Preface

The effective use of Information and Communications Technologies (ICT) and Information Systems (IS) among organizations is, nowadays, the result of multi-perspective research approaches within Enterprise Information Systems. It includes a wide spectrum of combined solutions, ranging from purely behavioural ones that reflect a person's state of mind regarding ICT and IS, to those that address more technical hardware and software challenges. In between, there is enough space for information systems effectiveness regarding project and process management, decision-making, cloud computing or even skills development. These are the main topics addressed by this book.

CHALLENGES

This handbook proposes a quite innovative set of solutions regarding challenges faced by Enterprise Information Systems knowadays. The book is organised into five correlated sections: section I presents three chapters related to the use and assessment of ICT within educational environments. Section II stresses the use of architectural models such as cloud computing, integration models and the use of algorithms to tackle technological challenges rose by dispersed EISs and data. Section III contains five chapters that describe project management approaches and organizational models to enhance operational procedures among organizations or even populations, while section IV addresses decision-making and semantical approaches to EIS. Finally, section V addresses the use of Business Process Management (BPM) to either improve the correctness of business process models, or as a mean to infer knowledge within the main EIS stakeholders.

TARGET AUDIENCE

The handbook is expected to support a professional audience of senior managers, CIOs, ICT professionals, project managers and academia (teachers, researchers and students, mainly from post-graduate studies). It foresees the intent to illustrate both actual real-scenario working solutions and ICT and IS proofs of concept that may dictate its widespread use in a nearby future.

ORGANIZATION OF THE BOOK

The book is organized into seventeen chapters. A brief description of each of the chapters follows:

Chapter 1 presents an overview regarding the challenges of the integration of Information and Communication Technologies (ICT) in schools, from the teachers, classroom and exterior environments points of view. It also includes a study conducted on existing ICT in schools and online safety. Main conclusions point out that the use of ICT is generalized, and that some steps regarding the use of specific tools were made. Additionally, it refers to the progression made in involving students in ICT-related projects, although lacking some maturity and integration with other existing technologies/applications. Regarding online safety, the authors also conclude that teachers' preparation seems to fall short, and that prevention is often based only on some billboards or warning signs.

In Chapter 2 the authors perform a comparative analysis on Learning Management Systems (LMSs), platforms and their main features. They also present a study conducted at the University of Aveiro (UA) that evaluates the effective use of the Moodle platform, that proves to be the most used LMS nowadays. Students use it at UA mainly for the purposes of "download materials", "news" and "deliver assignments". They also concluded that there were mainly two groups of respondents to the survey used, based on the importance that students give to Moodle tools. This results in statistically different values for both groups, up to a level of 5% regarding to the importance of each Moodle tool.

Chapter 3 proposes a new integration model architecture to enhance organizational operations as a whole. The authors base their research in a real-world case study of a company with highly demanding integration needs. It includes the use of SAP/R3 and MS SQL Server systems, and the ABAP and VB.NET programming languages, being results formatted as in XML. From this case study, they derive a ubiquitous integration architecture, in which the main components are Server, Interpreter, Server Broker, Client, Client Broker, Envelop, and several Server systems. This architecture can be used by other systems to process and collect data from any SAP/R3 system.

Chapter 4 assesses the state of knowledge and implementation of cloud computing in Portuguese companies. Researchers have conducted a survey throughout several companies with different characteristics, and concluded that only 26% of the respondents did not know about cloud computing, while 45% had the minimum knowledge, and 19% a consolidated knowledge. Economics led the reasons for the adoption of the cloud, followed by computing power. Concerns about data privacy hamper companies' opinions about using the cloud for business continuity and disaster recovery. Most companies use public cloud services such as email and storage, while about 25% of them had implemented their own private cloud.

In Chapter 5 the authors address the use of the Artificial Neural Networks (ANN) model to predict the tourism time series of "Monthly Number of Guest Nights in the Hotels". They compare four combinations of ANN's varying input features and using the feedforward, cascade forward and recurrent architectures. The four ANN models produced results for the mean absolute percentage error (MAPE) between 4.2% and 6.4% in the test set, and the feedforward architecture was the one which achieved better results considering both validation and test sets.

Chapter 6 proposes a model that allows the measurement of knowledge, as well as the generation of organizational improvement regarding customers' co-creation in innovative processes. They apply their model to replenishment practices in the Spanish market. The results show that relational capital positively influences the generation of improvements in the organizations in efficient replenishment practices. The proposed model can also be applied to different segments of interest and different companies.

In Chapter 7, project management practices in the Portuguese metalworking industry are the main subject. The authors perform a thorough analysis from practices observed in thirty companies, using a questionnaire to collect relevant data, and conclude about the most and least highlighted knowledge areas of project management. The most valued area was procurement management (73%), followed by scope (64%), quality (63%) and cost management (62%). The least valued ones include risk (44%), integration (50%) and communications management (53%). They also assessed most wanted project manager's skills, which include leadership, planning, communications, decision making and problem solving. Project success is also evaluated regarding compliance with technical specifications, budget and schedule targets.

