The Review of Contemporary Scientific and Academic Studies
An International Multidisciplinary Online Journal
www.thercsas.com

ISSN: 2583-1380 Vol. 4 | Issue No. 2 | February 2024 Impact Factor: 4.736 (SJIF)

Preparing Future Managers for Digital Transformation: Integrating ERP/CRM Systems and Organizational Courses into the Business Curriculum

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 Crossref/DOI: https://doi.org/10.55454/rcsas.4.02.2024.008

Abstract: *Digital transformation, new developments in business strategies such as the increasing migration to Cloud Computing and other Industry 4.0 technologies, suggest that business schools curricula should be modified in order to integrate these subjects and educate future professionals with profound skills and knowledge needed in today's environment. The paper describes the significance of ERP and CRM systems for modern enterprises and for the education of undergraduate students and proposes a procedure for the restructuring of the curriculum of business schools, by taking into account the case of the Department of Accounting and Information Systems (DAIS) at the International Hellenic University, Greece. Moreover, we claim that the teaching of these tools should be accompanied by courses related to the organizational change management and human related skills such as critical thinking, judgment and interpretation. The paper aims to share a framework of the standards and processes of updating the curriculum contributing to the current discussion of the importance of new tools and technologies for future managers.*

Keywords: Business Curriculum, Cloud Computing, CRM, Emerging Technologies, ERP, Industry 4.0

Article History: **Received: 19 Feb- 2024;** **Accepted: 25 Feb- 2024;** **Published/Available Online: 28 Feb- 2024;**

1. Introduction

Cloud computing and the integration of Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) systems become increasingly important for organizational success and the retention of competitive advantage. In addition, Artificial Intelligence (AI), Business Intelligence (BI) and other disruptive technologies and tools have changed radically the way enterprises operate worldwide (Luan et al., 2020).

The consequence of these changes is that managing and accounting tasks require knowledge and skills in accounting related subjects and data analytics (Zhang et al., 2018). Moreover, a number of accreditation bodies, require that all accounting departments in Universities with supplemental accreditation integrate a minimum level of technology skills into their curriculum (Andiola et al., 2020).

In the field of accounting, major accounting authorities and associations (see e.g. CPA in USA and ACCA in UK) propose that data analytics and information systems and controls should be incorporated into their exams. Thus, the importance of incorporating data analytics into the curriculum cannot be stretched enough. Although AI is not a new concept in accounting, new developments such as ChatGPT have made a leap forward, threat of accounting jobs and having the potential to radically transform the industry and accounting schools. AI has the potential to revolutionize the accounting profession by improving decision-making processes, enhancing data analytics capabilities, and providing new insights for financial professionals (Zhang et al., 2018). Efficient AI education equips students with advanced data analytics techniques, enabling them to analyze vast amounts of financial data quickly and accurately, leading to better decision-making. Business schools must recognize the importance of AI education to equip students with the necessary skills to remain relevant and succeed in the digital era (Majid and Lakshmi, 2023).

The aim of this paper is to highlight the significance and the potential of ERP and CRM systems integration into business schools curricula, through a detailed literature review and examples-cases from Universities around the world. Furthermore, based on the case of a Greek University department, our study attempts to describe a framework of the standards and processes of updating the curriculum with new tools and technologies, in order to prepare future managers.

2. Literature Review

In the context of Industry 4.0 and with the advancements in information and communication technologies that drive digital transformation and affect managers' profession, business and accounting schools need to

incorporate new concepts and tools in their curricula in order to equip their students with appropriate skills and knowledge (Dow et al, 2021).

Two of these tools-systems, are Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM). Although these systems have been used in enterprises for several years and knowledge upon them is important for graduates (Harrast et al., 2014), education and training on them is still a major problem for organizations of all sizes (Hepner and Dickson, 2013). At the same time, their incorporation into business schools curricula has several benefits (Blount et al., 2016) and barriers-challenges that make it a rather complex task (Bradford, 2003).

As far as the benefits are concerned, Blount et al. (2016) in their systematic literature review identified the following (among others): attracting key recruiters to the campus, generating new career opportunities, graduating students with ERP skills, emerging research opportunities, enhancing learning about business process, providing active learning environment, adding market value to graduate.

