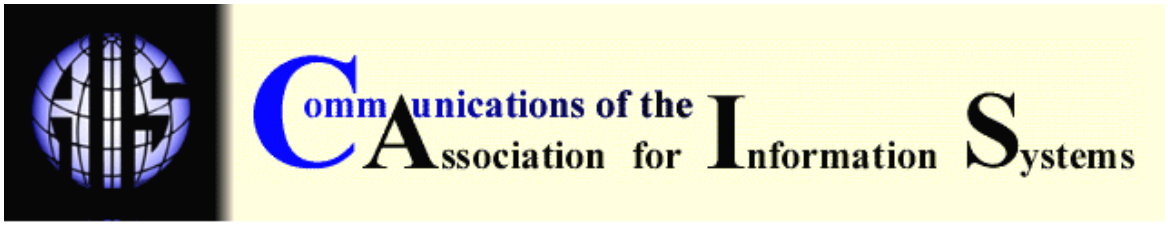

INNOVATION IN INFORMATION SYSTEMS EDUCATION-V THE MANAGEMENT OF OUTSOURCING: DEVELOPMENT OF A MODULE WITH IMPLICATIONS FOR THE IT CURRICULUM

Roberto Evaristo
University of Illinois Chicago
evaristo@uic.edu

Jorge Audy
Rafael Prikladnicki
Leonardo Pilatti
Leandro Teixeira Lopes
Pontifícia Universidade Católica do Rio Grande do Sul

ABSTRACT

We describe the development of a short module involving a globally distributed task with the objective of not only creating student awareness about the difficulties of managing outsourcing but also giving them experience in the process of learning about subtleties of project management and information requirements determination in a distributed environment. Professors from the U.S. and Brazil at both the graduate and undergraduate level were involved. Courses ranging from IS Strategy and Introduction to IS to IS Project Management and Systems Analysis and Design were the target of the modules developed. A detailed discussion of the exercise, its role in the courses in which it was used and the results achieved are also presented.

KEYWORDS: outsourcing, distributed software development, global software development

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I. INTRODUCTION

Distributed software development is increasingly more common. One of the consequences is the growth in IS outsourcing, particularly by taking advantage of differential labor costs in other countries [Agarwal 2003]. A practical and much discussed issue is therefore the export of jobs from the U.S. to such countries. Students took note. As a result, outsourcing contributed to lower enrollment in IT programs at all levels in the United States and other developed countries. Many efforts are underway to discuss potential changes in the IT curriculum to make it more relevant to a new reality. For example, curriculum change was the topic of a panel at ICIS 2004. One of such changes is clearly a better understanding of how outsourcing may affect the current curriculum. Hirschheim [2004] prepared a clear and succinct description of the outsourcing basics.

Outsourcing can be defined as the transfer of any business function from one organizational entity to another [Subramanyam, 2004]. Global IT outsourcing (also referred to as offshore outsourcing) is just an extension of the concept to outsourcing across country boundaries. Lacity and Willcocks [1998] maintain that the main reason for outsourcing is cost savings.

Subramanyam [2004] see three types of uses for offshore resources:

- managed development centers (those who do it themselves)
- offshore outsourced vendors (those who contract with offshore companies)
- onshore outsourcing (those firms using offshore resources on site)

These three types of outsourcing are compared in Table 1.

Table 1. Outsourcing Alternatives

Characteristic	**Managed Development Centers**	**Offshore Outsourced vendors**	**Onshore outsourcing**
Cost	Lowest	In between	Highest (but cheaper than US based outsourcers)
Risk	Highest	Moderate	Lowest
Implementation Time	Longest - 9 to 18 months	Fastest – under 3 months	Depends on the political situation and visa availability – up to 6 months
Governance	Special expertise in offshore culture, regulations, sourcing	Managing offshore contracts	Traditional vendor management

Source: Soubrmanyan[2004]

Although specific courses on outsourcing and management of outsourcing were not yet listed on ISWORLD in February 2005, it is reasonable to expect that such courses are not too far away. A careful search uncovered only one syllabus related to "IT Offshoring" [Friedrich Alexander University, 2004]. On the other hand, several syllabi included IT outsourcing among their topics. Examples are:

- The MIS course at the University of Missouri St. Louis[1]
- Distributed software development one in Sweden[2] and one in Zagreb, Croatia[3]).
- Course on global software engineering, at the Technische Universität München[4] and Carnegie Mellon University (CMU).

