Business Process Management in Higher Education. The Case of Students of Logistics

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The article contains an introduction to BPM and presents the examples of BPM deployment in high schools. The main part of the article contains the key preparation and realization stages of BPM course for students of logistics at Maria Curie-Skłodowska University (MCSU) in Poland. The main conclusions from the BPM market analysis and course preparation suggest that BPM competences are strongly desirable and BPN can be a powerful tool for improving organizational efficiency. Availability of many standards and tools makes it difficult to develop BPM course tailored to market needs and study programmes. Moreover ideal teaching software should cover the wide range of models and most popular standards as well as should reflect the whole BPM lifecycle. To meet the requirements we enhanced ADONIS software with tools for process automation like Bonita Suite.

Keywords: BPM, process modeling, process automation, business modeling, ADONIS, Bonita, workflow, higher education.

Zarządzanie procesami biznesowymi w kształceniu akademickim – na podstawie kursu dla studentów logistyki UMCS

W artykule zaprezentowano kluczowe etapy przygotowania i realizacji kursu zarządzania procesami biznesowymi dla studentów logistyki na UMCS w Lublinie. Główne wnioski wynikające z badań wskazują, że kompetencje związane z BPM są bardzo poszukiwane na rynku pracy, zaś mnogość standardów opisu procesów i narzędzi do dokumentacji utrudnia opracowanie uniwersalnego kursu BPM dostosowanego do potrzeb rynku. W celu sprostania ww. wymaganiom, w ramach zrealizowanych prac, zostało skonstruowane środowisko dydaktyczne zapewniające możliwość dokumentacji oraz symulacji i automatyzacji procesów biznesowych, oparte na systemach Adonis oraz Bonita Suite.

Słowa kluczowe: BMP, modelowanie procesów, automatyzacja procesów, modelowanie procesów biznesowych, Bonita, przepływ pracy, szkolnictwo wyższe

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1. Introduction

Business process can be defined as a set of connected tasks or activities that result in a specific product or service. We can divide all the processes into three categories: management processes (directing the operation of the system), operational processes (the essence of business and a source of added value) and supporting processes (support the main processes).

BPM is a set of activities performed by business analysts or domain experts that results in graphical presentation of processes of an organization. Identified (AS-IS) processes are visualized, documented, analyzed and if necessary improved (TO-BE). The processes can be identified manually by an expert or discovered automatically from system logs using specialized process mining tools like Disco, ARIS or ProM.

The techniques for business process modeling like block diagrams, flow charts, Gantt chart or PERT diagrams were introduced at the beginning of the 20th century. Since then many more complicated methods and standards for process modeling and information interchange have been developed e. g. UML (Unified Modeling Language), BPMN (Business Process Model and Notation), EPC (Event-Driven Process Chain), XPDL (XML Process Definition Language), BPEL (Business Process Execution Language).

There are four main areas of process management (Gawin et al., 2013, pp. 10–12):

- business process modeling – process documentation, definitions; graphical notations are currently used (e.g. UML, BPMN); nowadays, we can see the development of business platforms where process modeling complements the environment for simulation, monitoring and execution of workflow processes,
- business process simulation – the realization of the need for computer representation and execution of business processes that take place in a real business environment; it gives a possibility to quantify the need for specific resources, determine the available capabilities and measure Key Performance Indicators (KPIs),
- performing business processes – the process models are used in workflow systems to execute workflow logic,
- business process monitoring – current, automatic observation (lists, statistics); presenting data in various forms (tables, charts, etc.) in management dashboards.

The operations performed by the organization can be divided into core and supporting functions (Table 1).

There are many potential areas for applying enterprise process modeling. Proper presentation of the processes in each of the above areas and their characteristic features must be clear. Proper communication and subsequent analysis should be based on the ability to build a model that (Dąbrowski et al., 2009, p. 26):

- is understandable to stakeholders,
- is clear and built with symbols recognized by everyone,
- has a certain level of detail,
- allows the understanding of the structure and operation of the system at the appropriate level of abstraction,
- is consistent and logically related.

Core functions	Support functions
Finance Accounting Operations Marketing Sales	Information systems Human resources Legal department Facility management

Tab. 1. Core and supporting functions in the enterprise. Source: Weilkiens T., Weiss Ch., Grass A., Duggen K.N., OCEB 2 Certification Guide. Business Process Management – Fundamental Level, Elsevier, 2016, p. 16.

