



ACQUIREMENT OF IT-PROJECT MANAGEMENT AS AN AGILE PROJECT

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Abstract

In recent years, the state of innovation in society has radically changed. Words such as mobile phone, laptop and WLAN are now part of the everyday word usage. Due to the progress in innovation, IT-Projects have become much more complex and costly to supervise. In order to keep the overview and to enable the planning of the projects, appropriate management methods have been developed. The IT project management course at the FH Campus Vienna deals with these methods. The present work examines the possibility to view the knowledge acquisition of IT project management itself as a project and to support it using Moodle as a management tool.

Nowadays, teaching content related to project management is a common frontal lecture. Therefore, the focus lies in determining optimization potential in the way IT project management Scrum is taught by using a practical application. Likewise, a suitable product backlog was developed to cover the content of the lecture and a course schedule was defined. Due to this dynamic and flexible teaching method, the learning effect is optimized and rendered efficient.

Interviews were conducted to collect valuable data from experts who have personal experience in successfully transferring knowledge.

During the implementation, it became clear that Moodle offers a great support for documentation and knowledge sharing during the application. It also offers a wide array of rhetorical tools. Therefore, a custom Moodle course was developed for the defined Product Backlog, in order to support teaching and strengthen the lecture content accordingly. While developing the teaching concept, the focus was set on the integration of different rhetorical instruments.

Key words: *Scrum, project management, product backlog.*

JEL code: M15 (IT-Management)

Introduction

Project management, which originated in 1960, has changed rapidly in the last few years. The invention of the Internet and the revolution in information technology have resulted in a considerable economic change. This importance is also reflected in today's business world. IT projects are constantly gaining in relevance and also complexity and therefore found their way into all industries. Whether it is baker around the corner establishing a digital way of paying or an industrialized gigantic enterprise, in today's economy no one can escape the trending change (Lent, B, 2013).

A particular aspect of increasingly complex software projects, is that the entirety of the scope cannot be defined precisely in its initial phase anymore.

In an article by Philippe Kruchten, published in *ObjektSpektrum*, the following reasons were:

- Software inherently offers almost unlimited flexibility.
- Psychological and organizational constraints make it difficult or impossible to completely, correctly and accurately define a software system based on assumptions (without feedback in the processing cycles).
- The specification languages are often inaccurate.
- Rapidly changing market requirements often require late changes.

(ObjektSpektrum, 2001)

For the appropriate administration and implementation of projects new management methods and especially agile approaches have been developed to cope with the increased



complexity. These agile methodologies are based on a consistent set of rules. This includes the following approaches:

- Individuals and interactions > processes and tools
- Working software > comprehensive documentation
- Customer Collaboration > contract negotiation
- Responding to change > following a plan

This guideline should not mark the aspects listed on the right as "unimportant". Of course, they also have an important role to play in agile approaches, but during the project implementation and application, the methodology should primarily focus on the factors listed on the left (Andresen, J, 2018).

In many literatures, the Scrum method is named as a Best Practice approach, which is also underlined by increasing reputation and rising deployment in today's world of business. For this reason the methodology is ideally suited as the basis of the agile teaching concept in combination with IT project management (Rubin, K, 2012).

Empirical methodology of an agile teaching concept

It is clear how diverse the term IT project management can be defined, regarding problems that can be expected in the implementation and monitoring of a project and above all, the important role Scrum plays in this context. This disclosure forms the basis for understanding the concept of the agile transfer of IT Project Management knowledge

As mentioned above, the content of this thesis investigates the possibilities on how to structure and convey the lecture content of "IT project management" at the FH Campus Vienna as a Scrum process. The goal of the concept is to experience agile culture and methods, rather than learning them. Therefore, the roles that occur in a Scrum process are held by the teacher and the students, with the teacher acting as the product owner and the students taking the positions of the development team. The teacher and the students act exclusively within their respective roles throughout the entirety of the course.

Moodle, which is a widely known platform, shall be used to support the lecture. A specially designed Moodle course shall be used to exchange teaching materials and tasks, as well as for project documentations and performance reviews.