About the barriers-challenges, the authors identified the following: knowledge gap between academic and skill training, technical difficulties and infrastructure, lack of knowledge among instructors, training of faculty members, issues about the course content and unclear vision for the EPR integration in the curriculum. Finally, in their research, Andiola et al. (2020) identified lack of appropriate faculty and funding as the biggest challenges for integrating new technology in the curriculum.

A more detailed view in the relevant literature concerning challenges, revealed further issues that need to be addressed. Firstly, many schools lack of appropriate infrastructure and resources to install, run and maintain ERP and CRM systems in-house (servers, hardware and software requirements, experienced personnel etc.), either purchasing software licenses or using the systems with the form of ASP (application service provision). Of course, with the diffusion of cloud computing and the ability to use ERP and CRM under the Software-as-a-Service (SaaS) model, these problems seem to be solved, since the systems are hosted in the providers' data centers and operation, maintenance and updates are performed by them. In this case, schools have to perform a market research and find software companies that will offer and support such a solution, free of charge or in affordable prices.

Moreover, schools have to find appropriate faculty members that are willing to manage the whole procedure and the cooperation with ERP-CRM providers, in addition to their existing educational and administrative workload. In a survey performed by Bradford et al. (2003) in a sample of 59 business schools, the following reasons were identified for not using an ERP system in their modules: insufficient funds (63%), insufficient IT support staff (58%), lack of knowledge by faculty (54%), lack of interest by administration (40%), lack of interest by faculty (39%). Similarly, Zhang et al. (2018) consider the lack of qualified faculty members as decisive barrier in teaching data analytics related courses.

In their work, Hepner and Dickson (2013) categorize the challenges for ERP inclusion into a business curriculum to the following: formulation and coordination of faculty team, funding, infrastructure, staff involvement, pedagogy and leadership. Therefore, as the authors argue, universities should invest a significant amount of money, time and effort, in order to integrate ERP and CRM systems in their business curricula. And, according to Blount et al. (2016), this effort should have strong support and commitment from the top management authorities of the University.

Secondly, there is the issue of the training material. Software companies already have manuals-documentation, videos and other supporting material, provided through their websites, wiki pages, YouTube channels etc. However, this material was designed and developed aiming at customer's practical training and support and not at the educational needs of students. Therefore, software companies and the academic institutions should devote time and resources in order to convert or create new material (use cases, exercises, assessment tests etc.), customized for university use and build upon educational methods and frameworks (Bradford, 2003). Another issue that comes along with the "pedagogy" aspect of the ERP and CRM systems, is whether students acquire skills and knowledge that are "vendor-neutral" and transferable to any case or refer only to the specific system that they are taught in university modules (Hepner and Dickson, 2013).

Moreover, in order to comprehend the substance of ERP and CRM, students need to have successfully completed modules which provide them with knowledge about the way that organizations operate (Hepner

and Dickson, 2013) and perform everyday operations in the areas of sales and distribution, purchases, inventory and warehouse management, accounting, customer relationship management etc. Based on this knowledge and with the context of ERP and CRM modules, students will be able to map and visualize business processes and to understand how these processes can be integrated and managed through the use of an enterprise-wide information system (Bradford et al., 2003).

It should be noted though, that the above refer to the development of skills for the successful use of ERP and CRM systems. If the aim of the curriculum is to go further and focus in the implementation and impact of such systems, there is also a need for courses that deal with the aspects of organizational change and with the development of managerial and soft skills, such as critical thinking, problem-solving, judgment and interpretation. For example, Wymbs (2016) identified a skills-set for Data Analytics jobs, that includes balanced knowledge of: i) statistical software skills (SPSS, SAS, R), Microsoft Office (PowerPoint and Excel), ii) more specialized financial skills (financial planning, risk management, and underwriting), iii) programming skills, iv), critical thinking skills and v) ability to communicate results. Although some of these skills are still relevant and some, such as the ability to "communicate results", will always be, new industry norms, i.e. the technologies under the term Industry 4.0 (Stafyla et al., 2023) require a set of much more advanced skills and knowledge.