Organizations frequently use BPM techniques to improve the processes and compete with business process outsourcing (BPO) companies (Saraswat et al., 2014, p. 221). It enables them to innovate and continuously improve their operations (Bergener et al., 2012, p. 415). Process modeling can be also used for information systems design.

Business process modeling can bring many benefits, e.g. aligning everyday operations with strategy, improving communication inside the process and between the processes, better control and consistency of organization, improvement in operational efficiency and increasing competitive advantage (Singh, 2011, p. 1). In order to fully benefit form process management, the company (organization) should employ or hire the employees who have not only expert domain knowledge but also profound knowledge and skills in the area of business process modeling.

2. Business Process Modeling Education

Profound knowledge and skills in business process modeling are becoming necessary for analysts and business managers. Many organizations want to discover, document and optimize their business processes. However, availability of many standards, complex notation makes it not easy to describe the process in accordance with a chosen, easy-to-understand standard. Therefore, there is a strong need to introduce process modeling to educational programmes. Especially in higher education, in schools and universities that train not only managers but also staff that in the future will supervise the industrial, logistic or administrative processes. BPM is a complex topic and BPM courses should join process management theory with practice (Saraswat et al., 2014, p. 229). The syllabus should also be

adapted to the needs and capabilities of students and if possible to their cognitive preferences and finally should be adjusted to the market standards, tools, methods and needs.

In the literature we can find many examples of introduction of BPM into study programmes. Some recent research in the area of BPM education are presented in Table 2.

Author(s)	Research area
Jewer et al. (2015)	Teaching enterprise systems and business process management with open-source systems.
Saraswat et al. (2014)	Teaching BPM with simulation in graduate business programs.
Caporale et al. (2013)	Collaborative approach to business process management education.
Moormann et al. (2013)	BPM education, teaching and learning in academia and business.
Bergener et al. (2012)	The importance of agile communication skills in BPM education.
Seethamraju (2012)	Business process management in business education as a link between technology, domain knowledge, business and strategy.
Bandara et al. (2010)	Status, challenges, and recommendations for business process management education in academia.
Jeyaraj (2010)	BPM teaching and learning with simulated environments.
Powell et al. (2007)	Cooperative versus individual learning in the area of process modeling.

Tab. 2. Recent research in the area of BPM education. Source: own work.

Seethamraju describes the inadequacies of current business education and stresses the importance of business process management in the era of information technologies. The author treats BPM education as a missing link between business, IT and organization strategy. He concludes that BPM trainings have been offered for a long time, however the idea of processes is still not well understood. Different schools are focused on different skills like IT components, function specific skills, however there is a lack of a holistic view on the process management issues (Seethamraju et al., 2012, p. 532).

Anderson and Chircu explored business process management in graduate business programs. They described development and evaluation of BPM course. The researchers collected data from 95 graduated business students (IT oriented and non-IT oriented) and found significant differences between these two groups mostly in the area of mapping process structure, analyzing process performance, creating process models. They concluded

that simulation is an effective way of supporting basic BPM courses and suggested organizing different types of courses for IT and non-IT focused students. Some activities should be performed in groups to simulate real work conditions (Saraswat et al., 2014, pp. 228–229).

Jeyaraj suggests that skills of identification, modeling and reengineering of business processes have to be learned using student-centered teaching approach. During the course the attendants should participate actively in order to acquire both technical and soft skills. The author used role-playing activities and concludes that simulated environment is a very useful tool for developing courses related to enterprise system design (Jeyaraj, 2010, p. 253).

Powell, Bordoloi and Ryan performed an experiment to determine the effects of cooperative, team-based participation on self-efficiency and learning outcomes. They reported that less experienced attendants obtained better results working together in cooperating teams. They suggest that BPM training activities should be performed in small groups. At the beginning of the course the researchers propose to get knowledge about students preferences and motivation for learning. The course should be organized in a way that keeps attention and motivates participants action (Powell et al., 2007, p. 110).

Team education and group work needs good communication. The importance of agile communication skills in BPM education was investigated by Bergener et al. The research team evaluated virtual education of seven European universities. Literature research and supervisors' experience allowed them to develop preliminary principles. Using the principles they created a pilot collaborative virtual seminar. The seminar was assessed by students and supervisors. The lessons learned were then the foundations for designing new principles and improving the course (Bergener et al., 2012, p. 421). Their final work was a set of 13 design principles. The authors stress that communication skills can be developed among others by group work, allowing students to choose their own way of communication (rather peer-to-peer communication), developing clear deadlines, using complex and new topics. Finally, course supervisors should meet regularly and exchange course management information.