Based on the components of the Scrum methodology, these elements shall be reflected in the teaching method, which will be described in the following paragraphs. The product backlog will be referred to as the "LVA Backlog". The other components of the Scrum model retain their name, but are given the prefix "LVA". For example, the Sprint Review Meeting shall be titled „LVA Sprint Review Meeting“.

The entire preparation of this teaching concept, follows the vision of a memorable conveyance of the relevant teaching content, for "IT project management", to the students. So during the planning and implementation phase, the focus is set on successfully transferring knowledge.

In the preparatory phase of the course, the Product Owner is responsible for maintaining the Moodle course. Consequently, the teaching materials, as well as the "LVA Backlog" must be uploaded in the previously prepared Moodle structure. The "LVA Backlog" consists of user stories that cover the entire content of the course "IT Project Management". The following format is used:



User Story ID:	HM1	Sprint No.:	TBD
Title:	Hybrid / Collaborative Model		
Effort Estimation:	Medium	Priority:	2
Depending on:	LE1		
Necessary for:	SC1		
Description:			
Description of a mixed model, combining classical approaches with agile approaches and best practices with such			
Done when:			
2 students as groups against each other in review meeting: Classical versus hybrid model in cast Study example.			
→ Including feedback guideline			

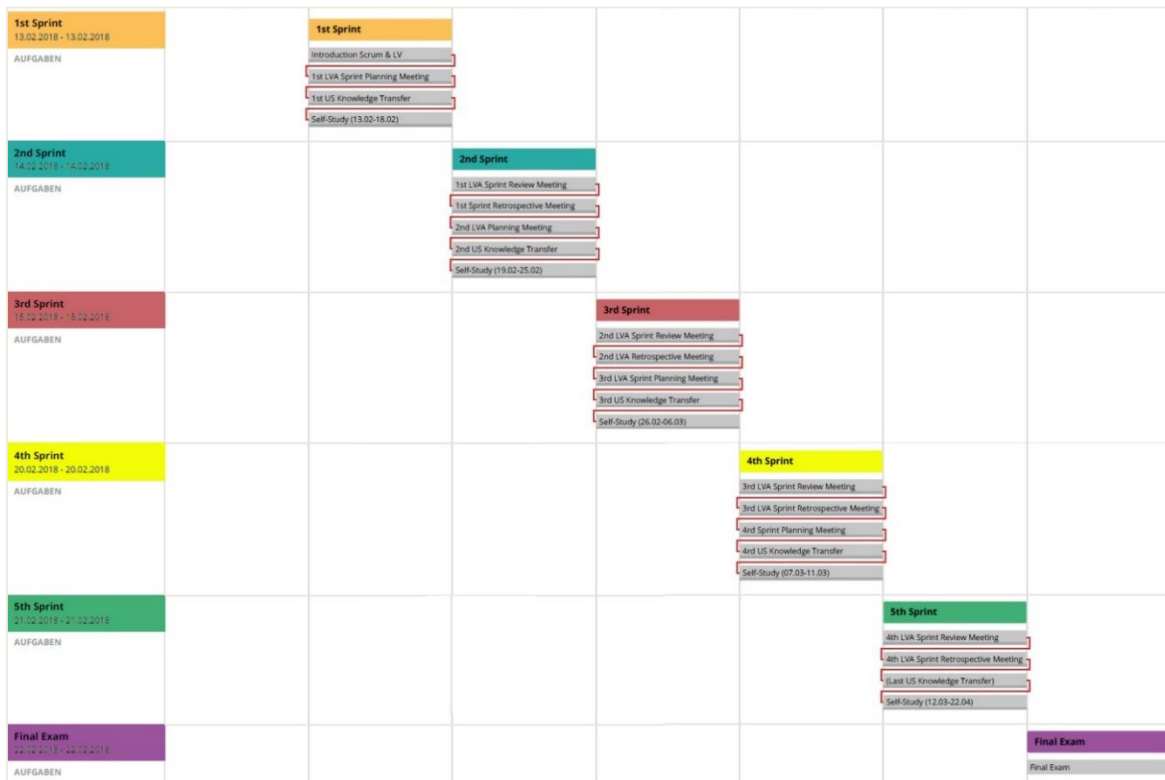
Source: Material of IT-Project Management lecture

Fig. 1. Example of a User Story

A still-to-be-defined sentence template shall help precisely word a good user story. Each user story should have an identification number, an approximate estimation of the teaching and learning effort, a dependency relationship and most importantly, if applicable, an acceptance criteria (Wintersteiger, A, 2013).

