Author-e

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University of Applied Sciences

INTERNSHIP PORTFOLIO HBO-ICT

FONTYS UNIVERSITY OF APPLIED SCIENCES

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1.0	26-11-2023	Lucas Jacobs	V1 of: • Abstract • Acknowledgments • Introduction • The assignment • Description of the process	Development
2.0	16-01-2024	Lucas Jacobs	V2 of: • Adding APA styling for referencing internal documents. • Updating section about the company. • Separated introduction to extra problem section. • Added research approach. • Updated 'Description of process'. • Conclusion, recommendation, personal reflection.	Finished

Communication

Version	Date	To
1.0	09-12-2023	First assessor

Abstract

This project report covers the outcomes of my internship in the field of Information and Communication Technology (ICT), where the primary goal is to develop a module from an old to a new system. The project objective is to improve the current system, by looking at and addressing identified shortcomings and by changing the technologies to new industry standards. The research methodology is followed by the DOT framework, choosing the most relatable methods to get to the best solution. The challenges that have been encountered during this internship have been addressed in chronological order.

Furthermore, the results and findings of this internship showcased a successful integration of the new module, contributing to the new system that is in current development. This project report will show the arguments for learning outcomes related to the ICT field and recommendations for future work.

Also, this project report will go over the internship assignment that focuses on the LearningBox4 (LB4) system, which is a Learning Management System for students and teachers. The assignment is about the module called 'qualification file', which consists of two parts.

- Managing the qualification file: containing core tasks, and work processes.
- Managing assessment schemes: schemes that teachers use to grade students.

This is used in the MBO education. The objective is to transition the older LearningBox3 (LB3) to LB4, by addressing deprecated architecture and techniques. This transition is within the vision of Simac Learning Solution, a smaller organization within the bigger Simac company, with the goal of improving LB4's functionality and extending upon the constraints of LB3.

Acknowledgments

I extend my gratitude to Autor-e for providing me with new opportunities to undertake this internship. I want to thank my company supervisor Jelle for his great guidance, and support throughout the internship. I am thankful to the entire team of Author-e for the collaborative and stimulating learning environment. This internship has been a great learning experience, and I appreciate everyone who contributed during the journey.

Table of Contents

1 Glossary

Term	Definition
B2B	Business-to-business (B2B), commercial transactions, and interactions between two businesses. (Chen, 2023)
CRUD	Create, Read, Update, Delete. A term used in the ICT industry to reference the standard operations an application can do.
LB3	Learning Box 3. A LMS for students and teachers. For example, students can read the theory and take tests. Teachers can assess and grade students.
LB4	The new version of LB3, that is currently in development.
LMS	Learning Management System (LMS), a digital platform for organizing, delivering, and tracking educational content.
MBO education	Secondary vocational education (middelbaar, beroepsonderwijs, MBO), prepares students for professional practice or further study. (Secondary vocational education, n.d.)

2 Introduction

This assignment is about one module to implement from LB3 to LB4, which is called the 'qualification file'. A qualification file is a set of core tasks (basic and profile parts), work processes, and competencies. A qualification file is used in the MBO education of the Netherlands. It is used to check if a student has reached all the requirements of the specific education they are doing. The module consists of two parts.

- **Managing the qualification files:** maintaining the qualification files, elective parts, and importing qualification files. In this management you can do, CRUD operations, copying to institutes, searching, etc.
- **Assessment scheme management:** making an assessment scheme that teachers can use to grade students.

To continue, the objective of this internship is two things. To begin, to get experience in the ICT company and develop my soft-skill and developer skills. Secondly, the successful development of the module 'qualification file' to the expected outcomes Author-e demands.

Furthermore, the importance of this study is in the challenges that come with the outdated LB3 system. By correctly integrating the module 'qualification file' into the LB4 system, this project aligns with the goals of Simac Learning Solutions but it also ensures the continuity and maintainability of LearningBox.