The objectives of such courses are to improve students' understanding of the challenges of global IT outsourcing and the potential impacts on their careers. A primer on contracts, software development process, and project management are all important because of the inherent differences between offshore outsourcing and a traditional project.

Clearly one of the issues is deciding which courses are more appropriate to include such content and what should be eliminated to make space for the new content. In Section II, we provide an analysis of the alternative courses where it may make sense to implement strong outsourcing content and which would therefore be good alternatives to adopting the module described in this article.

[1] http://www.umsl.edu/~lacity/ms480sum.htm
[2] http://www.idt.mdh.se/kurser/cd5610/2003/
[3] http://www.fer.hr/rasip/dsd
[4] http://atbruegge27.informatik.tu-muenchen.de/teaching/ws01/GSE/index.html

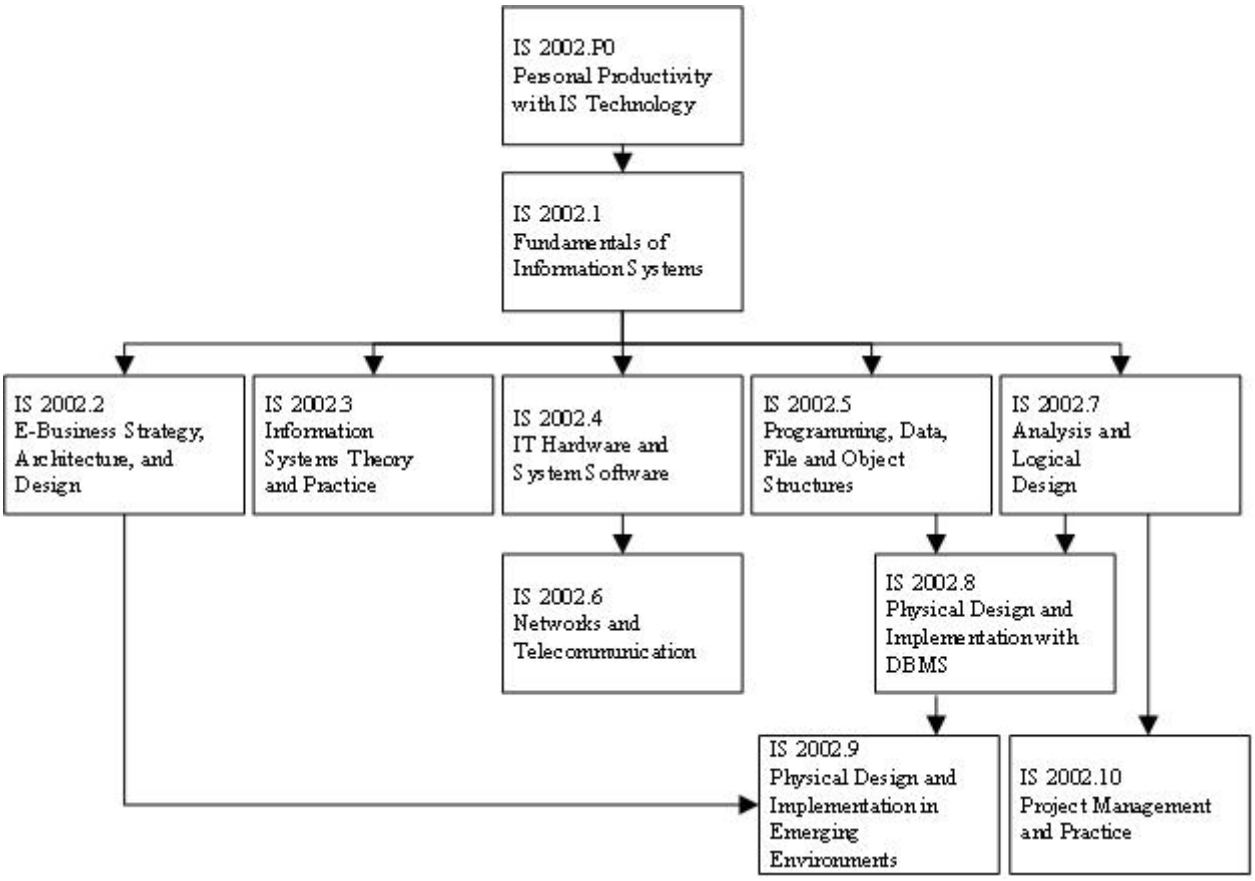
The objective of developing an "outsourcing" module with a distributed task is to help students understand and cope with the complexity and challenge of offshore development. This short module has been taught at both at the undergraduate and graduate levels, with the sophistication of the discussion adapted to the class levels. Trade-offs related to course content are discussed, as are the task and rationale involved.