The degree of detail for each individual user story depends on the visions degree of maturity. The product owner should always keep in mind, that at the beginning of the course the students have different levels of knowledge related to IT project management due to their educational background. Therefore when detailing the user stories he must pay attention that the level of knowledge does not exceed that of the student team. The progress of the students' building knowledge will contribute to further expanding the degree of detail for the rest of the "LVA Backlog" user stories throughout the course (Gloger, B, 2013).

The first teaching unit can be held, once the documents for the course have been entirely prepared by the Product Owner. The basic structure of the course looks like this:



Source: author's construction

Fig. 2. Agile LVA Structure

The initial unit deals with introducing the students to the course, informing them on the planned process, and giving them a short overview of the Scrum method.

Once the general conditions of the course are specified for the entire student team, the first “LVA Sprint Planning” Meeting can start. The Product Owner presents the already developed User Stories in printed form to the student team. In a predefined period of time, students have the opportunity to gain an overview of the contents and to prioritize the user stories for themselves for the first “LVA Sprint”. Next the whole team discusses the results and a joint prioritization is agreed upon. At this point the Product Owner has the opportunity to intervene, should he disagree with the prioritization, and redirect the students back on a more suitable path. This would be the case, for example, if a user story is used for the first sprint backlog, which has not yet reached the appropriate level of detail or is dependent on a user story that has not yet been completed.

If the entire team agrees with the decision, it will be documented properly by the Product Owner in the Moodle course. Thus, the progress of the entire course is made transparent to the product owner, as well as the student team.

Ensuing, the Product Owner starts with the knowledge transfer for the selected User Stories and deals with the acceptance criteria of the individual contents. At the end of the lesson, the Product Owner documents, which user stories of the “LVA Sprint Backlog” were dealt with in terms of content and which were leftover due to lack of time.

The students work on individual homework tasks which fulfill the acceptance criteria which have been specified by the Product Owner for each user story respectively. These could be tasks such as reading through specific literature regarding the development of an entire project documentation to a case study.



The following structure of a LVA unit can be repeated as often as needed depending on the time resources available. It starts with an “LVA Sprint Review Meeting”, where the acceptance of the selected User Stories for the previous “LVA Sprint Backlog” take place. The acceptance of the individual user stories is carried out by the product owner, if the defined acceptance criteria has been fulfilled by the entire student team. If the Product Owner approves the results, the user story moves to the so-called “LVA increment”. If the specified acceptance criteria has not been met or missed, the user story is moved back to the “LVA Backlog” and awaits re-editing. At the end of the “LVA Sprint Review Meeting”, the status of the discussed user stories is reflected in the Moodle course and the phase is closed.

As in any well managed project, there is always room and time for improvement. The “LVA Sprint Retrospective Meeting” offers exactly this possibility. The teacher takes the role of the Scrum Master and discusses difficulties in the implementation of the individual user stories, as well as any complications and ambiguities in the realization of the teaching concept together with the student team. The expression of frustration, disappointment or blame should not occur. The focus is on improving the process on a team level to disclose and gain lessons learned.

After that the preparation phase of the next “LVA Sprint Planning Meeting” starts. All user stories that are still in the “LVA backlog” are again made available to the students in printed form by the product owner. Based on the already established knowledge, user stories with unsatisfactory levels of detail may possibly already be worked out into an actionable state. The entire team, including the product owner, is therefore encouraged to analyze and co-design the remaining user stories.

Then the same procedure as in the initial teaching unit shall follow. Each member of the student team makes a personal prioritization of the remaining user stories, which will be discussed in plenary including the product owner, who of course has a veto right again. Once a uniform prioritization has taken place, the resulting “LVA Sprint Backlog” is transparently documented by the Product Owner in the Moodle course and the renewed knowledge transfer to the selected User Stories takes place.