Within this document, you will see what the assignment is about, how the goal of the assignment has been reached, a conclusion with recommendations, and a personal reflection.

2.1 About Author-e

Timeline

Author-e started as TVAS in 1998, where it started making interactive videos and animations. In 2001 it changed to Content-e and it went to the name Author-e in 2010. To give an illustration.

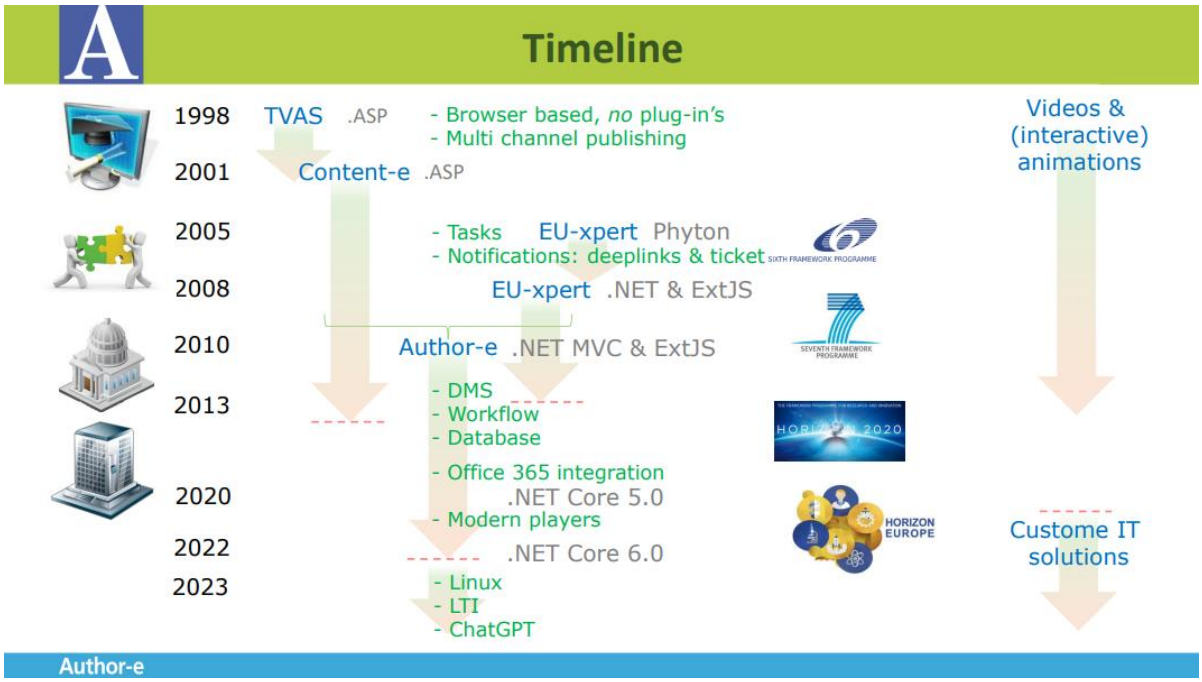

Figure 1: Timeline of Author-e (Author-e, n.d.)

Industry

The vision of Author-e is to have a trusted software firm specializing in designing, developing, implementing, hosting, and expertly managing web applications.

Author-e is a company that uses the model B2B. This means that it creates and maintains products of other companies. Besides doing tasks for companies, Author-e also has its own product.

Author-e product is a collaborative authoring environment with integrated Document Management System (DMS) functionalities. To integrate document storage and authoring, we have created our own document format. These Author-e documents can be edited simultaneously by multiple authors within the system. Apart from the standard editing utilities, you can use our own collaborative functionalities.

Simac Learning Solutions

One of the companies that Author-e has products to maintain and create is Simac Learning Solutions. It is a company that is a small organization operating within Simac, which is a large organization. This company develops smart e-learning products for education, government, and business. These products can be accessed via the digital Learning environment LearningBox. Currently, the version LearningBox3 is up and running for customers to use. Author-e is there to maintain LearningBox3 and it is creating a new improved version called LearningBox4.

