LARGE EDUCATIONAL PROJECT FROM THE MANAGEMENT TEAM’S PERSPECTIVE

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Abstract

MADEM, i.e. Mobile Application Development for Environmental Monitoring, is a large educational project. Its aim was complex preparation of a new interdisciplinary Master’s specialization conducted in English in the field of Computer Science. The project involved development of the new program of studies and the preparation of the curriculum, detailed syllabi, complete teaching materials for lectures, laboratories and e-learning courses, scripts for students as well as a technical base in the form of a laboratory for mobile and measurement technologies for environmental monitoring. Furthermore, the didactic staff preparing the curriculum of the new specialization had an opportunity to participate in study visits both in national and in foreign institutions connected with environmental protection. The purpose of the visits was to learn about the problems the institutions deal with as well as making long-term contacts. Familiarity with the issues of the environmental institutions enabled to focus didactics on solving ecological problems. The established long-term contacts provide a possibility of modification of educational programs with a view to adapting them to the changing requirements of environmental institutions.

The new specialization was developed in close collaboration with Scandinavian partners: a university and local institutions, including industry, to benefit from the experience of others and to adapt to the market needs. The interdisciplinary character of studies ensures innovation but it is also demanding for the teaching staff. The development of the Master’s program proved to be a successful and a challenging task both for the Faculty staff and the Management Team.

The paper presents the MADEM project, its achievements and the evaluation results of the process of the project implementation from the perspective of the project Management Team. The evaluation concerns different areas such as academic, organizational, educational, financial and managerial aspects. The evaluation depicted in the paper is an element of lessons learned from the MADEM project realized by the project Management Team. The perspective may be informative and useful for other teams pursuing similar educational projects.

Keywords: Higher education, educational project, Master’s program, internationalization, interdisciplinarity.

1 INTRODUCTION

At present the most important challenges that Polish tertiary education has to face include the low birth rate, an insufficient level of internationalization and the need to adapt to the requirements of the contemporary, dynamically changing economy. In order to respond to the challenges universities undertake activities which are aimed at improving the conditions for studying, raising the quality of teaching, the quality of scientific research and also supporting the academic staff with developing their competence and skills. Another significant change observed in the Polish higher education system regards systematic modification and extension of the education offer with a view to adjusting it to current and future needs of the employment market. In order to meet expectations of employers, universities develop new interdisciplinary courses, postgraduate courses and majors or specializations, introduce studies in English, and update already existing curricula [1], [2], [3].

Implementation of changes at universities as well as improvement of the existing system requires a substantial effort on the part of the authorities and academic staff. It all also entails financial outlays incurred to realize the plans which have to come from higher-education institutions or which have to be obtained from outside [4]. Nowadays, it is possible to obtain financing pursuing different types of educational projects.

A project, according to the definition of the Project Management Institute is “a temporary endeavor undertaken to create a unique product, service or result” [5]. It is a complex, unrepeatable undertaking with a definite beginning and ending that is completed when the planned aim is achieved. The final
success of the project is determined not only by a well-constructed budget or schedule but also by a well-selected team managing the project and pursuing particular activities. The Management Team is one of the most critical components of the project. The success of the endeavor is dependent on many aspects, including personality traits as well as competencies of people belonging to the Management Team. What is also important is experience of project managers and team members. A considerable part of their knowledge and expertise comes from operational experience gained from earlier projects, as “learning occurs on every project” [6]. Therefore knowledge should be acquired and broadened, since it constitutes an invaluable help in a better and more efficient accomplishing of similar tasks in the future. Collected conclusions from experiences are so called lessons learned, which means information that reflects both positive and negative experiences of the project. Project managers are given an opportunity to learn from their own project experiences as well as from the experiences and feedback received from others. It is worth noting that thanks to sharing lessons learned among project team members the organization and its staff are prevented from repeating the same mistakes in future activities and they may convert newly acquired information into organizational best practices [6].

The MADEM project presented in this paper proved to be successful; however, some challenges were encountered at different stages of its realization. The paper aims at transferring of experiences as well as recommendations of the project Management Team to other project teams pursuing or considering similar undertakings.

2 MADEM - GENERAL INFORMATION

The project “Mobile Application Development in Environment Monitoring - a New Program of Master Studies in English” was developed at the Faculty of Electrical Engineering and Computer Science of the Lublin University of Technology (LUT). MADEM commenced in February 2015, ended at the end of May 2016 and its realization was financed from the Scholarship and Training Fund program as well as from the University’s own funds [7].

