

Jacek Jakiela

Rzeszow University of Technology

Joanna Wójcik

University of Information Technology and Management in Rzeszow

RUP DRIVEN DEVELOPMENT OF SOCIAL LEARNING PLATFORM

Introduction

Nowadays most people understand quite well the need for life-long learning. It holds for students who are at the beginning of their career ladders as well as for professionals who would like to be highly competitive in their workplaces. However it requires ongoing, voluntary, and self-motivated pursuit of knowledge. This process may be significantly improved by ICT (*Information and Communication technologies*) based interactive tools used for professional development.

Tischner European University (TEU) in Cracow is developing an innovative education model as a means to meet students' expectations and to adapt the university education policy to socioeconomic changes in such areas as: social development, blended learning and open source philosophy. As a part of this model, a comprehensive education offer supported by innovative state-of-the-art ICT solutions in the form of social learning platform called WeLearning have been developed. The users of this platform may become members of a community of active learners that participate in discussions, meetings and can develop education stuff (e.g. articles, DL modules, and infographics) on the platform. The goal of TEU is to make the philosophy of life-long learning among Poles more popular.

In case of most development processes of web based solutions, project activities are usually done informally. It works for small and technically simple projects with clearly stated requirements and centralized small project teams. The characteristics of TEU WeLearning project such as decentralization of stakeholders, not fully explored application domain, the size of project team and innovativeness as well as technical complexity of software solution required more disciplined approach. On the other hand, because of time constraints the development process should not be too formal. As a solution to a problem, Ra-

tional Unified Process (RUP) methodology has been selected for WeLearning project. RUP has proven its value in the industry by delivering significant returns on investment (ROI) to the companies and organizations that have adopted it [Kruc03]. It provides disciplined approach to the development process but at the same time the formalization level can be customized to project's environment. The paper describes RUP driven development process of social learning platform and explains why decision of selecting RUP was a proper choice. What is more, all project activities undertaken have been analyzed and described from two main perspectives. The former regards *RUP as software development approach* and according to the latter RUP is considered as a *software engineering process*.

System under Development

The system under development is intended to be an internet platform that will help to create and share knowledge, as well as to develop skills and a sense of community among like-minded individuals. This community is not supposed to be made available exclusively for students, staff, and sympathizers of TEU, but from the very start it is open for everyone interested, regardless of age, level of education, or university affiliation. The only condition is a life-long hunger for knowledge and willingness to make new acquaintances with like-minded individuals. The interests of the users of the platform and their activities will be used as a way to measure the job and education market. The university will then be able to plan its endeavors (for example: the opening of new courses of study, creating new specializations) to ensure the best qualifications for its graduates and to build an interesting additional offer (cultural events, trips, conferences with interesting people). Besides basic functionalities planned, the platform will be equipped with mechanisms of gamification that will take the solution to new level of educational quality. According to the definition, gamification is “the use of game design elements in a non-game context” [Dete11]. The concept of applying game-design thinking to non-game applications has gained common acceptance in everyday activity. The huge success of using these two strategies (social media and gamification) pointed the way to the use of this type of mechanisms in other fields including education. The main objective is to encourage students to learn since some methods of learning that are often labeled as boring are met with resistance.

Why RUP?

There are several reasons why RUP methodology has been selected for the project. First of all it provides a disciplined approach to assigning tasks and responsibilities within a development organization. Its goal is to ensure the production of high-quality software that meets the needs of its end users within a predictable schedule and budget [KrKB03]. Secondly RUP is adaptable and extendable process framework. It can be properly configured to suit the needs of the specific project. Next reason is that one can select proper formalization level for the development process. In the areas where there are requirements concerning formal documentation, adequate RUP artifacts can be developed. In other places less formal approach may be taken. Finally RUP promotes best practices of software development so called *Spirit of the RUP* developed by many professionals and organizations all over the world. One of the most important aspects is that RUP is an iterative process what makes the development more flexible and adaptable to changing requirements of the system's owner and stakeholders.

RUP as a Software Development Approach

During the project both aspects of the RUP methodology have been taken into consideration. Firstly RUP is considered as a software development approach. It includes several essential principles driving the development process. They are the following [Kruc03]:

- attack major risks early and continuously... or they will attack you,
- ensure that you deliver value to your customer,
- stay focused on executable software,
- accommodate change early in the project,
- baseline an executable architecture early on,
- build your system with components,
- work together as one team,
- make quality a way of life, not an afterthought.