The last LVA unit starts like the previous ones, with an “LVA Sprint Review Meeting” of the last “LVA Sprint”. Once all the “LVA Backlog” user stories have been completed by the entire team and accepted by the Product Owner, they can immediately proceed with the “LVA Sprint Retrospective Meeting”.

Otherwise a last knowledge transfer follows after the “LVA Sprint Review Meeting”, led by the Product Owner to finalize the last declined User Stories.

In any case, the “LVA Retrospective Meeting” concludes the agile knowledge transfer of the course. At this point, the student team has the opportunity to review the entire process again retroactively and to provide suggestions on how to optimize the course. Furthermore, recommendations on how the communication or the lecture content can be improved are voiced. Thus, the Product Owner has a prospect for future students to perfect the execution and obtain better results. Also, the experience can be discussed with external lecturers to get a wider perspective on hidden possibilities.

The entire course will be completed by a final exam at the end of the semester. All contents of the “LVA Increment” will be dealt with again in this review. The entire course is passed if a student achieves a final grade of at least 50%.

Student’s opinion on the agile teaching concept

The course "IT Project Management" is in the fourth semester part of the curriculum "Technical Management" with the specialization "Information Technology" at the FH Campus Vienna. The teaching concept will be implemented for the first time in the summer semester of 2018.



To underline the effectiveness of the teaching concept, seven students of the study program were interviewed in expert interviews regarding their experiences with the agile instruction.

Without exception, the interviewees rated their overall impression of the teaching concept with four or five stars, resulting in an overall rating of 4.2 stars. The participants justified their grandiose evaluation by having the possibility of co-designing the lessons, as well as the resulting increased engagement in the cooperation and communication during the course content. Equally the students appreciate the recurring repetition of already learned teaching content in the "LVA Sprint Review Meetings", as this reduces the learning effort before the exam. Furthermore, the students can better identify with the contents of the individual "Knowledge Transfers", since they decide which topics are worked through.

Nevertheless, the interviewees also stated negative aspects of the teaching concept. Above all, the significantly higher learning effort between two teaching units was mentioned. Through the agile knowledge structure and the relaxed working environment, the students are more willing to engage in a discussion. This leads to high expenditure of time and as a consequence not all selected user stories can be treated. In addition, respondents still perceive the "US Knowledge Transfer" as a frontal lecture, even though the circumstances are different. However, 84% of those interviewed believe that the reverse sides of the agile teaching concept can still be remedied by revising and taking feedback into account.

The direct comparison of the frontal presentation and the agile teaching concept, based on defined viewing aspects, looks as follows:

Table 1

Agile teaching concept vs. frontal lecture

viewing aspects	agile teaching concept	frontal lecture
communication, participation	better, more active	bad, more passive
course construction	determined by students	determined by lecturer
repetition of the course contents	currently during the lesson	at the end of the course to compile the exam material
Expenditure outside the course	High overhead, due to ongoing repetitions in each unit	Low expenditure (one-time distance learning)

Source: author's calculations based on results of expert interviews

Due to the practical application of the Scrum method as a teaching concept and the recurring repetition of what has already been learned, nearly 84% of students feel their knowledge on the topic has improved significantly using the reformed teaching method compared to a typical frontal lecture. The remaining 16% assess their knowledge as nearly identical.

Apart from the fact that the new teaching concept, is the basis of IT Project Management course content, three quarters of the interviewees can imagine adapting this procedure in other subjects as well.

Moodle as a supporting platform for the agile teaching concept

Today, eLearning is an established and common term. In the earlier days, while computers and cell phones were still in their infancy, books and schools were the only sources of knowledge. Nowadays the internet is rich with information and knowledge is increasing constantly with every minute. This offers unsuspected opportunities in all sectors, including education (Stoecker, D, 2013).