Nowadays process management is strongly supported with information technology. BPM trainings can be supported by commercial, open source systems or free solutions. Open source systems were used by Jewer and Evermann to teach enterprise systems and business process management. They used experiential learning to teach beginning business students without business experience. The results showed that using open-source systems can bring satisfactory learning results. They conclude that educators should not avoid experiential learning and that open source solutions can be successfully used instead of feature-rich, large-scale commercial enterprise systems (Jewer et al., 2015, p. 199).

As many other fields of education, process management encounters many barriers and problems. The main challenges and issues for BPM education were presented by Moormann and Bandara. They tried to answer three questions about BPM education: What should be taught?, Who should teach? and How should BPM be taught? They suggest that the biggest challenges are: lack of appropriate educators, limited guidelines or cases repository, lack of understanding of the important role of process management in organizations, as well as not enough research on the effectiveness of different BPM learning approaches (Moormann et al., 2012, p. 3).

Status, challenges and recommendations for business process management education in academia were explored also by Bandara et al. The researchers based on information collected in 2009 on global educators' panel discussion. They present and analyze the BPM programs of five universities from Australia, Europe, Africa, and North America. They report that meeting educational goals of schools and university programs in the area of BPM can be very different. Their final conclusion is that there is a great need for close industry and academia partnerships resulting in workshops, seminars and that cross-functional discipline like BPM education should be constantly reshaped. Then it will be adjusted to the market standards, tools, methods and will meet business requirements (Bandara, 2010, p. 772).

The revised research and the cases characterized in the literature suggest that in order to organize successful training the authors should focus on four main elements (Figure 1).

At first, the preferable course participants should be students who feel a great need (internal or market need) to learn process modeling. Teachers (trainers) should motivate them using real life cases, allowing for group work. Secondly, BPM is quite a complex and interdisciplinary field so classes should be conducted by trainers with business experience, profound knowledge in the area of BPM and appropriate pedagogical approach. Thirdly, a well-known BPM standard should be chosen. That standard could be Business Process Model and Notation (BPMN). BPMN is widely used in process management and helps organizations to visualize processes in clear graphic notation, understand internal procedures and communicate these procedures to business partners (www3). Using standard notation can minimalize the communication differences (gaps) between cooperators, so the most frequent reasons for project failure (Bergener et al., 2012, p. 415). It is also recommended to use a modeling tool that is fully compliant with a given standard. Therefore the authors have chosen ADONIS application that supports BPMN 2.0 standard. Finally, during the first stage of the training the participants should work on standard cases or commonly known processes. To improve the outcomes, less experienced students should work in small teams. Training should be performed as a problem-based learning and role play simulation in the form of a lab that increases students' involvement and understanding of BPMN (Caporale et al., 2013, p. 367).
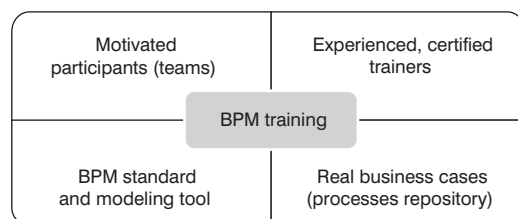
Motivated participants (teams)	Experienced, certified trainers
BPM standard and modeling tool	Real business cases (processes repository)

BPM training

Fig. 1. The main components of BPM training process. Source: own work.

3. ADONIS Business Process Management Tool

There are many proprietary or free BPM applications available on the market. Some of them offer only a mechanism for processes drawing (Microsoft Visio, Draw.io, DIA). Other allow also for modeling and simulation. The most advanced can be used for modeling, analysis, simulation, evaluation, documentation and optimization of the processes. For holistic process management, applications like ADONIS, ARIS, Bonita, Enterprise Architect can be used. After analyzing the functionality, cost, BPMN compliance, the availability of educational materials and support offered by distributor, the ADONIS system was chosen by the authors.

ADONIS is a tool for business process management. It was created at the University of Vienna. Nowadays it is developed by BOC Information Technologies Consulting GmbH. The application supports: process modeling, process analysis, simulation, evaluation and optimization. It allows for importing and exporting process definitions and creating documentation of processes (BOC, p. 12). With ADONIS, the user can create different types of models and diagrams including: product model, company map, business process model, working environment model, document model, data model, risk model, control model, IT system model, business process diagram (BPMN), use case diagram, conversation diagram (BPMN 2.0), collaboration diagram and choreography diagram (BPMN 2.0). The main window of ADONIS is presented in Figure 2.