All of them have been implemented in the project to some extent. System under development is innovative solution that has not been developed so far by other educational institutions. It means that there are no reference models which can be taken into consideration during the process of functionality planning and architecture selection. Therefore there are many possible risks related to the development process of this kind of platform. The risk has been mitigated by conducting extensive research involving all stakeholders. There are several ques-

tions that had to be taken into consideration before project started. Sample questions asked and answered are: What are the possibilities of creating and moderating of active learners' community? What are the possible methods and techniques used for e-learning that will stimulate interest and drive educational content development? What about motivational system? What mechanisms implemented will make them tick? What kind of revenue generation model can be applied (if any) to platform content? Should the access to the content be free or it is possible to receive payments for premium platform functionalities and educational stuff? In order to answer these general questions, in every category more specific ones have been formulated and research planned. For example for the first category related to potential of social learning platform the following questions have been identified:

- Do the prospects use social platforms? If yes which platforms? How often do they use this kind of services?
- Do the prospects know any social learning platforms or social platforms that offer educational services and content?
- What do the prospects mean by Distance Learning? What kind of associations do they have with regard to Distance Learning concept?
- Do the prospects have any experience with Distance Learning?
- What are the pros and cons of Distance Learning according to prospects opinion?
- Do the prospects use Wikipedia? How do they rate its content?
- Do the prospects have the skills and motivations for developing educational materials related to subjects they study and to sharing them with classmates?

Questions regarding other categories have also been elaborated [BaIP12a, BaIP12b]. Based on the questions prepared, research has been planned and conducted including such groups as students, alumni, university staff, external experts and employers. The research results enabled to make more informed decisions about platform's functionality, content as well as techniques and methods used. It also reduced the risks related to development and introduction of such unique and non-standard solution. More detailed description of the research is presented in the section of the paper, describing *Inception phase* of the project. Final issue concerning risk management is related to iterative development. All of the projects tasks have been done in iterative fashion.

As in all other ICT projects, delivering value to customer is very important and obvious goal. However the tasks that should be taken in order to achieve this goal are sometimes poorly specified and vague. The situation looks different in case of RUP. RUP provides recommendations derived from best practices of software development. Recommendations regard three aspects: iterative development, communication with customers and capturing functional requirements

[Barn07]. As has already been mentioned the project under consideration has adopted iterative approach. What is more, after every iteration, meeting with stakeholders have been arranged and conducted. During the meetings presentations of system functionalities developed so far have been delivered and feedback from stakeholders gathered. All remarks have been taken into account during following iterations. This enabled to reduce the gap between stakeholders' requirements and system under development functionality.

Finally, according to RUP, use case method has been used for capturing requirements. After all use cases have been specified, they drove whole development process. Since use cases describe how a user will interact with the system, they are easy for a user to relate to. And since they describe the interaction in a time-sequential order, it is easy for both users and analysts to identify any holes in the use case [Barn07].

Because of the project's time constraints *Stay focused on executable software* principle has been adopted. This means that the progress of the project has been measured with regard to ready to use executable software. Therefore, main focus was not on RUP documentation artifacts but on modules (or functions inside modules) fully implemented, tested and presented to stakeholders. A clear focus on executable software forced right thinking among project team. Less risk of overanalyzing and theorizing has been run, and it was possible to prove which solutions are optimal. As was written in [KrKB03] forcing closure by producing executable software is often the fastest way of mitigating risk.

Continuous communication with stakeholders also enabled to *accommodate changes early in all stages of the project*. This approach has reduced costs of changes and minimized requirements creep. Before the project started, the research results have been deeply analyzed, all insights discussed with stakeholders and the contract describing the system scope approved by them. After functional and non-functional requirements have been gathered and specified, they have been presented to stakeholders and elaborated according to their hints and comments. What is more, decisions on solution final architecture were made before elaboration phase. Changes related to design and implementation have been managed rather easily as component base approach to system modules were taken. All the functionalities have been implemented with the use of customized by developers off-the-shelf elements, that are well tested and verified in many solutions working on-line.

Common knowledge is that people are the project's most important asset. Project under consideration was organized around cross-functional team that consisted of *project manager, system analysts, user experience and SEO expert*

as well as *developers*. During implementation stage developers coordinated their tasks quite smoothly as they knew each other very well because of many projects done together so far. The same held for system analysts and UX expert. Every team member was informed about state of project once or twice a week during meetings organized by the project manager. There was also continuous asynchronous and synchronous communication done via e-mail and instant messengers. Unfortunately every day stand-up meetings have not been organized. The reason was decentralization and responsibilities of team members related to other projects and classes (part of the team was sourced from university staff). As a solution to this problem, project documentation, constantly updated by system analysts, was published on-line in the form of interactive website, where everybody could analyze the contents, check the current state of the project and drill down the artifacts to the abstraction level she/he was interested in. As experience showed, this solution improved communication significantly and partially compensated the lack of every day short meetings.