As far as the integration of ERP and CRM into business curricula, there are several examples and studies found in the literature. In Central Michigan University, School of Accounting, the challenges faced were the following (Harrast et al., 2014): selection of the appropriate ERP system, selection and training of the appropriate faculty (accounting-oriented, computer science-oriented, business-oriented), development of the curriculum and administration of the project. The assessment of the initiative showed that graduates who took at least one ERP-supported class were offered higher starting salaries compared to those who had not taken any ERP course (Harrast et al., 2014).

In the case of California State University of Fresno, as described at Iriberri et al. (2015), students expressed positive perceptions and understand the usefulness of ERP integration into their curriculum. Especially students with working experience seemed to realize more the value of ERP training, while students with no working experience expressed increased feelings about usability of the ERP taught.

In a large Australian University, according to the findings of a research conducted by Blount et al. (2016), the majority of students enjoyed the ERP experience, found the resources provided as useful and appreciated the opportunity to work with a real ERP free of charge. However, some students found it difficult to get familiar with the ERP interface, while some others wanted more detailed instructions for using it. As far as the perspective of instructors is concerned, the first issue reported was the time and effort needed for the design and the development of teaching material. The second issue referred to the time and effort for the execution of administrative tasks, such as communication with the ERP provider, generation of usernames and passwords for every student etc., something that required the help of another assistant. Other issues reported, include student's low computer literacy and technical inefficiencies, such as the fact that the ERP system was only available in the university's computer labs and students were not able to practice at home (Blount et al., 2016).

Similar to the above benefits are the findings of another survey in an American University (Choi and Ngo-Ye, 2019), where students' perceptions about course content effectiveness and usefulness were more than positive.

Finally, in a research performed at Qatar University after the integration of an ERP into the accounting curriculum, students that this kind of training was a valuable complement to their studies and that it will help them find a job after graduation (Saidi et al., 2019).

From all the above, it is evident that integration of ERP and CRM systems into a business curriculum has significant benefits for students and departments. At the same time though, it must overcome several challenges, since it "requires a redesign of the curriculum rather than an ad-hoc approach" (Blount et al., 2016). Therefore, Universities should proceed with a detailed plan and appropriate procedures for the success of such a project.

3. The Procedure of Developing A New Curriculum

The current program of the Department of Accounting and Information Systems (DAIS) of the International Hellenic University (IHU), Greece, is structured around fundamental subjects taught in the first four semesters and advanced skills courses and elective courses taught in the late semesters. As far as the technology-related subjects are concerned, the foundation courses include statistics, databases, excel techniques for financial analysis and analysis of financial statements. The advanced courses, taught in the last 4 semesters include data mining in accounting and big data analysis. Also, a number of elective courses are offered, including SAP ERP courses (mainly concerning modules such as financial accounting, sales and distribution and materials management) and CRM systems, provided through the SAP University Alliances program (SAP, n.d.).

Some years ago, the DAIS seized an opportunity offered by a new law to change the title of the undergraduate program and make the necessary adjustments. The previous title was "Department of Accounting and Finance" and after the department's decision to concentrate on Accounting and Information Systems the title has changed to "Department of Accounting and Information Systems". The Quality Assurance Unit of DAIS, after a thorough research in the curricula of similar courses offered in the UK and USA, proposed a new curriculum that integrates ERP, CRM, Business Intelligence and related subjects. In this point, it should be noted that according to the quality assurance standards of the Greek authority for higher education, curricula should be revised regularly, which normally is no sooner than the completion of the full course consisting of eight semesters (four academic years).

The main changes regarding the curriculum are presented at Table 1 below:

Table 1: Technology related courses

Courses	Remained / Modified / Introduced
Contemporary Information Systems and ERP systems	Modified: SAP ERP, Member of SAP UA
Customer and Suppliers Relationship Management	Modified: CRM systems
Financial Analysis using Excel	Remained
Office / Access	Modified: Databases / SQL
Data Mining	Introduced: new course

Although students are quite satisfied with the courses offered, judging from the evaluation reports filled at the end of every academic semester, there is a growing concern among academic staff that not only several new technologies should be integrated in the forthcoming program but also, and perhaps more important, about the appropriate way to teach them in order to release the full potential of an advanced undergraduate program.