In this context the term "Moodle" is often mentioned, which could be related to the fact that this platform is known as one of the world's largest learning management system in the



field of open-source programs. Moodle regularly extrapolates the following statistics, further underlining this statement:






















Moodle Statistics

Registered sites	94,632
Countries	230
Courses	15,039,481
Users	128,539,392
Enrolments	535,578,108
Forum posts	262,671,827
Resources	135,503,290
Quiz questions	787,719,901

Source: Moodle Pty Ltd. 2018

Fig. 3. Moodle Statistics

Apart from the enormous range of communities, Moodle additionally offers a wide repertoire of predefined teaching elements to design one's own course. The Moodle course serves as a platform, for the agile teaching concept, to exchange information and submit tasks.

ACTIVITIES		RESOURCES
<input type="radio"/>  Assignment	<input type="radio"/>  Glossary	<input type="radio"/>  Book
<input type="radio"/>  Chat	<input type="radio"/>  Lesson	<input type="radio"/>  File
<input type="radio"/>  Choice	<input type="radio"/>  Quiz	<input type="radio"/>  Folder
<input type="radio"/>  Database	<input type="radio"/>  SCORM package	<input type="radio"/>  IMS content package
<input type="radio"/>  External tool	<input type="radio"/>  Survey	<input type="radio"/>  Label
<input type="radio"/>  Feedback	<input type="radio"/>  Wiki	<input type="radio"/>  Page
<input type="radio"/>  Forum	<input type="radio"/>  Workshop	<input type="radio"/>  URL

Source: Moodle Pty Ltd. 2018

Fig. 4. Moodle Activities

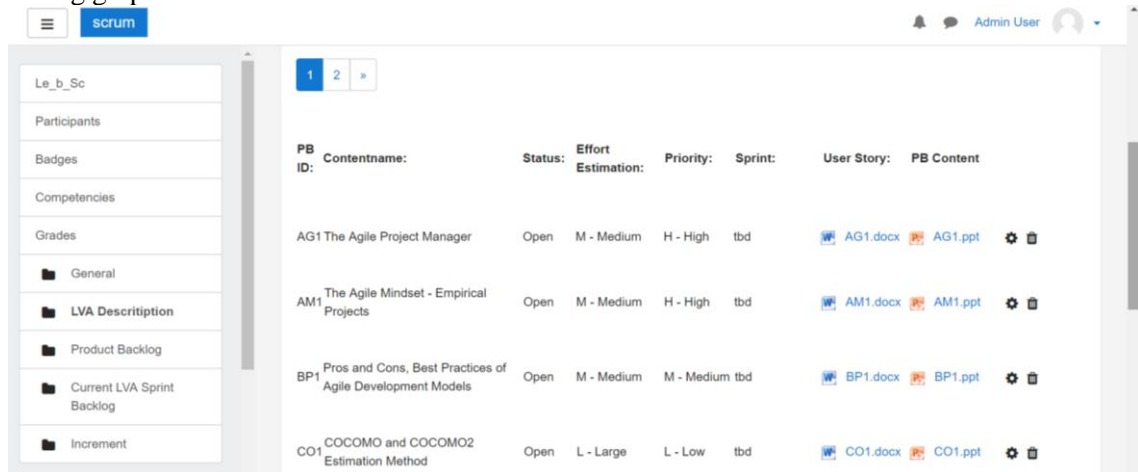
The course consists of the following four main chapters:

- LVA Description
- LVA Backlog
- Current LVA Sprint Backlog
- Sprint Review Tasks

The chapter "LVA Description" comprised the LVA structure, which was already illustrated in the chapter "Empirical methodology of an agile teaching concept". Also the explanation of the course modalities are available in this chapter.