ADONIS contains functionalities not only for intuitive process modeling, but also for models verification, wide analysis and reporting. It offers a business simulation library, an interactive process stepper, a mechanism for HTML or PDF publishing (www1). The application supports BPMN 2.0 standard that is understandable by various business users including technicians, developers, deployment staff and business representatives. It allows not only for process drawings but also for a detailed processes description. It supports storing additional information necessary for analysis and simulation like costs, execution time, resources needed, responsibilities and translations (Figure 3).
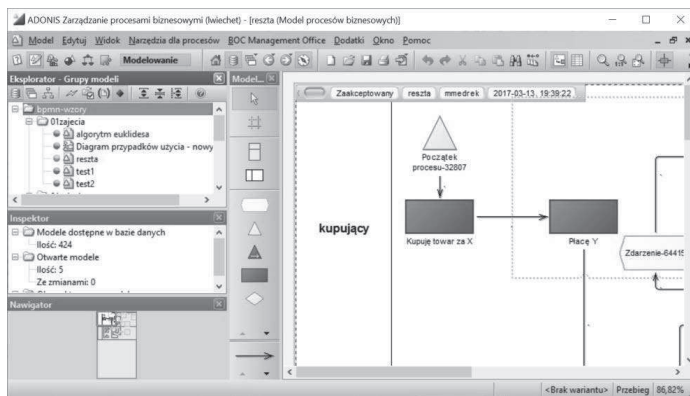
Fig. 2. The ADONIS main window. Source: own work.

ADONIS is offered as an on-premise application that can be installed on Windows operating system or web-based process modeling tool ADONIS NP (Gunka et al., 2017, p. 123). Educators and business organizations can also use ADONIS: Community Edition (ADONIS:CE) free version of BPM tool with all the features needed for professional business process management (www 4).

ADONIS can cooperate, exchange data with complementary software components designed for managing processes and building workflow applications. The solution for process automation used in the described course program is Bonita BPM Studio which contains a Bonita BPM Platform with BPM Engine and Portal.
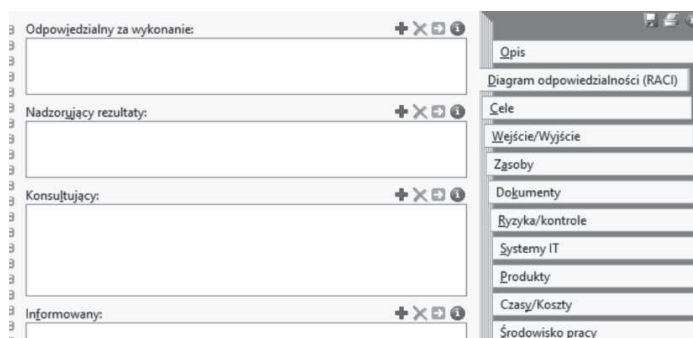

Fig. 3. ADONIS task attributes window. Source: own work.

It is worth emphasizing that BOC offers not only the ADONIS application but also access to the online platform that contains complementary educational materials, webinars and trainings for teachers (www2).

4. Preparing BPM Course for Students of Logistics

The authors divided the BPM course development into three phases: analysis and framework preparation, realization and monitoring, evaluation and improvement. The main steps of the course development were shown in Figure 4.
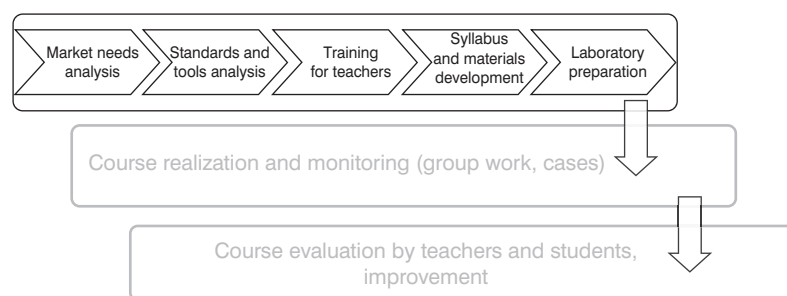

Fig. 4. Course development main steps. Source: own work.