Realization of the MADEM project was possible thanks to experience in other educational projects realized at the Lublin University of Technology. So far the Institute of Computer Science accomplished five projects. One of them was "Graduate of Our Time", in which new Master’s studies in Computer Science were created. In the project, the staff at the Institute gained their first experiences in cooperation with IT industry in the educational area [8]. The satisfaction survey conducted three years after the project revealed that students participating in the project were satisfied with their studies [9]. Due to a big demand for mobile applications developers and a big motivation of adult people to requalify [10] the Institute of Computer Science started another project "University of Technology in the Future". The project was designed to create new postgraduate studies "Mobile Application Development". The satisfaction survey [11] proved the project to be successful. Experiences gathered in these projects were used in subsequent projects: “Qualifications for Labour Market” that focused on adjustment of bachelor level IT studies to requirements of IT firms and “MEGA Graduate” aimed at strengthening the cooperation with computer science industry.

MADEM was developed with the goal of creating a new Master’s degree program called "Mobile Application Development for Environmental Monitoring". Preparation of studies in English in the field of Computer Science was an opportunity for LUT to extend the educational offer of the University and a chance to increase internationalization of the institution [12]. MADEM is an education opportunity both for Polish and for foreign students [4]. Internationalization of studies has recently been strongly supported by the Polish Ministry of Science and Higher Education and therefore higher-education institutions attach more and more importance to that form of their development.

Except for internationalization another aspect of the project is its interdisciplinarity. The studies combine two disciplines: Computer Science and Environmental Engineering, which allows students to gain knowledge and skills from two fields of study during one education process [4]. The major benefit of development of the new specialization is increasing of employment opportunities for University graduates, which will be possible thanks to enhancing students’ IT skills, language skills and extending their knowledge about environmental engineering issues [7]. The new major will prepare students to develop information systems, primarily mobile applications, for environment monitoring with special consideration of monitoring threats, working with detecting sensors and matters of safety. In addition, the graduates will acquire social skills, such as the ability to work in a team, the ability of creative thinking, and problem solving. They will be also able to resolve ICT-related dilemmas concerning environmental protection and monitoring.
MADEM aims planned in the project were fulfilled thanks to good cooperation on different levels e.g. among Management Team members as well as among Management Team members and performers doing assigned tasks. Good communication with the external environment i.e. employers as well as the Program Operator also contributed to achievement of project goals. The activities undertaken in the project are presented in Figure 1. in a form of a detailed schedule, including the whole lifetime of the project and the description of particular activities.

MADEM development and accomplishment involved achievement of the following results [12, 13]:

1. Development of Master’s studies curricula for the MADEM specialization in line with the EQF (nets, syllabi, outcomes, graduate profile, recruitment requirements and rules) and a standard for Master’s theses.
2. Preparation of teaching materials in English (lecture materials, laboratory instructions, books).
3. Expanding of the education base of the Faculty by equipping laboratory classrooms with computers and specialized environment monitoring devices.
4. Designing and administrating of the project website that will be used for the project promotion, presentation of achieved objectives and as a management tool.
5. Launching of the Knowledge Exchange Portal in the English language open to collaboration with universities, industry, local governments, social institutions and citizens.
7. Raising qualifications of LUT staff by providing access to substantive knowledge contained in digital libraries and an opportunity to gain practical skills thanks to purchased equipment.
8. Complementing LUT’s staff knowledge on issues related to environmental protection thanks to study visits (in Poland and Norway).
9. Tightening of cooperation between science and business, which will facilitate better diagnosing of competency gaps of University graduates [7].

From the perspective of the Faculty the overall results of the project include extension of the education offer with interdisciplinary studies conducted in English and preparing the staff for conducting the new study program. From the perspective of the LUT, the major outcome of the project is increasing of internationalization thanks to starting a new specialization in the English language [13].

3 ORGANISATION STRUCTURE OF THE PROJECT

Realization of the MADEM project involved many people who belonged to one or a few teams as presented in Figure 2. In general the participants of the project may be divided into two groups: internal and external stakeholders. Stakeholders are people or organizations who actively partake in the project or who are directly interested in implementation of project results [14]. Management, performers, the Quality Assurance Team as well as LUT’s committees, were all comprised of
academic staff as well as students and all fell into the group of internal stakeholders. The other groups, i.e. foreign partners, IT companies (employers), the Provincial Environmental Protection Inspectorate, Local Authorities constituted the group of external stakeholders.

MADEM realization involved implementation of good governance practices, which was possible thanks to effectiveness of management. Providing the appropriate division and allocation of duties, full supervision over the project and accomplishment of planned horizontal issues was achieved using a multilevel organization structure of the project consisting of the Steering Committee, the project Management Team and the Quality Assurance Team.