There is no doubt that current digital technologies and data analytics are rapidly changing the expectations of customers, employees, and academia. The new program should provide a solid foundation to the students rendering them with the ambition and confidence to lead the digital transformation of the companies in which will be employed after graduation. The main goal of the new program, as documented in meetings of the teaching staff, is that students should have acquired all necessary skills and knowledge in order to adopt more collaborative decision-making approaches, to operate sufficiently ERP and CRM systems and to be able to implement cloud computing migration and digital transformation projects.

Challenges for running the new program, include the following, among others:

- Faculty readiness: accounting schools may face challenges in finding qualified faculty with expertise in ERP and related business applications to teach these specialized courses effectively.
- Curriculum integration: successfully incorporating ERP courses into the existing curriculum require also the teaching of related subjects such as change management and this can be complex. Current courses might be needed to be replaced causing conflicts among academic staff.

To answer the above challenges, we propose a procedure consisting of the following steps:

1. The Quality Assurance Unit of the Department initiates the project by defining its parameters taking into account all mandatory requirements (e.g. number of courses, European Credits Transfer System (ECTS), etc).

2. Establishing a three-member committee with members of teaching staff of various backgrounds (accounting/auditing, finance and computer science) for leading the restructuring of the program of study. This committee will report to the Quality Assurance Unit of the Department which in turns reports to the Quality Assurance Unit of the University.

   The tasks of this committee include:

   - Analyzing the feedback from students and graduates with working experience
   - Searching of the curricula of all University departments offering the accounting, auditing, finance and IS discipline worldwide using appropriate keywords
   - Searching of companies' open position announcements (as proposed by Mamonov et al. 2015)
   - Literature search using appropriate keywords (according to Wang, 2015; Elmegaard, 2021; Ruhnke, 2022)
   - Consulting with the Advisory Board of the DAIS. The board consists of members from local software, auditing and consulting companies, leading industrial companies, Economic Chamber of Greece/Accounting section and Institute of Internal Auditors of Greece.
   - This Advisory Board is newly established and is now officially recognized and integrated in the departments' organizational structure for consulting purposes. Its function has been approved by the Quality Assurance Committee of the University. Partnering with accounting firms, leading industrial companies and AI experts can ensure that the curriculum aligns with industry needs and best practices.

3. Several meetings of the Quality Assurance Unit of the Department with all the members of the teaching staff for discussing and deciding on:

   - the final curriculum and the inclusion of a standalone Data Analytics course
   - the developing of new interdisciplinary courses by collaborating with other departments or industries (as stated in Wang, 2015)
   - strengthening the faculty members' expertise on business analytics and intelligence (proposed by Wang, 2015)
   - how to motivate the instructors to incorporate AI tools in their courses (other than Data Analytics)
   - how to motivate the instructors to incorporate judgment and critical thinking skills in their courses
   - the methods and approaches to teaching
   - the type of exams and evaluation of the students
   - the monitoring and evaluation of the program results during and after its completion.

4. Conclusion

New advancements in technology, economy and society are forcing business schools to restructure their curricula in order to not only meet current needs but also to make them bullet- proof for the future. This requires the establishment of a mechanism that is agile, flexible and can be supported by the accounting schools sources. For schools belonging and solely financed by the public sector as it is the case in Greece, this could be proved to be a very difficult exercise. Other challenges include the availability of ERP systems and AI tools and incorporating related courses into the existing accounting curriculum. Hands-on projects and real-world case studies can enhance students' understanding of business. Providing training and resources to accounting faculty can help them develop expertise and effectively such courses.

The paper presented a proposed framework to be followed by a university department for restructuring the accounting curriculum taking into account the new technological advancements as well as the human related

skills that need to accompany the use of modern tools and technologies. This procedure is generic and it could be adopted by other departments and schools. Future research should concentrate on the automation and the flexibility of the mechanics for restructuring the accounting programs and methods of teaching in order to meet the ever changing demands and educating tomorrow's professionals.

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ISSN: 2583-1380 Vol. 4 | Issue No. 2 | February 2024 Impact Factor: 4.736 (SJIF)

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