II. APPROPRIATE COURSES AND IMPLEMENTATION ALTERNATIVES

In this section we explore potential courses where the topic of management of outsourcing is appropriate and at what level. The way in which the module was eventually implemented and how it can be customized to fit such courses is then discussed. Assessments from students are also presented.

UNDERGRADUATE CURRICULUM

Traditional courses in the IT curriculum for undergraduates [Gorgone et al. 2002] include several courses where outsourcing could be included. In introductory courses such as "Fundamentals of Information Systems," an initial discussion may be appropriate, but it is unlikely that it should be more than purely descriptive. Some of the more advanced courses can go further in the coverage, such "IS Theory and Practice" and in particular "Project Management and Practice." An alternative would be to insert such coverage as a practical exercise in one of the most applied courses such as "Analysis and Logical Design" or either of the two instances of "Physical Design and Implementation." Figure 1 shows the IS2002 undergraduate curriculum in information systems.

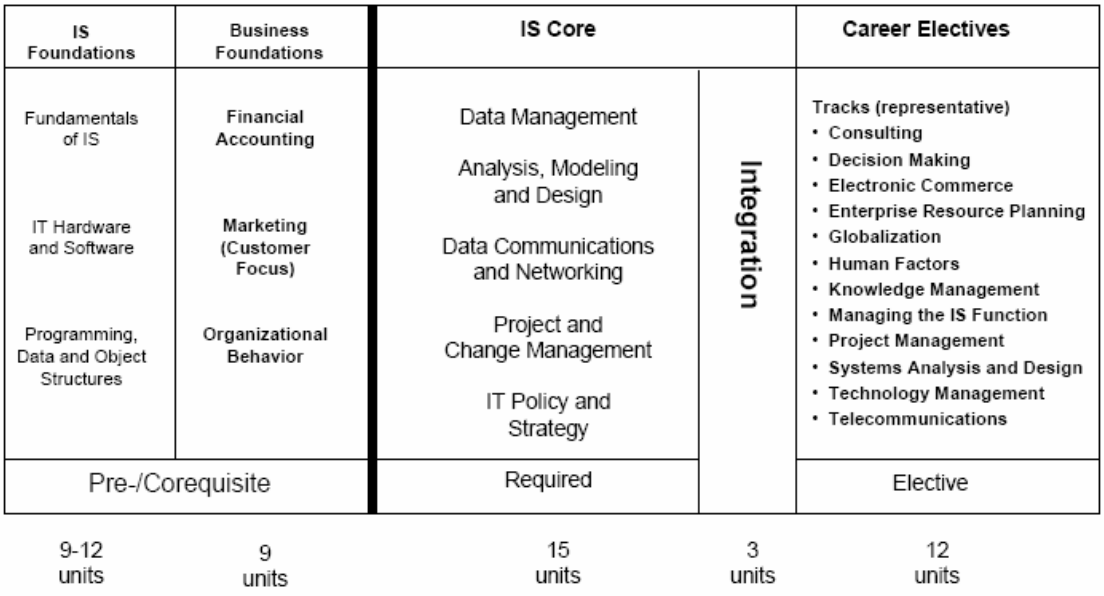


Source: Gorgone et al. (2002)

Figure 1. IS 2002 Representative Course Sequence for the Undergraduate Curriculum

GRADUATE CURRICULUM

The recommended graduate curriculum for an MS in Information Systems [Gorgone et al. 2000] suggests a somewhat similar set of courses. Since this curriculum contains an enhanced managerial focus, more possibilities exist for including outsourcing content (or even a specific course) could be implemented. Variations on this curriculum are implemented in many Universities.