RUP as a Software Engineering Process

The RUP is also software engineering process. All the stages and activities in the life-cycle are well-defined and well-structured with essential milestones and decision points precisely articulated. RUP clearly defines who is responsible for what, how things are done, and when to do them [Kruc03]. Structure of the RUP is presented on Figure 1. Process has two dimensions: static and dynamic. Static structure describes how process elements are logically grouped into core process disciplines. Basic process elements are: activities, disciplines, artifacts, and roles. Dynamic structure shows how the process, expressed in terms of cycles, phases, iterations, and milestones, unfolds over the lifecycle of a project [KrKB03].

RUP defines four main phases: inception, elaboration, construction and transition. In *inception* phase a good understanding of what system to build is gotten. It is done by getting a high-level understanding of all the requirements and defining the system's scope. In this stage the focus is also on mitigating business risks, and producing the business case for building the system. Finally it is important to get acceptance of all stakeholders and decide whether to proceed with the project.

During *elaboration* phase most technically difficult tasks such as: design, implementation, testing, and baselining an executable architecture (including subsystems, their interfaces, key components, and architectural mechanisms) are undertaken. What is more, major technical risks are addressed by code implementation and validation [Barn07].

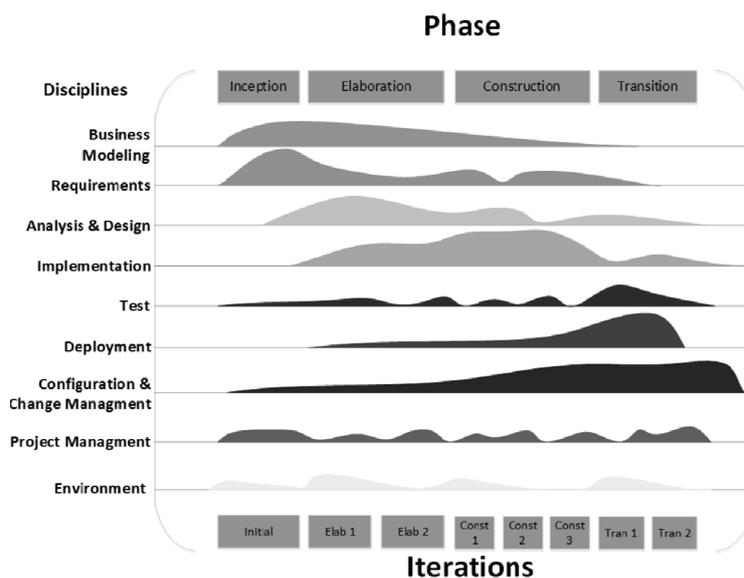


Fig. 1. Structure of the Rational Unified Process

Source: [Kruc03].

Most of the implementation is done during *construction* phase. Programmers are developing first operational version of the system on the base of executable architecture. Then they deploy alpha releases to verify if system under development meets stakeholders' needs. At the end of this stage fully functional beta version is deployed, however system still requires improvements and tuning related to overall functional and non-functional requirements as well as quality.

Main aim of the *transition* stage is to collect final feedback and ensure the release of the system under development addresses needs of all stakeholders. During this stage testing and minor adjustments are made. Basic activities include fine-tuning of the product, configuration and usability analysis. Focus is also on users training and integration issues.

The Inception Phase of WeLearning Project

As has already been mentioned, this stage is mainly about understanding what to build – major system's objectives and scope. System's objectives are formulated in vision statement. However the process of preparing a vision has to be driven by the needs of system's stakeholders. The vision statement should also express strategic potential of the solution under development. Therefore the first step was related to identification of project's stakeholders and their needs.

All stakeholders have been divided into two groups *primary* and *secondary*. The first group includes students and university staff members. Second group consists of external experts and employers. Figure 2 presents primary stakeholders and the roles they can play as platform users.

In order to better understand the stakeholders' needs as well as a strategic potential of the platform under development research was planned and conducted with the use of two well-known techniques: *focus groups* and *expert interviews*. Focus groups is a form of qualitative research in which different groups of people have been asked about their perceptions, opinions, beliefs, and attitudes towards a product itself (platform), services it will provide and the main idea that is quite unique and innovative – to provide users with internet platform where they will learn, share knowledge and insights, build the educational content as well as influence the quality of educational stuff created by other virtual community members.