During the first phase of BPM course implementation the authors performed an analysis of market needs, standards and tools used in process management, participated in a specialized certified course for trainers, prepared course materials (syllabus, templates, cases) and organized a course laboratory with a necessary database server, web server and workstations for course participants. These steps are described in the article. The authors also planned a course realization schedule, a monitoring procedure and an outline of the course evaluation process. Lessons learned from the course realization and evaluation will be presented in the next articles.

4.1. BPM Trends on the Market

Rapid development of information and communication technology and transport systems results in the globalization effect and leads to the fusion of national markets into a global one. Information and knowledge are now the strategic resources in addition to traditional ones, such as raw materials, energy and food, which have determined the progress of economies for decades (Warnecke, 1993). Therefore, there is a natural need to introduce common standards which provide the world-wide comparability and compatibility of the products and processes (Kalpic et al., 2003).

Business Process Management (BPM) techniques serve as a framework that allows for designing the business goals in a universal form that can be easily transferred between organizations and countries. Therefore, process management and modeling can be a powerful tool that allows for capturing, externalization, formalization and structuring of knowledge about enterprise processes.

As the enterprise business survey shows, the popularity of BPM is growing. Over 50% of business organizations use BPM for performing important business processes (Table 3).

	2005	2007	2009	2011	2013	2015
Major strategic commitment by executive management	28%	26%	19%	31%	21%	24%
Significant commitment to multiple high-level process projects	23%	24%	33%	30%	32%	27%
Initial commitment to limited number of mid or low-level projects	23%	25%	29%	26%	33%	35%
Exploring opportunities	21%	23%	16%	12%	11%	14%
No interest	6%	2%	3%	2%	3%	1%

Tab. 3. The commitment of business organizations to BPM. Source: Harmon, P., The State of Business Process Management, "A BPTrends report", 2016.

Another 35% of organizations use BPM at the pre-intermediate or low level and there are almost no organizations that give up process management (only 1%). From this point of view, the subject of BPM is very important also for higher education, so the Faculty of Economics of MCSU decided to respond to market trends with the right BPM educational offer.

4.2. Market Demand for Process Modeling Competences

The search process (http://trends.google.pl, 22.04.2017) of the term *Business Process Modeling and Notation* (search area: worldwide) indicates a strong persistent interest in this area. Interesting is also the geographical structure of interest where Poland took the seventh place with a value of 50 just behind Switzerland – 100, Belgium – 95, Chile – 93, Germany – 74, Peru – 72 and Austria – 51 (Figure 5).
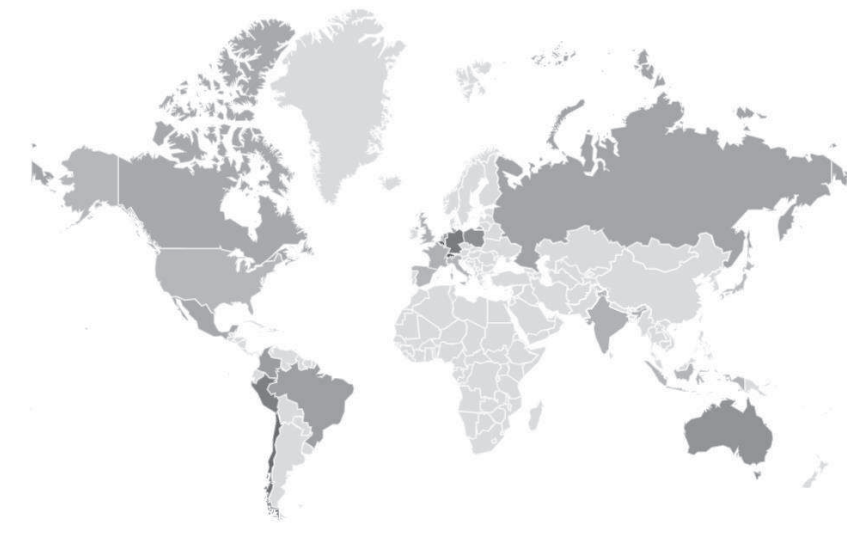
Fig. 5. Interest in the term BPMN according to geographical location. Source: Google Trends.

The current market requirements are forcing university graduates to have both knowledge and practical skills in the area of process management because the analysis of processes can be a starting point for process understanding, optimization and automation that translates into economic benefits.

Interest in business process modeling is also evident in job offers. Three job posting portals have been analyzed (23.04.2017) using the search phrase "bpmn" (Table 4).