Source: Gorgone, et al. (2000)

Figure 2. The Complete MSIS Curriculum

As in the undergraduate curriculum, the topic can be offered in at least two ways:

- as a descriptive topic for discussion at different levels of coverage or
- in an applied manner.

We believe that the combination of the two approaches is best.

IMPLEMENTATION APPROACH TAKEN

One of the many difficult points in outsourcing IT is coordinating efforts between groups of individuals in different locations where culture and work customs, time zones, language knowledge, and perhaps importance given to a particular project are different.

Therefore, we strove to develop a distributed collaborative task that could give students practical experience in managing such situation and it was at the same time customizable to the needs of different courses. Moreover, the task was planned as something that could be introduced to the students as an opportunity to try their hand at dealing with an outsourcing situation. Realistically, even the most complex and realistic task would only give students a taste of the problem. In our case, the task was also developed to be manageable within the time frame of one semester.

The crux of the task was a distributed analysis problem. Students in one country role played analysts engaged in a distributed information requirement determination job while students in the other country role played users. The topic of the system in question changed over time so that it was appropriate to the needs of the students in the particular courses taken. Moreover, the role of analysts was changed back and forth between the two universities (one in Brazil and the other in

the U.S.). An initial report on the findings can be found at Audy et al (2004) and Evaristo et al. (2005).

Naturally, a distributed task is not by itself fully representative of a true outsourcing situation. It does, however, capture one of its most visible aspects and, if conducted and debriefed appropriately, it brings home some of the key learnings intended.

A typical debriefing involved a one period class-wide discussion of the problems encountered and solutions implemented to deal with them. Time devoted to the practical aspects module included two full class periods, one at the beginning of the semester discussing issues with management of distributed projects and a detailed explanation of how the task would be performed plus the debrief period at the end. In addition, about 15 minutes were devoted on a consistent basis on each class period to discuss issues that came up. Typically the set of readings provided were anticipated to address many of the problems that would be brought up. The total time devoted to presentation, discussion and debriefing is estimated to be about 3 full class period equivalents out of the 15 in the semester.

The module was offered in a graduate level Information Systems and Organizations class at PUCRS (Pontifícia Universidade Católica do Rio Grande do Sul) in Porto Alegre, Brazil, and a graduate level Systems Analysis and Design class at the University of Illinois, Chicago (UIC), taught by the first two authors. The interviews and discussions between the students took place entirely through the electronic discussion feature of the Blackboard system (web-based course instructional site at UIC). Students were instructed not to use e-mail or communication media other than the discussion board because that was the only way to ensure that all the exchanges would be recorded and therefore evaluated. Students were given 30 days to complete the assignment.

WIN-WIN SITUATION

Clearly U.S. students gained advantages from participating in such an exercise. At a minimum they were exposed to the problem and became aware of the issues in outsourcing. But this exercise was also useful for the Brazilian students. The Brazilian students attended PUCRS, where the largest and most advanced technological park in South America is located. Over 1,000 employees work on campus for subsidiaries of multinationals like Dell and HP developing software. These subsidiaries are slowly taking over much of the development work previously performed in the U.S. Brazil is fast becoming the up and coming outsourcing center, with many advantages compared to other sites, including highly trained workforce, fairly similar culture, and small time zone differences. Moreover, these companies hire most of the students from PUCRS to work for them. In other words, these students are the future outsourcers themselves, and such exposure to outsourcing improved their sophistication and awareness.