3 Problem

The current system LearningBox3 is maintained by Author-e. This system uses deprecated architecture, UI, and older techniques. The LB3 system has some challenges when coming to maintaining the system, these are some of the main reasons:

- **Outdated Architecture:** The architecture of the LB3 system is hard to understand. This is due to that they are not using a strict architecture and do not have proper documentation, therefore finding the right code for each component can become a real challenge.
- **UI outdated:** The user interface of LB3 lacks a lot of design that is standardised in todays world. They are not applying the modern design principle and do not have the best user experience.
- **Technological:** the techniques that are used in LB3 are based on older methodologies, which makes it harder to up the evolving industry standards.
- **Database compatibility:** One of the main system restrictions is backward & forward compatibility with the LB3 database.

This makes it difficult to maintain. Therefore, Authore-e wants to design a new version called LearningBox4 which will use software, UI principles, and architecture that is the standard in the industry. Also, they are using software they are familiar with and also use in other projects, making maintenance easier. The LB3 system will be step by step (module by module) integrated into the LB4 system.

4 The assignment

The assignment is to develop the module 'qualification files' that exist in LB3 to LB4. Since this module already is in LB3, this assignment also includes doing research on the usage of this module and what can be improved.

The module consists of two main parts, both of these parts consist of three parts. To begin the qualification file management.

- **Qualification file overview:** This is where you can maintain all the qualification files that can be used by institutes.
- **Elective part overview:** Maintain all the elective parts and assign them to other profiles.
- **Import page:** In this section, you can import files that have qualification files to them en store them into the LearningBox system.

The other section is about managing the assessment schemes.

- **Assessment scheme overview:** manage the assessment scheme where you can assign profiles to grade and use a curriculum cohort course to pick for what students this assessment scheme is used. This assessment scheme has assessment moments which are measuring points where a teacher can grade the actual student.
- **Assessment scheme moments overview:** Select an assessment scheme and add the subjects you want to include to an assessment moment to grade.
- **Assessment point:** for an assessment moment, you can for each course assign a grading system, for example, a USGO (unsufficient, sufficient, good, outstanding), or a 1-10 grading system.

Goal of the assignment

The main goals of this assignment can be found in detail (Jacobs, 2023, Project plan, §2.2). To give a short summary, I wrote some important parts down below.

The main goal is to after investigating the LB3 system, integrate the module 'qualification files' into LB4.

This can be divided into three sections:

1. **Technical aspect:** Implementing the 'qualification files' module in LB4 with a focus on flawless integration and improved performances.
2. **Research aspect:** Investigating the current usage of the module in LB3 to identify struggle points for a user, system inefficiencies, and areas to improve on.
3. **Optimization:** Suggesting and implementing improvements to the LB4 module, to ensure a user-friendly experience and address shortcomings identified during research.

5 Description of the process

Throughout the internship, I used methods and kind of guidelines to keep myself on track. These guidelines gave me a structure in the way of approaching my assignment and can be found in detail (Jacobs, 2023, Project plan, §2). The most important parts are listed below.

- The goal of the project: visualizing the end goal of my internship.
- Research questions: keeping myself on track to look at all the points, guiding me through the processes.
- Approach and planning section: Setting the base, by looking at inspiration from the DOT-Framework to answer the answer research question, way of working, and how the learning outcomes will be achieved.

First I will explain what research methodology was used during this internship. After that, I will give a brief timeline of the products that are established and after that, I will go more in-depth to explain why and reference the products.

Research approach

The Development Oriented Triangulation Framework (DOT-Framework) was used during this internship. The strategies in this framework are library, field, lab, showroom, and workshop. (shown in the figure below).