The research was done in structured form with scenario prepared in advance. There were 137 participants from two main categories of stakeholders: students and alumni. They came from *Tischner European University* in Cracow, *University of Information Technology and Management* in Rzeszów and *University of Management and Administration* in Zamość. Groups included part time and full time students from first and second cycle studies (different majors) as well as graduate students and alumni.

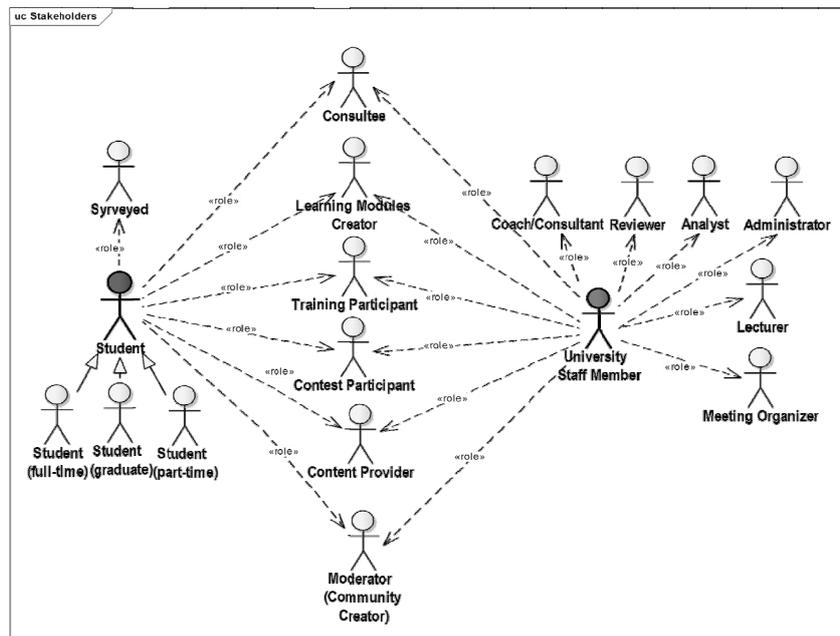


Fig. 2. Primary Stakeholders of the system

The research was conducted from the end of October to the beginning of December 2012. Every focus group had 1,5 hour session time and the results were recorded, transcribed and coded.

For coding the results Atlas.ti software has been used. Focus groups members were informed in advance about the scope and goal of the research and the participation was fully voluntary. What is more all indicators and codes were operationalized in order to properly mark quotations selected from recordings (for details see [BaIP12a, BaIP12b, BaIP12c]).

All of the stakeholders answered the questions from the following modules: *Diagnosis of opportunities related to creation and moderation of life-long learning virtual communities, Social potential of learning platform, Scope and type of learning methods and techniques, Scope and topics of subject-matter, Motivation system and Diagnosis of opportunities related to introduction of payments for access to platform's content.*

Second group of stakeholders included employers. The research was conducted in the form of structured *In-Depth Expert Interviews* with the use of scenario prepared in advance. The *Expert interview* is ideal tool for presenting ideas and content and encourages subject matter experts to share knowledge from an area under consideration. Ten experts from social media and ICT fields have been selected. This group consisted of entrepreneurs (ISPs and social portals owners – zadane.pl) and experts (social media investors and advisers, start-up practitioners, and on-line brand creation experts).

The research was conducted in December 2012 and every interview lasted from 0,5 to 1 hour. Every expert was informed in advance about the goal of research and the participation as in previous groups was fully voluntary. In case of this group new questions categories have been introduced such as: *Verification of technical capabilities of different social platforms including open source solutions and Market demand for this kind of services as well as prospect employees who are using them.*

University staff members constituted the third group which opinions were analyzed. As in case of employers, the research regarding university staff members was conducted in the form of structured *In-Depth Expert Interviews*. Group included 18 people – 6 from *Tischner European University* in Cracow, 6 from *University of Information Technology and Management* in Rzeszów and 6 from *University of Management and Administration* in Zamość. The group consisted of decision makers such as vice presidents, deans, heads of departments and lecturers. Part of them have been dealing with e-learning issues for some time. Besides the research modules already mentioned they were supposed to answer questions related to their experience with e-learning, key platform features, evaluation and certification processes and platform's brand building process.

Careful analysis of research results enabled to formulate system's vision, establish preliminary scope and key functionalities of platform under development. All these elements become a part of *inception deck* developed for a project.

- For [all learning and teaching fiends]
- who [follow life -long learning philosophy]
- the [WeLearning]
- is a [Social Learning Internet based Platform]
- that [enables to learn from others and teach others by providing innovative educational content].
- Unlike [other Distance Learning solutions]
- our product [builds the virtual community around the concept of life -long learning and provides motivation mechanisms for enriching virtual community resources with high-quality and innovative educational stuff].