Process modeling is present in the requirements (both theory, tools and experience) of many presented job offers. The required competencies concern knowledge of notation (BPMN, BPMN 2.0, UML), usage of business process modeling tools, implementation of processes modeling in the organization, standards for modeling IT systems. These competencies are required for the following professions: Business Analysts, Business Process Analysts, IT Analysts, System Analysts of B2B / B2C Solutions, Business Analysts – Risk Scoring, Business Intelligence Architects, JAVA Developers, Projects Coordinators.

Internet portal	Number of offers	Website
Pracuj.pl	63	https://www.pracuj.pl/praca
indeed	252	https://pl.indeed.com/praca
MONSTERPOLSKA	55	https://www.monsterpolska.pl/praca

Tab. 4. The number of potential jobs associated with the term BPMN. Source: own work.

4.3. Analysis of Available BPM Standards and Tools

The popularity of BPM has been rising in recent years. The report "State of BPM market – 2016" indicates the growing importance of BPMN, which is becoming the dominating technique of process modeling (Table 5).

	2005	2007	2009	2011	2013	2015
ARIS EPC (Notation)				14%	22%	18%
ISO 9000	49%	40%	36%	39%	30%	23%
CMM/CMMI	28%	28%	30%	17%	18%	16%
BPMN (Notation)	22%	41%	51%	60%	60%	64%
UML (Notation)	33%	30%	24%	14%	18%	17%
ASQ Lean Six Sigma Body of Knowledge					25%	25%

Tab. 5. Six most popular BPM standards for adoption in organizations during the last decade. Source: Harmon, P., "The State of Business Process Management", A BPTrends report, 2016.

Other standards of process management, like ARIS, SixSigma and UML, are also well known on the market. A short description of chosen standards is presented in Table 6.

Since we want to teach not only the semantics of the chosen BPM methodology, we decided to use tools that offer a wider range of models which reflects the complex structure of a business organization. BPM does not only deal with analyzing, designing, developing and executing business processes. It also determines the relationship between stakeholders and aligns capacities with people and technology. From this point of view, the ideal teaching software process management suite should cover a wide range of integrated models, including the most popular standards presented in Tables 5 and 6. Another important requirement is to reflect the whole BPM lifecycle (Figure 6) in the teaching environment, including the implementation of the processes in the real workflow systems.

Our idea is to make BPM education more motivating and practical for students and provide lecturers and students with a complete learning environment for process management. We focus on the real software used in organizations: ADONIS for process management and Bonita for process automation in the workflow system. Figure 7 presents the main components and their dependencies in BPMS standard of ADONIS. The set of models includes also BPMN (process, choreography and conversation diagrams) and UML (Use Case diagram) notations, which are among the top 6 standards of BPM on the market (Table 5).

Standard	Description	Source
Business Process Management System	BPMS is the application library for analyzing processes developed by BOC. It includes some models from UML and BPMN.	Karagiannis et al., 1996
Architecture of Integrated Information Systems (ARIS)	Platform oriented framework for analyzing processes and taking a holistic view of process design, management, work flow, and application processing. The main process diagram in this methodology is Extended Event-Driven Process Chain.	van der Aalst, 1999
Rational UML Profile for Business Modeling	Component of the Rational Unified Process (RUP). It presents the UML language for capturing business models and is supported by the Business Modeling Discipline in the RUP.	Johnston, 2004
Business Process Model and Notation (BPMN)	Graphical notation that facilitates the understanding of the performance collaborations and business transactions between the organizations. Provides organizations with the capability of understanding their internal business procedures.	Object Management Group, 2011

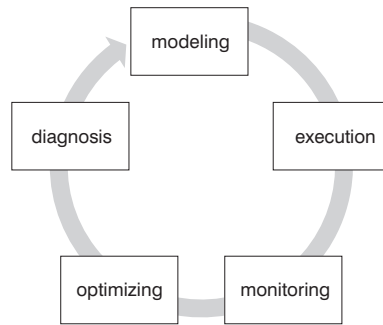Tab. 6. Description of the most popular BPM standards. Source: own work.

Fig. 6. The main steps in Business Process Management lifecycle. Source: Macedo de Morais et al., 2014.