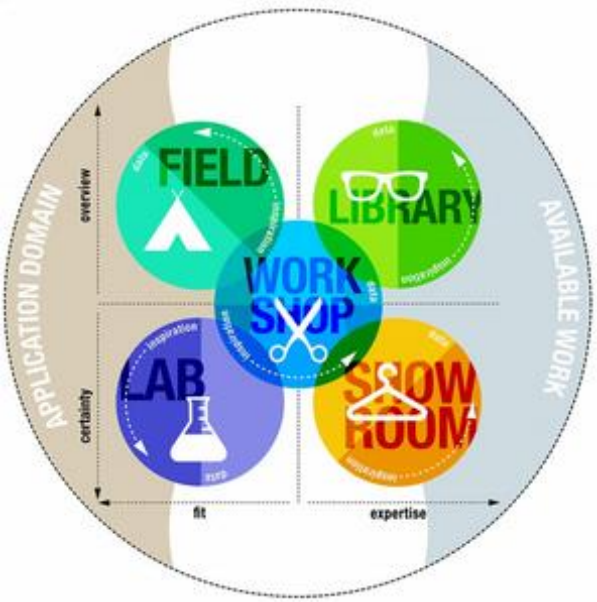

Figure 2: DOT-Framework

- **Library:** This is used to explore what is already done and what information is possible to help you further on design. This research is also known as desk research. An example is community research, where you will look at trustworthy communities to gain knowledge.
- **Field:** Applied to explore the context of the application. Use it when you need to know what the end user wants. Get it to know by for example looking at documents of a company or doing an interview with a user.
- **Lab:** Testing your product. Looking if parts of the solution you made are functional in the way it is intended to be. For example, doing a unit test to test if your code is working as intended.
- **Showroom:** Testing your products about existing work. So have it tested by experts. Also, you can test it to certain measurements that are discussed. For example, in our agile environment of Author-e, giving a demo to show your current product so that the company supervisor is aware of the goals/requirements that are not yet met.
- Workshop: Researching to explore opportunities. So by brainstorming or thinking of new ideas or by doing a code review to help you find bugs.

(The DOT Framework, n.d.)

Research Question and Objectives

The main research question is:

"How can we smoothly integrate the module 'qualification files' from the existing LearningBox3 into LearningBox4?"

With this research question, I wanted to achieve certain points to complete the assignment. These are the following points.

- Improve User Experience:

The primary focus of this assignment is to elevate the UI/UX for the users. This is important for example if companies want to use this product. The initial steps are that I first do my own research to improve the current LB3 system, talk with the UI/UX developer of Author-e, and give demos to my product owner and company supervisor.

- Improve maintainability of the module:

The old system is hard to maintain. Therefore, a big part is improving the system to a way that developers can maintain this system more easily. The initial steps to get a better-maintained module are to do an analysis of the old system, and what the bottlenecks are. Also, have meetings with the company supervisor to go in-depth about how the maintainability is covered.

- Improve the architecture of the module:

Specify the current architecture of the module 'qualification files' in LB3. Then look in depth at the architecture, and propose improvements to the architecture to make it scalable, flexible, and efficient to apply it in LB4.

- Secure that functional requirements are implemented:

All the functional requirements that are discussed with the client need to be implemented. This is envisioned by having meetings, setting priorities, and setting tasks for each sprint.

Approach and Methodology of ActivitiesApproach

To structure my approach, I will give a brief overview of how I achieved my end goal. To find the detailed approach look (Jacobs, 2023, Project plan, §3.1), where it is explained, what methodology is used in the company.

