points of the current situation. One of the outcomes of those processes, was that the department technical staff must be more involved in the project, and that the support given was not good enough.

Oracle Israel was involved in the process, generously provided few support day, and the CEO personally met the academic staff to encourage the use of the system in IS curricula. The academic staff, with Prof. Pliskin on the head, decided to continue the project.

In the next year (2003), another collage in Israel started to use Oracle Applications (actually replaced it's SAP R/3 System with Oracle Applications), and came to see the project in BGU. They received full support from BGU IEM academic staff, and still are in touch with the team. Academic year 2003 characteristics were very good rates on students surveys on this course, requests of signing in to the course almost double from places on the course, but few major problems (mainly originated from luck of experience with the system) on class. Students could accept it, but academic staff could not. We must add that the system in use was beginning to be "old" (installation was not on the latest version and no upgrades were done since). Therefore at the end of the year the decision was – **change**.

The change selected in the end of few meetings with internal and external sources was to shift to Oracle Applications SE (special edition), new on the market. This system was Oracle solution to SMB's, containing the full system capacities with pre-defined organization defaults. The use and support of the system is easier than the original system, but to academic needs it is enough. This solution was selected with Oracle Israel support, but with no support from the University authorities. To this solution it was required to buy a new server, and the academic staff wished to locate it in the IEM department. In the political and financial atmosphere, this solution (that could support growth in the number of students practicing the system) was difficult to implement. Finally, after many mail and letters corresponding, formal and informal meetings, the solution implementation started. The budget to the hardware (server) was found in combination of IEM budget, few research budgets (that suggested implementing research with the system) and AFA (Air Force Academy), that wanted the students to start practicing ERP on IEM system. The installation and software was fully provided by Oracle Israel, with support team on site for 3 days (actually the need was of 2 days only). The ERP administrator was IEM technician, which was sent to course funded by Oracle Israel, after working hours. After all issues resolved the third phase started – Local server with Oracle Applications SE, academic year 2005.

This phase allowed to run 2-3 groups in parallel on the system and required more academic staff. New professors started to work with the system, and after 2 semesters of working in this mode the staff is showing high satisfaction. At this stage Ness (Local provider of SAP R/3) suggested to allow IEM to use SAP in ASP mode on their servers,

and a test with one group was made (in parallel of the Oracle courses). The IEM BGU academic staff decided to change the IS curriculum and from the next academic year (2006), ERP will be obligatory course and lab, therefore about 6 groups will be taking the course in the next year.

## 6. Main Findings

This paper is presenting the initial findings found so far. First analysis of the case is showing that the process was divided to phases; table 2 is showing main characteristics of those phases.

Table 2: Main characteristics of the defined phases

	Phase 1	Phase 2	Phase 3
Vendor	Eshbal (local)	Oracle Israel	Oracle Israel
System	Priority ("Small" ERP)	Oracle Applications	Oracle Applications SE
Server	Local IEM department machine	BGU Server, not dedicated	IEM department dedicated server
No. of courses	1 per semester	1 per semester	2-3 per semester and planned 6
Problems frequency	low	high	Mid, decreasing
Students satisfaction	low	high	high
Academic staff satisfaction	low	medium	high
IS curriculum adequacy	low	high	High
Required special funds	No	No, with BGU computer team support	Yes, but affordable

Trying to map the CSF (Critical Success Factors) of this process we found:

1. Strong willing of the **local vendor** to support the process, to provide the University with adequate material and software in order to succeed. CEO personally involved in the process, allowing all internal systems to respond immediately and effectively to all demands.
2. Capable **academic staff** – the academic staff showed strong will to practice the system. The requirements were very high – to learn such system in short time, to develop academic material suitable for classroom use [6]. Such development is not only time consuming but requires intimate knowledge of a complex program, and IEM staff was capable of it.
3. **Funds** – As all software and licenses were given

through the main University agreement, and support was given free by the vendor, the funds were hardware mainly. The hardware was purchased, according to vendor specifications, with combined budget, in very smart mode, so few authorities shared the expense.

4. **Training** - Faculty must be trained in both technical and functional aspects of ERP, in this case training was provided to technical staff by the vendor, therefore it was no issue.
5. According to Bradford et al [2], **knowledge-sharing** among faculty is also a problem because the same ideas are constantly We can see in this case that sharing the knowledge with other faculties occurred (we must consider the fact that the other collage in Northern one, therefore is not direct competitor). It can be the beginning of alliance. [7; 8].

In order to review the effect that this process occurred with Oracle Applications rather with SAP, the literature leading vendor according to [10] we analyzed 2 questions. First, is SAP is really still the leading vendor to academy? We answered it by small sample. We searched two common databases of scholar publications, and found major difference. We limited the searches to scholar articles that published between January 2000 and April 2005, with some key-words and found major differences (shown in Table 3). This demonstrates the findings of Esteves and Pastor [10], and shows us that the gap is still effective.

Table 3: Comparison of refereed publications in the ERP area

Key Words	ABI	Compendex
ERP and SAP	34	75
ERP and Oracle	9 (9/34=26%)	31 (31/75=41%)
ERP and Oracle Applications	1 (1/34=3%)	13 (13/75=17%)

The second question is qualitative by nature, is the vendor Oracle played major role in this case? The answer to this question is complicated, but we found 3 dimensions of it, all of them showing the effect of the vendor:

1. Technical – Oracle Applications is based on open architecture, on which no need of installation on client is required. It allows academic staff teach in many labs, with no need of pre-configured computers (but Java Initiator). Therefore it facilitates the use of the software technically.
2. Motivation - The willing of Oracle to be a part of the "Academic Game" was major catalyst on this case. They provided few solutions that did not require major effort (as course), by few that required budget and effort (as team on site).
3. Corporation – The finding show that corporation between the BGU staff and Oracle staff was productive, and beneficial to both sides (Win-Win situation). IEM team tried to bring the technology frontier to the department, while

Oracle team was trying to demonstrate that the SE application is working and ready to market. The combination of the situations was beneficial to both.

## 7. Conclusions

Findings from the case study indicate that implementation of ERP system for academic use is demanding project, but not impossible one. The department must find supportive vendor, which is the major influencing factor, then aggregate academic capable staff (in this case experienced in industry). The third factor is the training to technical staff, and only fourth is the financing abilities of the department. The model presented here is showing a unique situation of which all parties plays a Win-Win situation game, and all interests match.

We showed that although literature showed no advantage to Oracle as vendor, and supported SAP's experience in the world, although academic staff preferred SAP, the field conditions showed that Oracle was the vendor that locally could support best on this project. Post implementation findings are showing that this choice was good in few other critical dimensions.

## 8. Implications to Research

In this paper, we have added one of the missing pieces to the IS curriculum puzzle. For the past decade, the majority of research focused on SAP implementations and applications. This work looked at the Oracle Applications implementation and ability to perform in academic environment. However, those finding leave us with field that has been largely left unexamined.

We encourage more research on implementation of ERP systems for academic use, success and fails, and we would like to examine a collective case study of those stories. We encourage qualitative and quantitative research on this field, examining the CSF leading to success. We would like to draw and outline the steps toward success and to define a methodology or standard to implement ERP for academic purposes. Finally, we are willing to establish cooperation regarding classes, scenarios and IS curriculum established on the basis of Oracle Applications (Oracle Alliance).

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