The project Management Team members were responsible for complex realization of the project in terms of content-related aspects, organization of the project as well as the project finance. Their responsibilities included:
realization of tendering procedures, signing of contracts for work planned in the project schedule,
substantive preparation of documentation necessary to launch studies in English,
direct technical and financial supervision of the performed work,
ensuring of effective communication and cooperation among persons involved in the project,
monitoring of the progress of the contracted work and services,
project evaluation and dissemination of project results,
preparation of substantive and financial reports,
final settlement of the project,
monitoring of the effectiveness and results,
promotion of the project and its results.

High qualifications, extensive experience and organizational potential of the project managers contributed to adequate governance of the project, achievement of its aims and keeping to the schedule. What proved to be critical was competencies and experience of key people listed below who were involved in realization of the project.

- The Coordinator who had to have human resource management skills, experience in managing and coordinating of projects co-financed from EU funds, experience in organization of work and conferences, knowledge of legal acts and procedures relating to the teaching activities of universities, including the National Qualifications Framework as well as extensive expert knowledge.
- The Substantive Coordinator who had to possess extensive experience in governance and realization of didactic projects, including projects co-financed from EU funds, ability to organize work and ability to work in a team and also expert knowledge in the field of Computer Science.
- The Project Manager who had to have experience in governance, realization and settlement of projects co-financed from EU funds, ability to work in a team and ability to govern a team as well as having knowledge of the Public Procurement Act.

Except for the above mentioned persons, the Management Team encompassed the Project Secretary and the Finance Specialist. The Management Team members closely cooperated, participated in monthly meetings, prepared reports required by the Operator, partook in meetings with the Program Operator, took part in study visits as well as in conferences. They also developed promotional materials and conference papers disseminating the project.

Project performers were a group of over 20 people conducting many different assignments included in the project. The tasks concerned the development of the curriculum, syllabi for courses, learning outcomes, the graduate profile and teaching materials for courses as well as a standard for Master’s theses. The work also involved development of the project website, rebuilding of the existing e-learning platform and the Knowledge Exchange Portal – adding the English version and administrative activities. Performers also participated in discussion panels, in the concluding conference as well as in study visits.

The Quality Assurance Team played a key role in the project, since the Team members were responsible for checking the quality of the submitted documentation prepared to launch the new MADEM studies program. The Team’s work involved preparation of reports evaluating the quality of individual elements of the Master’s specialization such as syllabi and teaching materials that after their quality check were supplemented with recommendations for the authors. There was also a separate group of the Team that included foreign reviewers whose job was evaluation of five textbooks in English created with a view to the new Master’s program.

Launching the MADEM specialization was dependent on different LUT’s committees i.e. the Quality Committee, the Teaching Committee, the Course Council and the Student Council. After their positive recommendation on the developed documents, the Faculty Council carried a resolution officially confirming the acceptance of documentation concerning the MADEM specialization.

A vital component of development of the project was close cooperation with IT companies. This sector shows currently a considerable interest in cooperation with LUT especially when it comes to education in the field of Computer Science, and employers from IT businesses are willing to be involved in the
process of education. Within the project there were 2 discussion panels as well as a conference that focused on the MADEM specialization program with special attention being paid to current needs of the employment market in the scope of gaps in competencies of graduates from Computer Science programs. The events involved discussions related to principles of further cooperation between the University and companies. The meetings resulted in modification of the planned program of studies in order to adapt it to current requirements of employers and to enable closer collaboration with IT companies.

The project also involved study visits of the Faculty staff at the head office as well as at regional centers of the Provincial Environmental Protection Inspectorate. The meetings aimed at raising qualifications of LUT staff in the area of environmental protection and monitoring. The staff members were familiarized with the current state and perspectives of environmental protection development in the region, assignments conducted by the institution as well as existing solutions in the field of environmental monitoring in the Lublin region. The visits provided an opportunity for the academic staff to get acquainted with the station, laboratories and measurement equipment. The established contacts also resulted in exchanging experiences in the area of mobile solutions dedicated to environmental monitoring as well as plans for further common activities in the future, primarily with reference to mobile applications for protection and monitoring of the environment.