A software component complementary to ADONIS is Bonita BPM Studio, which contains a Bonita BPM Platform with BPM Engine and Portal designed to manage processes and build applications – see Figure 10.
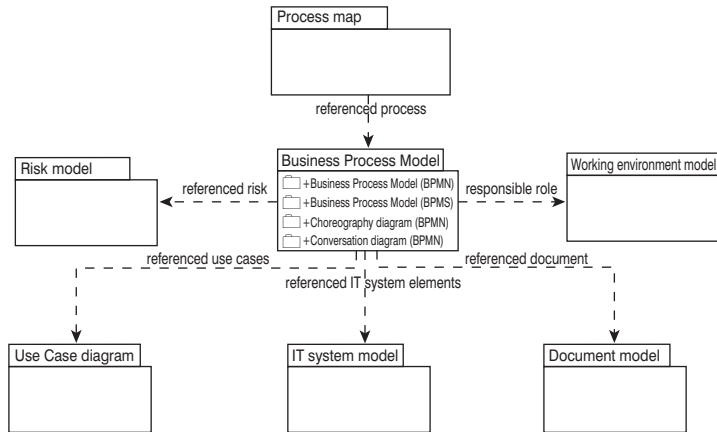
DOI 10.7172/1644-9584.71.10

Fig. 7. Main model dependencies in BPMS notation supported by ADONIS software. Source: own work.

4.4. Course Scenario

Our framework is used at the Faculty of Economics of Maria Curie-Skłodowska University during the course of BPM dedicated to graduate students. This intermediate course provides students with a comprehensive view of the business process management cycle and classes include information on process mining, BPMS and BPMN modeling as well as process execution. Figure 8 presents the main activities in the learning process.
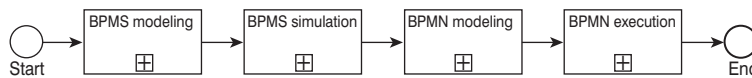

Fig. 8. Main steps in the BPM learning process. Source: own work.

The first step which covers about 30% of the full time of the course is dedicated to BPMS modeling technique. In this part students prepare the process map of the analyzed organization and develop models of processes, documents, IT systems, risk and working environment. All models are connected through active, visual hyperlinks as shown in Figure 7 and Figure 9.
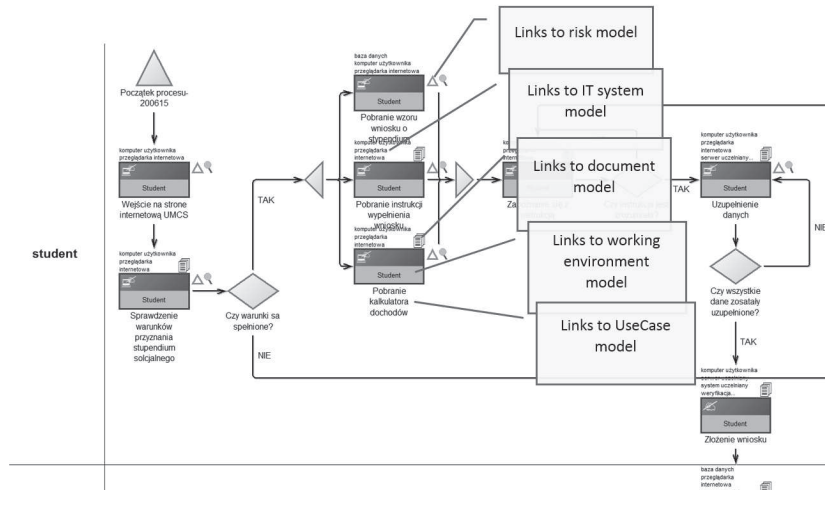
Fig. 9. Connections to different BPMS models on a sample process model in ADONIS software. Source: own work.

The next step in the course scenario is dedicated to process analysis. We perform a cost and time analysis of the prepared processes. Also some work in the area of process optimization is done. This part covers about 15% of the course full time.

After process optimization we move to implementation of prepared processes in BPMN notation. ADONIS supports auto-generation of BPMN templates for the process prepared in BPMS notation (BOC), but the generated templates require refinement using the full BPMN notation. At this level we also introduce the BPMN standard and practice the notation on example processes, patterns and best practices libraries.

In the final part of the course (about 15% of the full time) we work on implementing the BPMN models in the workflow platform of Bonita software. Process models exported in XPDL format from ADONIS are used to build a working workflow solution in Bonita Portal. We complete the process model with the necessary forms and user interface components and perform some tests of a simple workflow application.

The presented scenario covers the full BPM lifecycle. During the classes students are supported by extensive educational content provided also by BOC company and the quantitative analysis of complex processes is done through introduction of small changes and observing the effects of such adjustments. We notice that such an instructional, supervised approach encourages creative thinking on real life problems.