Fig. 3. Elevator pitch for WeLearning project

In order to prepare inception deck, three techniques taken from agile approaches have been used: *elevator pitch*, *designing product box* and *NOT list*. Elevator pitch is well known tool that enables to communicate the essence of the project in a very short period of time. Elevator pitch for the project was created according to the template published in [Rasm10] and is presented on Figure 3. As a part of project's documentation, there was also prepared the extended version of system's vision (included in *Executive Summary*) for strategic stakeholders.

Next technique is called *designing the product box* for a solution. Creating a product box for the project, and asking why someone would buy it, gets the team focused on what's compelling for stakeholders and the underlying benefits of your product [Rasm10]. Product box developed for the project is shown on Figure 4.



Fig. 4. Product box for WeLearning platform

After vision statement has been formulated, the system's scope was established. When setting expectations about the scope of the system, saying what will not be done is just as important as what will be [Rasm10]. The technique that has been used is a *NOT list*. By creating a NOT list, it is clearly stated what is in and out of scope for the project. Figure 5 presents *NOT list* for the project.

In Scope		Out of Scope
<ul style="list-style-type: none"> • News • Surveys • Groups • Communication with University Administration • Blogs • Forums • Galleries • Networking • Meetings • Social Bookmarks • Profile Management • Talents Management • Reporting • Search Engine • System Administration • Backup • Access Control 	<ul style="list-style-type: none"> • Calendar • Wiki • Job e-Marketplace • Contests Management • Payments Management • Educational Resources 	<ul style="list-style-type: none"> • Video conferences Management • LMS Platform • Asynchronous Communication Facility
Unresolved		
Integration with LMS Platform, Integration with Video Conferencing System		

Fig. 5. NOT list developed for WeLearning platform

Final decisions that have been made in the inception phase were related to solution architecture and software engineering process. Project team decided that system will be built around three-tier architecture. It is common architecture for web based applications. All system components should comply with Model-View-Controller pattern. Because of time constraints and quite high technical complexity of planned functionality, most of the modules will be implemented with the use of Joomla® CMS and additional off-the-shelf components that will be tuned to system's requirements. According to RUP best practices, the development process will be fully iterative. Releases and iteration planning will be done during elaboration phase.

The Elaboration Phase of WeLearning Project

The elaboration phase started from gathering details of system requirements. All functional requirements were specified in the use case model including use case diagrams and use cases scenarios. For selected use cases GUI proto-

types and storyboards were created to present the system from the user perspective. Users usually are able to better understand functional specification when it is presented in terms of screens they can see during interaction with system under development. Then non-functional requirements have been described and project glossary developed. Because of large number of use cases, they have been divided into modules. The architecture of WeLearning platform is presented in Appendix 1.

In order to plan the first release of the system and iterations, for all use cases priorities have been set and labor intensity estimated. Use cases priorities were determined by strategic stakeholders (system owner). Labor intensity estimates were provided by developers. For every iteration use cases were selected according to defined priorities and time needed for development.

First iteration (iteration 0) was responsible for baselining executable architecture of the solution. Therefore the tasks undertaken regarded auditing hardware architecture for platform, server virtualization, installation and configuration of CMS and frameworks (Gantry 4, Twitter Bootstrap), and selecting Joomla extensions as well as self-contained systems that will enable to implement planned platform's functionality.

Table 1 presents main CMS extensions chosen for development [Wojc12].

Table 1

CMS Extensions Selected for the Platform

Extension Name	Related Platform Functionality
SobiPro	Social Bookmarking
JomSocial	Networking Groups Galleries Calendar Communication among community members Dashboard Meetings
EasyBlog	Blogs
JS Jobs	Job e-Marketplace
Kunena	Forums

Besides Joomla extensions that can be relatively easy installed and configured, some functionalities required self-contained systems that had to be integrated with WeLearning platform. For educational resources management (DL modules) *Moodle® LMS* has been selected. Video conferences will be supported by *BigBlueButton* solution and synchronous communication by *CometChat*.

After all elements of executable platform architecture have been settled, the layout and look-and-feel of main system's screens have been designed according to User Experience best practices. In order to better suit stakeholders needs the session was organized during which prospect users have drawn sample sketches of system's screens. Based on the sketches, digital mock-ups have been developed and presented to stakeholders. With the feedback gathered, final look-and-feel of the user interface has been designed.

Next iterations planned were responsible for development of key solution features. In elaboration phase WeLearning platform was equipped mainly with features that can be implemented with Joomla Extensions. Iterations for elaboration phase are presented on Figure 6.