Within the project there was also a study visit of Polish Faculty staff in Norway. During meetings with Norwegian partners in the project i.e. the Telemark University College and the Porsgrunn City Hall, the staff members had an opportunity to become familiar with the approach to environmental protection and monitoring in both countries. During the visit at the Telemark University College staff from both higher-education institutions presented profiles and activities of their institutions, discussed their education and scientific offer as well as their research equipment bases. The partners exchanged information on research conducted in both institutions and their ideas for projects that could be pursued within further cooperation in the future. The meeting at the Porsgrunn City Hall concentrated mainly on aspects concerning the Telemark region: the character of the region, climate conditions, the natural environment, population issues connected especially with employment situation. The members of staff from both institutions also discussed environmental problems as well as solutions employed by local authorities and companies in the area of environmental pollution and protection of the environment. Another important aspect of the visit was exchanging information on channels and ways for warning citizens against environmental threats as well as warning systems employed with this aim.

The realization of the project required effective collaboration with the Program Operator who in Poland is an institution responsible for the program preparation and implementation, call for proposals, project selection, monitoring and promotion of the program [15].

The process of the MADEM specialization development also involved Local Authorities whose members shared information on the situation in the local employment market, environmental issues in the Lublin region and gave examples of international cooperation, its scope, potential and common pro-ecological initiatives.

4 CONCLUSIONS OF THE MANAGEMENT TEAM

The conclusions from the MADEM project arise from experiences as well as observations conducted by the project Management Team i.e. the Manager, the Substantive Coordinator of the project and the Project Secretary.

Conclusions from the project realization are presented in several areas, such as: academic, organizational, educational and financial as well as in the area of project management.

4.1 Conclusions in the academic area

The development of interdisciplinary studies, in this case combining Computer Science and Environmental Engineering, required engagement of specialists from these two areas of knowledge. At LUT it was relatively easy to create such studies, as the University structure involves both the Faculty of Environmental Engineering and the Faculty of Electrical Engineering and Computer Science. However, the problem consisted in fast reaching such specialists. Organizing and enlisting the staff team involved "doing a private search." A solution to the problem could be development of a special university catalogue that would contain the names of specialists in particular fields of knowledge, which would facilitate a fast search of required experts.
One of positive aspects of the execution of the project was development of language competencies of the project participants. All the documentation of studies, teaching materials as well as their reviews were prepared in English. Each member of the project team was obliged to prepare high-quality materials, which involved proof-reading and, if necessary, also correcting mistakes pinpointed by the reviewer at that stage.

The development of language skills was also connected with the opportunity to access and use specialist sources and specialist literature in English, thanks to which the authors of teaching materials were able to update and broaden the knowledge in the areas of their interest and specialization. It was facilitated by access to databases containing the latest articles, publications and journals.

4.2 Conclusions in the organizational area

Preparation of the specialization required a lot of efforts put into development of the full documentation concerning the studies. Complex, elaborate and time-consuming requirements connected with the documentation were a result of too formal an approach to the National Framework of Qualifications/European Framework of Qualifications. The current policy of the Polish authorities aims at simplifying the procedures and minimizing bureaucracy in higher education. The project was realized when such changes were not implemented yet.

The development of the specialization also entailed a complicated approval procedure and the need of obtaining a positive recommendation on the developed documents that had to be given by various committees and University bodies i.e. the Quality Committee, the Teaching Committee, the Course Curriculum Council, the Student Self-government as well as the Faculty Council.

A big challenge in the project was organization of the planned study visit. The difficulties with finding a project partner led to a delay of a few months and shifting the execution of the task in time. One of the reasons for the problems was the insufficient knowledge that the project Management Team had at that stage about the existing contacts between LUT and foreign partners as well as insufficient support received within the Institution in winning new foreign contacts. The difficulties were also caused by mistakes made at the stage of project planning and were a consequence of having no funds for foreign partners for supporting scientific cooperation with foreign institutions. The lesson learned from this experience is that funds for such activities should be included in the financial project plan so as to be financed within the project funds.

During realization of the project many problems were connected with complicated financial guidelines from the Ministry and some discrepancies between the rules of the Scholarship and Training Fund and the regulations in force at LUT.

Problems were also encountered during the tendering process. They were caused by changing regulations when the project was already in progress, bureaucracy and sometimes even the need to repeat the tender procedure.

With a view to providing high quality of books prepared during the project, the books were to be reviewed by recognized, foreign specialists. However, finding such experts who would be also willing to cooperate proved to be another big challenge leading to repeating tender procedures and in the end to delays in execution of the task.

A positive aspect of realization of the project was definitely connected with making new contacts with IT companies as well as an institution dealing with monitoring of the environment. Thanks to meetings with entrepreneurs, conditions of further cooperation were specified and the curriculum of the new specialization was consulted. During a study visit at the Regional Inspectorate of Environmental Protection the participants of the project widened their knowledge in the area of environmental monitoring and were acquainted with measuring equipment used in the laboratories of the institution.