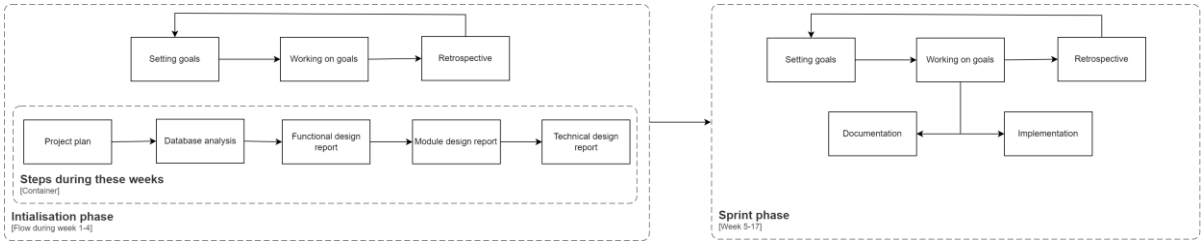

Figure 3: Approach of working

As you can see, in the first weeks, I made sure that I understood the assignment, system, and way of working in Author-e. After this, I could properly start on the implementation and keep a standard way of the agile way of working.

In the project plan, I specified what products were going to be done at the end of the internship, these were all done in a specific order, such that I got to understand my assignment on a good level to complete the internship on a good end.

Initialization phase

To begin, after the project plan I started on creating a database analysis. This is to get to know what part of the database I am going to work with. This is possible because both LB3 and LB4 systems use the same database. With this analysis, I got a lot of information on how the specific items of the qualification file module work with each other.

Next, I started on the functional design, setting up requirements and making clear to the client how these requirements are applied in the system by using use cases. This document is to have a clear overview of what needs to be implemented into the system, and it gives an overview of how certain processes will go, the restrictions, and how this module handles security. This is needed to check with the client what important is when implementing the module. It also is good when I am implementing, to keep track of what is done.

Now, we have a clear view of how the system should work and can start making the design of the new module. The document Module Design Report is used to document the changes I made and the reasonings behind the decisions to make certain UI/UX changes. With this document, the wireframes were made, which is a good guideline for me to spare time when actually implementing the system. These are also good so that the UI/UX developer can see how the flow works and give feedback on it.

Furthermore, I could then start on technical documentation. This documentation is important for the following things before starting on the sprint phase, which we then start on implementing the system:

- **Used to do analysis on the code of LB3:** Look at the code of LB3 and find potential improvements. Also, analysis to try and improve the code based on what is implemented in LB3.
- **Visualize the system in multiple ways:** Show a C4 architecture design to show how the LB4 system works and how the module is structured.
- **Showing diagrams of processes**: Some processes of implementation require extra attention because they are a bit complicated.

Sprint phase

After all the bases of the documentation were done, I understood the system enough, with agreements between the client and company supervisor part. I could start on the sprint phase. This means that we will start implementing and throughout the weeks when there are certain changes to for example the design, I will document this.

In this sprint phase, I also made some other documents. These are the research on the system, to point out the differences between these systems and why the new implementation is an improved version, but also the struggle points we can come across during the implementation, see details (Jacobs, 2023 Research integrating LB3 to LB4). Furthermore, I made an acceptance test plan, to make sure the system will work the way it is intended to work, see (Jacobs, 2023, Acceptance testplan). Also, it will argue which tests are used during the implementation and why.

Next, I also had to make a small document about the import section, which was about how to approach the import function for LB4. This documentation was done by looking at how an import works by looking at the old LB3 version and another application called Leerhub. These two systems both have an import function that might be a good solution to LB4. This was needed since the product owner and my company supervisor wanted a bit of clearance on what to do when it comes to the import section.

Conclusion sprint

The final sprint of the sprint phase concluded a sprint where the intern made a presentation for the second company visit of the Fontys supervisor, a final presentation at Fontys, and the last adjustments for documents and code to have a complete product.

Use of DOT Framework

To answer the main research, I have made sub-questions that have been answered throughout the internship, using the DOT-Framework. Let's go over each sub-question what methods are used and where I applied it.

- Sub-question 1: What are the main functionalities and features of the module 'qualification files' in LearningBox3?