With the occurrence of the large earthquake and tsunami in the Tohoku region in Japan, many people evacuated and were dispersed all over Japan, losing human bonds ("Kizuna") in neighborhood communities damaged by the nuclear disaster. Chapter 8 presents an ICT-based platform that can systematically accumulate information owned by the local government and residents, for the purpose of restoring "Kizuna" in the community where inhabitation is not possible. The authors propose the combination of life logs and social graphs to achieve a deeper restoration of a community's identity, as well as to serve as reference for planning the political reconstruction and homeland recalling.

Chapter 9 describes the research conducted to improve the Portuguese Air Force operational domain while increasing levels of effectiveness and efficiency. The authors propose a model that uses two main concepts: EX-ANTE and EX-POST, together with the Zachman framework. Their Operational Management Model (OMM) was applied to SIGOP (the resident information system for operational management), providing better operational planning, as well as the necessary data to analyze Key Performance Indicators (KPIs) of all essential operational elements: missions (flight hours), crews and aircraft.

In Chapter 10 the authors propose an operational effectiveness index system (OEIS) in order to assess the overall effectiveness rate regarding operations at the Portuguese Air Force. This index is derived from several effectiveness vectors that regard to operational key elements such as mission – number of flight hours, mission ready aircraft and crew qualification. The index was tested among several Air Units, and calculated on a monthly basis for each one of them. Its dissemination throughout the entire organization led to an increased effort by commanders towards operational improvement, as well as its use as a decision-making tool.

Chapter 11 aims at describing a set of relevant concepts for the design of information systems supporting the global decision-making process in an enterprise. The author proposes a system that will help managers to evaluate, through the use of decision dashboards, the flux of decision-making for which they are responsible. These dashboards also allow for crowdsourcing regarding non-managers different aspects of decision. Since the dashboards are connected in a conversational network, they will promote the support for a global decision process within an organization.

Chapter 12 focuses on the examination of the quality of decisions made by groups making decisions in the laboratory under either majority rule (MR) or consensus rule (CR). The authors measure engagement of people within increased five-person groups, including self-reports, number of participant utterances during discussions, and changes in galvanic skin responses (GSR). They predicted that engagement, based on number of utterances, would be greater under CR discussions, which are open-ended, rather than those under MR, which are focused. Conversely, under MR, we predicted that average galvanic skin response (GSR) responses would be greater, indicating more attention to the problem at hand.

In Chapter 13's research work, the authors present and discuss the usage of lexical, syntactic and semantic lexical technologies to address interoperability problems at the product identification level, in the context of food consumption. They perform a case study analysis based on information provided by Point-Of-Sales (POS) systems and a public healthcare authority system, where food composition data is available. They have achieved a matching accuracy between items in the POS and in food composition databases with the help of advanced lexical, syntactical and semantic processing of items textual descriptions. They further applied multi-objective optimization to minimise the number of matching errors, as well as food composition deviation values.

Chapter 14 presents an innovative generic semantic search platform, as well as an architecture and four stages that a given traditional search system should use to evolve to a semantic search system: concept definition, data insertion, data expansion and search process. The authors also refer to a real-world implementation of their search platform, used on the Quality Management System (QMS) of Viana do Castelo Polytechnic Institute. The need for a semantic search system applied to a QMS is considerable as these systems have often a lot of documents and the search for a particular document can be increased with semantic technologies.

Chapter 15 provides an approach to add preciseness to the OMG's Business Process Model and Notation (BPMN) metamodel specification, in order to enhance correctness of BPMN process models. The authors analyse the well-formedness rules described informally (in natural language) in the BPMN specification, and derive the formal correspondent rules using the Object Constraint Language (OCL). They also provide some model snippets illustrating correct and incorrect situation, and describe how their approach was operationalized, namely by developing several transformations for conformance checking of BPMN models available from public repositories. Using the same metamodel-based approach, they also formalized a set of best practices for BPMN modellers, based on published recommendations produced by BPMN experts in tutoring books.

Finally, in Chapter 16 the authors present a Business Process Management (BPM) training program initiative (CertiBPM), developed in the context of the Leonardo da Vinci Programme. The approach was built in an international partnership between teams of specialists from Slovenia, Romania and Austria. The experience gained by a Slovenian group of trainers in building, disseminating and implementing a BPM training program has been transferred and adapted to Romania, using the basic knowledge already existing in the field. The authors present also the research results regarding the Romanian market acceptance of the CertiBPM training program based on the participants/trainees feedback collection and marketing survey.

CONCLUSION

This book's themes range from more technical approaches of effective use of ICT, algorithms, Artificial Intelligence and Data Mining, to more high level Management Information Systems, Decision Support Systems and Business Process Management.

For its variety of effective and real-world scenario applications, we definitely think that this book can be used as a roadmap for EIS implementations and case study examples.

We hope you find it useful. Enjoy your reading!
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