Elaboration Phase					
<ul style="list-style-type: none"> • Access Control • Communication with University Administration • Search Engine 	<ul style="list-style-type: none"> • Surveys • Social Bookmarking 	<ul style="list-style-type: none"> • Forum • Gallery 	<ul style="list-style-type: none"> • Networking • Communication Among Community Members 	<ul style="list-style-type: none"> • Groups • Blogs 	<ul style="list-style-type: none"> • Meetings
Iteration 1 (1 week)	Iteration 2 (1 week)	Iteration 3 (1 week)	Iteration 4 (1 week)	Iteration 5 (1 week)	Iteration 6 (1 week)

Fig. 6. Iterations Planned for Elaboration Phase

The Construction Phase of WeLearning Project

Elaboration ended with the internal release of a baselined, executable architecture, which allowed to address major technical risks by implementing and validating actual code [Ba07]. During the *Construction phase*, project team focused heavily on detailed design of modules, modules implementation, platform integration with self-contained systems and testing.

Some of the modules planned in the construction phase could not be implemented with CMS extensions and needed in-house development, e.g. *Reporting Module* and *Talents Management*. There were also modules that were created on the basis of CMS extensions. In such cases basic functionality of specific off-the-shelf extension has been tuned and programmed according to system's requirements (e.g. *Profile Management*).

Next tasks in the construction phase were related to self-contained systems integration. In order to enable users to create, upload, use and manage educational resources, platform was integrated with Moodle LMS. The integration was done with the use of *Joomla* component which is a bridge between Joomla and Moodle platforms.

Because of high significance of synchronous communication among community members Chat facility had to be developed. It was done with the use of *CometChat* system integrated with CMS and *JomSocial* extension. One of the advantages of such solution is smart-pooling technology used for sending messages from users to system and back, without having to deploy additional application server for synchronous communication.

Construction Phase					
• Profile Management	• Educational Resources Management	• Educational Resources Usage	• Reporting	• Chat	• Talents Management
Iteration 1 (1 week)	Iteration 2 (1 week)	Iteration 3 (1 week)	Iteration 4 (1 week)	Iteration 5 (1 week)	Iteration 6 (1 week)

Fig. 7. Iterations Plan for Construction Phase

Third external solution used is *BigBlueButton*, open source video conferencing system offering many options and APIs for customization as well as integration with learning tools. It enables remote students to have a high-quality learning experience. However this part of the system is still under development. Iterations plan for construction phase is presented on Figure 7.

Because of time constraints (first version had to be available in 3 months) the platform functionality was divided into two releases. All system elements presented in iterations plans (Figure 6 and Figure 7) regarded first release. Second release included such modules as: *Certification*, *Job e-Marketplace*, *Calendar*, *Wiki*, *Learning Outcomes*, *News Management*, *Shared Repository*, *Contests Management*, *Payment Management* and *Video Conferences*. Most of them require in-house development. Part of the modules is done but some of them are still under development.

Non-functional Requirements

During development of first release of the system, non-functional requirements had also been taken into consideration [Wojc12]. Modern user interface and animation implementation without *Adobe Flash Player* required to use *HTML5*, *CSS 3.0* and *Javascript* (with *jQuery* libraries). This enabled to use new features provided by newest versions of web technologies.

Because it should be possible for users to access platform with mobile devices, system was implemented with *Twitter Bootstrap* framework, which can be used for *Responsive Web Design*. WeLearning solution was equipped with flexible and dynamic user interface which automatically recognizes screen resolution and rescales all GUI elements.

Reliability requirements was implemented through code optimization for most internet browsers including IE8+, Firefox 3+, Safari 4+, Chrome 8+, Opera 10+ as well as for mobile devices internet browsers (Android and iOS). The source code complies with W3C standards.

Responsiveness of the system was improved thank to additional module with DEFLATE algorithm installed on the server that enables lossless compression of all data sent to platform users. All CSS and Javascript files have been minificated. All CSS and graphics files have *Expitacion Header* and all files loaded by internet browser obtain *Entity Tags*. These improve the performance of browser's cache. Most of the modules loaded to browser's cache are stored and therefore there is no need to load them again when the user needs them.

Security requirements was implemented with SSL certificates and mechanisms protecting from unauthorized access and XSS as well as SQL injection attacks.