III. LIMITATIONS AND IMPROVEMENT ALTERNATIVES

The realism of the task is limited due to the practicalities involved. However, we believe that depending on the situation, potential adopters can increase the task's realism by also simulating roles of the project management office, contracts, potential CMM processes, project manager roles, while at the same time controlling for scope creep and sign-offs.[5] Another set of improvements would deal with the logistical difficulties encountered in running the module. One of the key issues between the Universities was related to different weights assigned to the assignments. We recommend that, to the extent possible, such weights should be aligned. Another problem was trying to equate the number of groups in both sides; very little control is possible over enrollment numbers. This difference required creative solutions: in one instance,

[5] We are indebted to the reviewers for pointing out ways in which this task could be improved.

there were many more groups in the U.S. than in Brazil. As a result, we paired two U.S. groups (needed for other class purposes) to interface as a single group with the Brazilian counterpart.

IV. CONCLUSION

In this paper, we described how a module was created and implemented with the objective of giving students an opportunity to be exposed to issues related to IT outsourcing. Students of two countries (Brazil and U.S.) role-played users and analysts in a distributed requirement determination task. The students were enthusiastic about their experience, and quality research results were obtained.

In the Appendix we describe the course module developed, with excerpts from the syllabus of both Brazilian and U.S. courses, assessment tools, task descriptions, and excerpts from the students' deliverables.

Editor's Note: This article was received on February 7, 2005 and was published on February, 24 2005. This article was fully peer reviewed.

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EDITOR'S NOTE: The following reference list contains the address of World Wide Web pages. Readers who have the ability to access the Web directly from their computer or are reading the paper on the Web, can gain direct access to these references. Readers are warned, however, that

1. these links existed as of the date of publication but are not guaranteed to be working thereafter.

2. the contents of Web pages may change over time. Where version information is provided in the References, different versions may not contain the information or the conclusions referenced.

3. the authors of the Web pages, not CAIS, are responsible for the accuracy of their content.

4. the author of this article, not CAIS, is responsible for the accuracy of the URL and version information.

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APPENDIX I. OUTLINE OF THE COURSE MODULE

This module was used in four different courses in the United States:

- Introduction to Management Information Systems at the MBA level,
- Systems Analysis and Design both at the graduate and undergraduate level, and
- IS Project Management at the graduate level.

The description in this Appendix is for the Project Management course. Most students were enrolled in the MS in IS, and a few were MBA students.

At PUCRS, the University in Brazil, the module is part of the Master of Science program in the computer science school. The course is mandatory for all IS students, and called "Information Systems Modeling in Organizations". Its goal is to understand information systems in organizations, their management decision processes, strategic planning, and project management. The module was assigned 30% of the grade.

SYLLABUS EXCERPT (U.S.)

> *This course examines the management of complex projects, the tools that have been developed to assist managing these projects, and the tradeoffs faced by most project managers. While the course is applicable to all types of projects, we will focus on two types of projects: (a) Information System projects and (b) technologically intensive projects that have characterized most new product development projects in recent years….*
>
> *Moreover, we will be covering the management of distributed projects. Additional readings will be suggested to discuss this topic in more detail….*
>
> *One of the group projects will involve a long distance assignment: Students at UIC will role-play users of a computerized system (details to be made available before the beginning of the assignment); system analysts from Brazil will prepare a detailed specification for the system, and a prototype will be actually developed. This is intended to raise the issues related to working at a distance in a distributed project.*

SYLLABUS EXCERPT (BRAZIL)

The syllabus includes:

1. *An introduction of the information systems in the organizations*
2. *Decision process and organizational learning*
3. *Modeling and planning information systems*
4. *Information Systems Project Management*
5. *Information Systems Audit*

SUGGESTED READINGS FOR THE U.S. COURSE

Andersen, E., & Jessen, S. A. (2003). Project Maturity in Organizations. International *Journal of Project Management* (21), 457-461.

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TOOL EMPLOYED

Blackboard with its discussion thread feature was employed. A userid was created for each of the Brazilian Students, and groups formed. Although Brazilian Students were originally not familiar with Blackboard, a simple “how to” was developed and shared with the students. Given the intuitive ease of use, it was assumed that this training would be appropriate. Debriefing showed that although there were reservations about the medium, there were no problems with using the tool itself.

INSTRUCTIONS AND ASSESSMENT CRITERIA

Distributed Project Management Exercise

This exercise involves U.S.-based groups and Brazil-based groups. The U.S. students role-play users of a system, whereas the Brazilian students play the role of systems analysts and developers. The deliverables include two items:

1. requirement analysis, or a description of the requirements of the system; and 2. a "lessons learned" document, both in Word format. More details below.