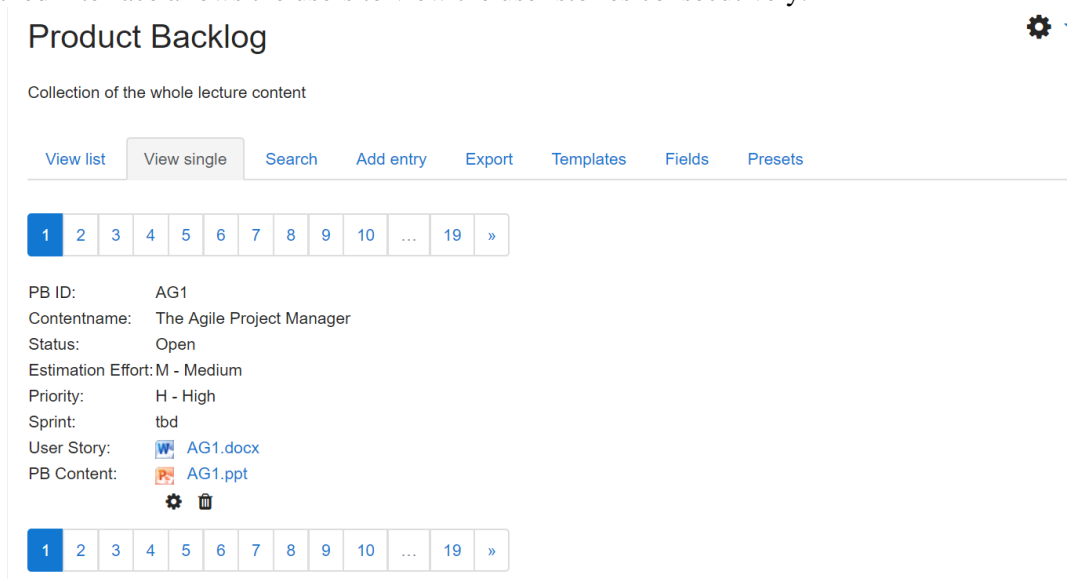
The "Database" activity is perfect for a clear representation of the “LVA Backlog”, which is why it is used in the chapter "Product Backlog". All user stories are listed as depicted in the following graphic:



Source: author's construction

Fig. 5. Moodle Course Product Backlog Overview

For each user story the product backlog ID, content name, status of editing, effort estimation, priority, sprint assignment, description of the user story and lecture material, are displayed. The detailed interface allows the users to view the user stories consecutively:



Source: author's construction

Fig. 6. Moodle Course Product Backlog Detailed View

The status progress and sprint unit, in which the user stories are handled, must be maintained by the product owner after every planning or review iteration.. Thus, the sprint planning is reflected in the list and individual interface. Moodle does not offer a suitable activity showcasing which user stories were selected to be dealt with in the following sprint. . However, Moodle allows the integration of external tools. Such as Survio was integrated into Moodle, to survey the students on their personal preference when which user story should be dealt with.



The Product Owner can then use this evaluation as a basis for discussion for the Sprint planning in plenary.

In the final chapter "Sprint Review Tasks" the acceptance tasks of all user stories are listed. At the beginning of the course this chapter is empty. Over the time of the course, the product owner will reveal the acceptance tasks to the students, for the already discussed user stories.

In the "LVA Review Meeting", the results of the tasks are discussed together and the product owner decides whether the associated user stories have been accepted or not. The status of the individual user stories will be updated by the Product Owner, in the chapter "Product Backlog", after every "LVA Review Meeting".

Implications/Conclusio

IT project management is a complex concept for administrating and executing projects, scoping a vision, which is hard to define. Management methods are also evolving due to the constantly changing economy. The agile teaching concept is more than ideal, as it can continuously adapt to an ever changing environment. Due to the possibilities of individuals co-design the teaching units, the lessons are based flexible and open to discussion for continuous improvement. At the beginning of each lesson, the teaching content of the previous LVA Sprints will be taken off, continuously confronting the students with the material. Thus, the learning effort is limited to a minimum immediately before the final exam.

Through the popular Moodle platform, the teaching concept and course progress can be recorded in an appropriate manner and made available for all concerned parties. Thus the "LVA Backlog" as well as the individual "LVA Sprint Backlogs" are always visible. Likewise, work assignments, teaching materials and documents as well as important due dates can be exchanged via Moodle in an uncomplicated and structured way.

The expert interviews also revealed potential for optimization, making it clear that the transfer of knowledge in the agile teaching concept is still similar to a frontal lecture. Accordingly, the preparation and imparting of the teaching content could be done by the students themselves. The research work of this thesis could also serve as a basis for establishing the teaching concept in other courses as well.

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