4.5. Laboratory Configuration

The laboratory runs in a client-server architecture: the network version of ADONIS is connected to centralized user and model repositories which are stored in MS SQL database. The connection is realized through ODBC, defined at Windows Server. The second server, based on Linux operating system, is the platform for the workflow solution used for process automation – Bonita portal and Bonita BPMN engine. Figure 10 presents the software components of learning environment.
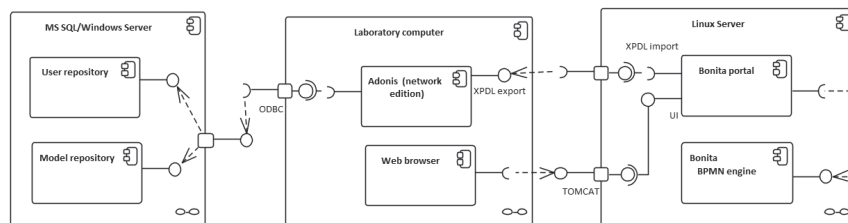

Fig. 10. Model of the main software components in the students' BPM laboratory environment. Source: own work.

5. Conclusions

Knowledge of BPM standards, methods and tools is important because it allows: the provision of a rich set of elements to represent common situations of business processes, the facilitation of processes interpretation by defining a visual representation and the improvement of mapping to execution standards (Pillat et al., 2015, pp. 95–115).

A proper analysis of the company's processes requires well-trained staff with both theoretical knowledge and practical skills and experience in process identification, modeling, simulation, optimization and automation. Therefore, in response to market demand, the Faculty of Economics of MCSU introduced a BPM course for Masters students. The performed analysis in the area of BPM in education and lessons learned from preparing the BPM course indicate that:
* process management and modeling can be a powerful tool that allows for capturing, externalization, formalization and structuring of knowledge about enterprises,
* first simple techniques for business process modeling are quite old; however, nowadays we can use many sophisticated methods, standards and specialized IT tools for process modeling, information interchange and workflow automation,

- business process modeling is becoming an increasingly desirable skill for employers and there is a need to educate students about BPM standards, tools and BPM areas of application in the organization,
- a successful BPMN course should among others possess four main components: motivated participants, experienced trainers, real business cases and appropriate BPM standard and modeling tools,
- availability of many standards, complex notation makes it not easy to choose the right standard and tool for teaching process modeling at business schools,
- the ideal teaching process management software should cover a wide range of integrated models, including the most popular BPM standards, and reflect the whole BPM lifecycle: modeling, execution, monitoring, optimizing, diagnosis,
- the ADONIS software is easy to install and configure in the client-server architecture, and easy to use for students with basic knowledge in BPM,
- choosing the BPM tool, we should pay attention not only to its functionality and ease of use, but also to additional elements of the offer that are important in the educational process, e.g. easy access to educational materials (webinars), trainings for teachers, business cases and processes repository as well as technical support of the tool provider,
- the preparation of good content for a BPM course needs not only knowledge in the area of BPM standards and tools but also profound business knowledge in order to prepare appropriate, real life cases, interesting templates for course participants,
- completed course modules indicate that theoretical elements of the course like standards and notations should be supplemented by more dynamic elements. At the beginning of the course students can complete the theoretical knowledge performing (easy to implement in ADONIS) process simulations, more advanced activities should result in implementing, executing and optimizing workflow logic,
- the software that can enhance models prepared in ADONIS can be Bonita BPM Studio, which contains a Bonita BPM Platform with BPM Engine and Portal designed to manage processes and building applications.

6. Future Work

The analyzed literature suggests that business process management has a lot of areas of usage and is increasingly used to support performance of industrial, logistic and administrative processes. Therefore there is a great need for preparing BPM courses for business students and monitor their effectiveness. In this article the authors presented the characteristics and main conclusions derived from the introduction of a business process modeling course for higher education. The research was limited only to

students of logistics at the Faculty of Economics of MCSU, which may limit the findings generalizability. The future research would be conducted to compare the presented findings with the opinions of students of different fields of studies and different universities but also with those of experts in the area of business process modeling working for business, industry and administration. At the end of the described course the authors will perform quantitative research in the form of an on-line questionnaire to gather and analyze detailed information about the business processes modeling perception and the BPM learning process. The future questions are related to: organization of learning, useful sources of knowledge about process modeling, opportunities offered by process modeling in future work, BPM preferable styles of learning, and also the main barriers faced by students in the BPM educational process.

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