The system about which the "analysts" will interview the "users" is used in manuscript submission and reviews. All students should exchange information ONLY through the discussion thread mechanism. PLEASE NO EXCHANGE OF SYSTEMS PHOTOS other than screens if needed. Since Chicago based students used this feature before, information on how to do that is included below in Portuguese only. An earlier email to Brazilian students included the same information, and it is repeated here for their convenience.

Deliverable for the U.S. Students

The deliverable is a "lessons learned" document. Sample questions (to be updated later in more detail) include:

a. Effort of each team (US vs. Brazil)
b. What worked best?
c. What did not work?
d. Adequacy of the medium (discussion threads) to the task
e. What were your concerns during the task?
f. What did you learn from this task?
g. How efficient did you find the dialogue with the Brazilian or US team (or whatever language you are using for requirements elicitation process? Can you give us some examples of how the process was efficient and/or inefficient?
h. Were there any misunderstandings? Can you explain and tell us how these were rectified?
i. Did you trust your distant teammates to give you correct and complete information? If so, why? If not, why not?
j. Did your level of trust change over the time of interactions? If so, can you explain what led to this change.

Please answer these questions in a thoughtful manner (and the additional ones to be posted soon) directly in your text. Please create one text section for each question, and label it clearly.

Task Description

> *The proposed system will manage submission of papers for a minitrack of a conference. Every minitrack will have one or more chairman who is in charge of managing the minitrack. Our system should facilitate the chairman with all the steps he/she goes through in assembling accepted papers for a minitrack.*

Detailed Description of the System Requirements:

The chairman of the minitrack does the following tasks for his/her minitrack. Specific deadlines for each of the task are listed below. The system should provide the capability of the chairman being able to set the deadlines based on the conference deadline date.

I. *Call for paper abstracts and a deadline should be set for the last date to receive the abstracts. The deadline for the abstract submission is 1-½ months from the call for paper abstract date.*

II. *Based on the abstracts received, the chairman selects the topics and the authors are contacted within two weeks to send the manuscripts in* Microsoft Word *format before the specified deadline. The authors are given two months time to send their manuscripts.*

III. *After receiving the manuscripts, the chair sends an acknowledgment letter to the authors within a week telling the authors that they will be notified if the manuscript has been accepted or rejected.*

IV. *Chairman has a list of contacts and he/she contacts asking them if they would be interested in reviewing papers for the conference before the specified deadline. The chairman should come up with the potential list of reviewers within 15 days.*

V. *After short-listing the reviewers, a letter is sent to the referees to review the manuscript. An evaluation form will be sent along with the letter for the referee to record the evaluations on the manuscripts. Reviewers are given 1-1/2 months time to review and record their evaluations.*

VI. *A week before the deadline, chairman should send a reminder letter to the reviewer.*

VII. *After receiving the evaluations, the chairman aggregates them and checks to see if the opinions of the reviewers differ. Based on the evaluation, the chairman decides if a manuscript is accepted, rejected or needs to be sent to authors for revision. The sorting should be done within 15 days. If a paper is accepted then the chairman should send an acceptance letter to the authors. If the paper is rejected, a rejection letter should be sent to the authors. If the paper needs to be revised, the authors are given the option to revise and resubmit the paper. The authors are given a maximum of one-month time to revise and resubmit the manuscript. The chairman should also send the evaluation form received from referees.*

VIII. *A week before the deadline for resubmission, the chairman should send a reminder to author asking them if they would be able to revise and resubmit within a week.*

IX. *The chairman verifies if the revisions were made by the authors according to the evaluation and decides if the paper is accepted or not.*

Within 10 days the chairman sends notification to the authors and the publisher on all the accepted papers.