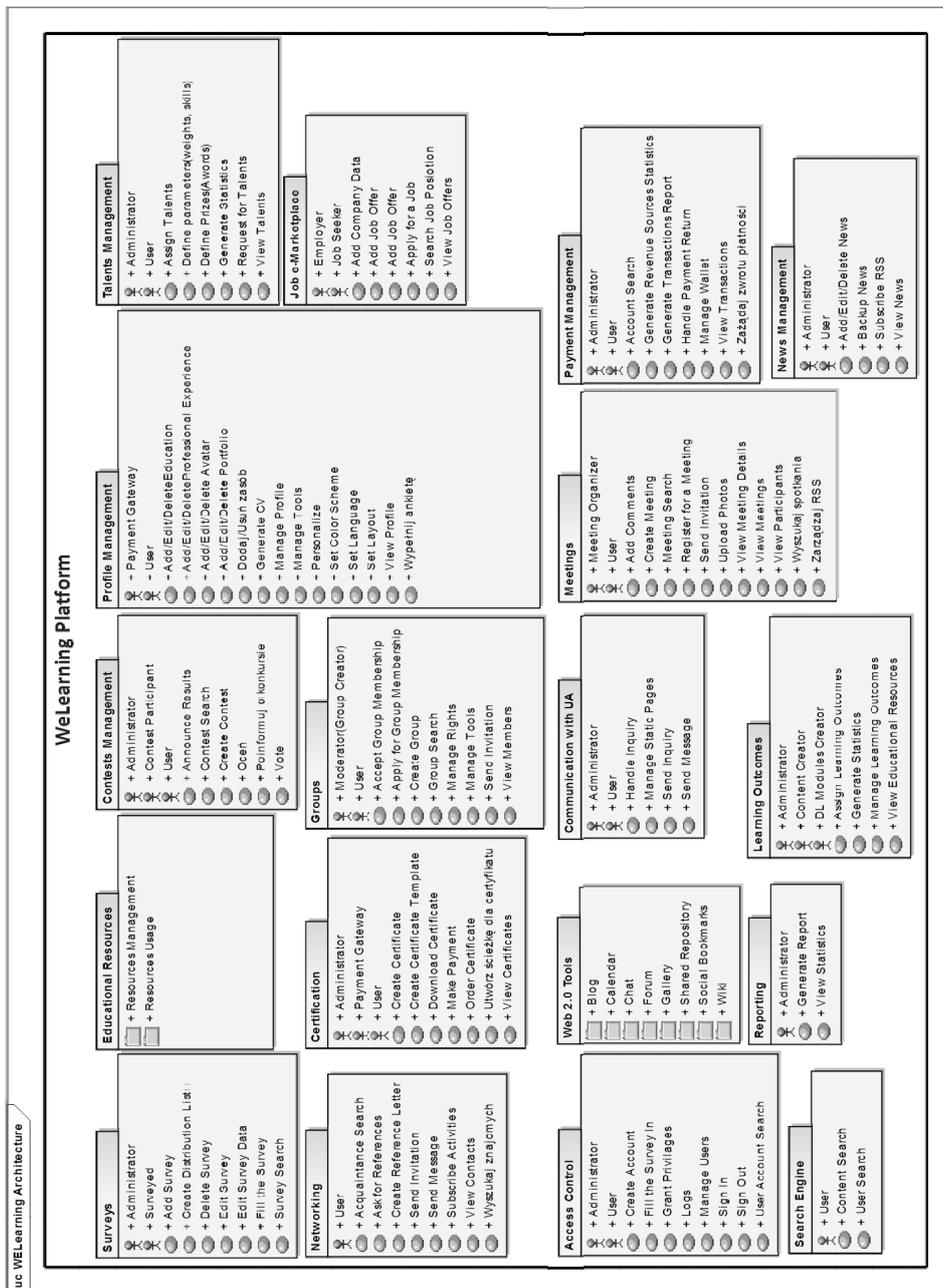
Transition Phase of WeLearning Project

In the *Transition phase* all major structural issues should have been worked out, and user feedback should focus mainly on fine-tuning, configuration, installation, and usability issues [KrKB03]. All of the WeLearning platform modules have periodically been presented to stakeholders and feedback was gathered. What is more testers were hired for checking if all systems elements meet acceptance tests. During this phase final documentation and user manuals were prepared and training planned. First training took place after first release was deployed. Second training regarded presentation of new modules from second release and improvements made to first release. The third training course was conducted in the form of workshop in computer lab where WeLearning team (10 persons) responsible for platform deployment learnt how to use all system functionalities in practice and provided feedback. In the time period when platform were being deployed all developers were constantly available on-line and under the phone.