4.3 Conclusions in the educational area

The major positive aspect of the project was creating a new specialization encompassing current conditions of the regional employment market.

The requirement for creating the new unique interdisciplinary specialization was development of high-quality teaching materials that were subject to reviews as well as books containing innovative content.
The interdisciplinarity of the developed specialization as well as purchasing high-tech equipment are an opportunity for creation of innovative student projects e.g. projects and works dealing with weather forecasting or the analysis of human reactions to staying in different environments.

Students who need to supplement the differences in the study curricula between degree programs may do so using materials made accessible on the e-learning platform in a form of e-learning courses.

The process of developing the project imposed the need for content-related interfaculty cooperation in the area of preparation of teaching materials between the Faculty of Electrical Engineering and Computer Science and the Faculty of Environmental Engineering. The activities were definitely a positive aspect in the educational as well as the organizational area of the project.

4.4 Conclusions in the financial area

The financial construction of the project program which assumed the last tranche of money would be unlocked after the project had been completed and the final report had been approved of proved to be faulty, as that imposed on the beneficiary the need to invest their own financial resources in order to execute tasks planned for the final stage of the project. That approach was not cost-effective for the University. It also decreased the profitability of the project and entailed the risk of losing a part of the funds.

Another negative element of the project was an extensive reporting process, particularly tiring in the final report which repeatedly required describing the same issues from different angles. The work was also impeded due to poor quality of the reporting system.

A further impediment in the execution of the project was too big a number of inspections at the University which itself is an institution that has to comply with all necessary financial regulations and is obligated to follow public procurement procedures. Other inspections control and monitor these areas on a regular basis. Needless to say, frequent checks generate unnecessary engagement of human resources.

What needs to be emphasized as a positive aspect is the flexibility of the Program Operator who facilitated beneficiaries’ modifications in the area of expenses. It was possible e.g. to spend the savings generated within the project on new aims and in that way extend and enrich the project with new opportunities.

4.5 Conclusions in the area of project management

Efficient realization of the project was possible thanks to very good cooperation with authorities of the Faculty where the project was pursued. A well-planned, multilevel organizational structure of the project was also conducive to pursuance of the project and eventually contributed to its success. An important aspect was the selection of key people involved in the project who had high qualifications, an extensive experience and organizational potential. The good collaboration among elements of the management structure stemmed from allocation of tasks specified before the commencement of the project as well as from the management themselves who had a considerable experience in human resources governance.

In order to ensure a smooth pursuance of the project, the Management Team monitored the schedule of subsequent tasks, and if necessary, contacted contractors i.e. performers so as to avoid potential problems connected with missing deadlines.

A special Quality Assurance Team monitored the provision of high quality outcomes in the project, particularly with regard to documentation indispensable for initiating the studies as well as for preparation of teaching materials.

Proper realization of the project was ensured using constant monitoring of the project progress. The evaluation of the stage of execution of specific tasks was conducted during monthly meetings of the Management Team. Moreover, every three months on the basis of the reports from the beneficiary an additional periodic inspection was carried out by the Program Operator.

5 SUMMARY

The MADEM project involved 23 University staff members and was a large organizational undertaking lasting 17 months. The budget for the project was € 215,000. The project development encompassed...
preparation and reviewing of 31 teaching materials in English, including 17 lecture materials, 16 laboratory guides, 9 e-learning courses and 5 textbooks. An e-learning platform, the Knowledge Exchange Portal as well as the project website were launched. A University Laboratory was equipped with computers and it was possible to purchase equipment for student projects that would be used for development of mobile applications for environmental monitoring.

After completion of the project, the Management Team members held a brainstorming meeting to consider experiences and challenges encountered during realization of the project. It was also a good opportunity to discuss solutions used for the problems that were overcome as well as the lessons learned that would be useful for further project plans and activities. The observations were grouped in a few areas i.e. academic, organizational, educational and financial aspects as well a group of conclusions related to project management.

Lessons learned discussed in this paper concentrate only on the perspective of the Management Team. Presentation of a full scope of conclusions on the experiences collected in the project would require studying opinions of other project participants i.e. performers responsible for project tasks, as well as external stakeholders who were mostly representatives of the IT sector in the Lublin region.

The conclusions from MADEM presented in this paper can help other teams pursuing similar educational projects and may be used in other similar undertakings conducted at higher-education institutions with a view to improving project planning and execution.

REFERENCES