EXAMPLES OF "LESSONS LEARNED"

From a US-based group:

> *"When the distributed project began, we initially thought that UIC teams of four or five would be working with Brazilian teams of four or five. Later, due to the fact that there were just four teams in Brazil some of the teams at UIC were merged together to form a bigger team (8-10 people).*
>
> *Furthermore, the prospect of working in a "distributed" environment excited us all. However, we were not sure how it would all turn out. This was the first time most of us were working on a distributed project as a group. In addition, this was the first time working with some of our own team-members, let alone another group in some other country! Therefore, the first step we took was introducing ourselves to the other members of the UIC team so as to begin the communication process. Initially most of us were not sure of what was in store for all of us in this project. This step helped us get over the initial discomfort of working with someone new.*
>
> *Moreover, since some of us work full-time, we could not get the opportunity to attend all the meetings but made sure we were updated as others took the lead and made sure all the i's were dotted and t's were in crossed. As the project got underway everyone contributed and ensured that as a team we all took the*

ownership of the work assigned within ourselves for the success of our project. The following points give a brief about what we have learned in this project."

From a Brazil-based group:

"Due to an American holiday, our involvement started late. But after the beginning we had a constant involvement. Communication was interrupted only during the time needed to discuss actions to be taken and prepare an answer. We believe that the same happened in the USA team, once their answers happened in an adequate time period. In rare circumstances was necessary to send messages asking urgent responses, in both teams.

Interaction with United States team worked fine. In the period defined for interaction there was no communication related problem. The definition of a common protocol (rules) in the beginning of the exercise has also contributed to its success.

Even though we had no relevant problems with communication, its asynchronous aspect brought little difficulties. In some moments message exchanges took more time than necessary, because no one was always checking Blackboard. Sometimes a simple message was only answered after one day because it was sent just after a check in Blackboard. This problem could be avoided if we have used our own e-mail accounts, which are more frequently checked. Or, if team had more rigid rules of time and frequency of access."

ABOUT THE AUTHORS

Roberto Evaristo is Assistant Professor of Information and Decision Sciences at the University of Illinois, Chicago. He is currently involved in projects related to the management of distributed projects, with work done in Japan, USA and Europe. His publications appear in such journals as *Communications of the ACM, International Journal of Project Management*, *Database*, *Journal of Engineering and Technology Management, International Journal of Emergency Management, Business Horizons, European Management Journal, Human Systems Management, Journal of Organizational Computing and Electronic Commerce,* and elsewhere. He is an associate editor for the *International Journal of e-Collaboration* and the *Journal of Global Information Management* and also serves on the editorial board of *Information Technology and People* and the *Journal of Global Information Technology Management*.

Jorge Audy is Professor of Computer Science and Vice President of Research and Graduate Studies at the Pontifical Catholic University of Rio Grande do Sul (PUCRS), Brazil. He holds a Doctorate in Information Systems. He is currently involved in projects related to global software development and project management, with work done with companies like DELL (U.S.), Hewlett-Packard, SONAE (Portugal), DB Server (Brazil) and research projects with researchers at HEC and the University of Victoria in Canada and the Universities of Kentucky Illinois, Chicago in the United Stateds. His publications appear in such journals as *Engineering Management Journal, Software Process Improvement and Practice Journal* and *International Journal of E-Collaboration* and in many conference proceedings.

Rafael Prikladnicki is Assistant Professor of Computer Science School at the Pontifical Catholic University of Rio Grande do Sul (PUCRS), Brazil. He is currently involved in projects related to distributed and global software development, risk management, and software quality, with research collaboration in Brazil, Canada, USA, India, and Europe. He is also one of the coordinators of the research group on distributed software development (MuNDDoS), and member of the research group on software quality (QUATES), at his university. He is a member of the working group on global software development, coordinated by the University of Victoria. He is working on his Ph.D. at PUCRS and earned his graduate degree in Computer Science from the Computer Science School at PUCRS. His publications appear, among others, in the Journal

of Software Process Improvement and Practice and in the proceedings of many conferences. He is a member of ACM, AIS, and the Brazilian Computer Society (SBC).

Leandro Lopes is a computer science graduate student at PUCRS. He is a member of the MuNDDoS research group. The main focus of his research is on the requirements engineering process in distributed software development environments.

Leonardo Pilatti is an undergraduate student of computer science at PUCRS. He is currently working on global software development, analyzing the impacts and problems that this approach has in the quality frameworks used by IT companies. He is also a software development analyst working at Dell in its global development center in Brazil.

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