Conclusions

It seems that the project is on the right track. So far the project team has met all acceptance criteria with regard to budget, schedule and scope. It was done to large extent thank to using RUP in development process. Of course it will take some time to fully verify the success of the whole enterprise. In case of platform like this, Metcalfe's law will apply. It means that *the value of WeLearning platform will be proportional to the square of the number of active users*. Important question here is if motivation mechanisms implemented via virtual currency called *talents* will work according to assumptions taken. But the statistics gathered are quite optimistic. At the moment WeLearning platform has 640 users (580 active users). There were 222 educational resources items published. Users have taken 83 competence tests (57 completed) and created 43 profiles with individual development plans. Forum includes 30 categories with 110 topics and 442 posts. Further development of the solution will depend on effective moderation of life-long learning community members, smart discovering what makes them tick and transforming these insights into innovative features of WeLearning platform. It will require constant monitoring of e-learning standards, learners preferences and advances in ICT field.

Appendix 1. Architecture of WeLearning Platform



References

- [BaIP12a] Baran L., Inglot-Brzęk E., Przywara B.: Pracownicy uczelni o e-learningu – Raport z wywiadów eksperckich z pracownikami uczelni. WSE, Kraków 2012, retrieved from <http://www.welearning.edu.pl>.
- [BaIP12b] Baran L., Inglot-Brzęk E., Przywara B.: Studenci i absolwenci o e-learningu – Raport z fokusów eksperckich. WSE, Kraków 2012, retrieved from <http://www.welearning.edu.pl>.
- [BaIP12c] Baran L., Inglot-Brzęk E., Przywara B.: Pracodawcy o e-learningu – Raport z wywiadów eksperckich z pracodawcami. WSE, Kraków 2012, retrieved from <http://www.welearning.edu.pl>.
- [Barn07] Barnes J.: Implementing the IBM Rational Unified Process and Solutions: A Guide to Improving Your Software Development Capability and Maturity. IBM Press, 2007.
- [BeLZ10] Begel A., DeLine R., Zimmermann T.: Social Media for Software Engineering. Proceedings of the FSE/SDP Workshop on Future of Software Engineering Research, November 2010, p. 33-38, ACM.
- [Dete11] Deterding S.: Meaningful Play: Getting “Gamification” Right. Google Tech Talk, 2011.
- [FiCo11] Fields T., Cotton B.: Social Game Design: Monetization Methods and Mechanics. CRC Press, 2011.
- [GiOF13] Gibson D., Ostaszewski N., Flintoff K., Grant S., Knight E.: Digital Badges in Education. „Education and Information Technologies” 2013, 1-8.
- [Kruc03a] Kruchten P.: The Rational Unified Process: An Introduction. Addison-Wesley Professional, 2003.
- [KrKB03b] Kroll P., Kruchten P., Booch G.: The Rational Unified Process Made Easy: A Practitioner’s Guide to the RUP: A Practitioner’s Guide to the RUP. Addison-Wesley Professional, 2003.
- [McGo11] McGonigal J.: Reality Is Broken: Why Games Make Us Better and How They Can Change the World. Penguin, 2011.
- [Rasm10] Rasmusson J.: The Agile Samurai: How Agile Masters Deliver Great Software. Pragmatic Bookshelf, 2010.
- [ThKC13] Thongtanunam P., Kula R.G., Cruz A.E., Yoshida N., Ichikawa K., Iida H.: Mining History of Gamification towards Finding Expertise in Question and Answering Communities: Experience and Practice with Stack Exchange. „The Review of Socionetwork Strategies” 2013, 7(2), pp. 115-130.
- [Wojc12] Wójcik J. et al.: Platforma Kształcenia Społecznościowego WeLearning. Analiza wymagań i specyfikacja systemu. WSE, Kraków 2012, retrieved from http://www.wse.krakow.pl/pl/Platforma_Kszaltczenia_Spolecznos.

ZASTOSOWANIE METODYKI RUP W DZIAŁANIACH ANALITYCZNO-PROJEKTOWYCH PRZY ROZWOJU PLATFORMY NAUCZANIA SPOŁECZNOŚCIOWEGO

Streszczenie

Celem prac, których częściowe rezultaty przedstawiono w niniejszym artykule, było zaprojektowanie i zaimplementowanie platformy nauczania społecznościowego WeLearning na poziomie szkolnictwa wyższego, uwzględniającej mechanizmy grywalizacji. Działania analityczno-projektowe zrealizowano z wykorzystaniem metodyki RUP. W artykule wyjaśniono, dlaczego wybór metodyki RUP był właściwą decyzją podczas projektowania platformy, oraz przedstawiono szczegółowo kolejne fazy cyklu życia projektu platformy, tj. fazę rozpoczęcia, opracowywania, konstrukcji oraz przekazania systemu.