1. **Explore user requirements:** I did this by having meetings with my clients through teams. I prepared questions for the client and then explained them in the application or gave requirements the client wanted differently. for each bi-weekly sprint review at the beginning of the week, I gave a demo to my company supervisor and product owner, to get potential improvements/adjustments of requirements. These meeting summaries can be found in (Jacobs, 2023, Sprint reviews) and (Jacobs, 2023, Progress document).
2. **Requirements prioritization:** By interviewing and having chats with the client, I can come to a conclusion about what the client prioritizes the most. I can adjust my way of implementing this module for this, using the MoSCoW and backlog. Also during meetings with my company supervisor, I discussed what for them is important and adjusted my requirements based on both inputs to handle the most high-prioritized requirements. This prioritizing can be found in (Jacobs, 2023, Functional Design, §2.1) where the use cases of each prioritization to give more context can be found in (Jacobs, 2023, Function Design, §3).
3. **Document analysis:** Author-e has documentation on LB3 and LB4 on how the module works for some parts, I could get information out of this and understand the system better so that I can write the requirements in the most specific and best way. Also, the LB3 system was available to test and explore the module. I did self-exploration on how the system should work, which also really helped create requirements.

- Sub-question 2: What are the challenges of integrating the LearningBox3 module into LearningBox4?

1. **Community research:** Comparing the two systems by asking questions to trustworthy communities, to look at what can be difficult during my implementation phase. This was to get to know what people think of the different architectures the systems use and the code styles.
2. **Problem analysis:** Comparing the systems LB3 and LB4 in the architecture, the way of coding, maintainability, and asking what is going to be hard when implementing the module is a way to tackle challenges during the implementation phase. This is explained in the research (Jacobs, 2023, Research integrating LB3 to LB4, §4 & §5)
3. **Document analysis:** Using documentation of the LB3 and LB4 systems, I can compare the two systems to look at how the software is set up, how the infrastructure works, and the way of working.
4. **Literature study:** Researching why some architecture is preferred or what the benefits are of the systems and why the new system is preferred. Found back in (Jacobs, 2023, Research integrating LB3 to LB4, §4 & §5)

- Sub-question 3: How can I make the implementation of the module 'qualification files' into LearningBox4 as User-Friendly as possible?

1. **Product review:** This project is done in an agile way of working (Scrum), I will give demos to my product owner and company supervisor, who will give feedback on the UI/UX. Discussing potential improvements in these demos. Also, I have meetings with the UI/UX developer of Author-e to check if the system is designed to the standard Author-e intends to do. The demo notes of these meetings can be found in detail (Jacobs, 2023, Sprint reviews).
2. **Usability testing:** Parts of the system is during the implementation phase uploaded to a testing server so that other developers can test the system for potential improvements. Also by making an acceptance test plan, users can use these documents to test if the application is working as intended. This testing can be found back in (Jacobs, 2023, Acceptance testplan)
3. **Literature study:** By doing research on what can be an improved UI/UX for the new system, I can come up with ideas to have better experiences for the user. This can be found in (Jacobs, 2023, Module Design Report).

4. **Document analysis:** Looking at the LB4 documentation, to see what styling they are using and what they are using to optimize the user experience. I could see how the button placement is standardized in LB4 or what the main colors are in the system.

- Sub-question 4: Are there any existing bottlenecks or problems of the module 'qualification files' in LearningBox3?

1. **Task analysis:** During the investigation of the LB3 system to find potential bottlenecks, it came down to looking at the error handling to improve, and the architecture that will be improved.
2. **Literature study:** Looking at how the system works more deeply, I got to understand the system better.
3. **Design pattern research:** I researched the code that was in LB3 and looked if I could potentially improve maintainability by applying design patterns inside the new system. These improvements can be found in technical documentation (Jacobs, 2023, Technical Design, §4)
4. **Document analysis:** The documentation that was available for LB3 did not have a lot of inside information on the module works. The only problem they came across to figuring out a way to implement the module correctly.

- Sub-question 5: How can it be validated that the module that will be integrated into LearningBox4 ensures its readiness for the Author-e client?

1. **Product review:** Doing demos and discussions during every sprint, I got continuous feedback on my product. Therefore, I got a good understanding of what needs to be implemented to meet the requirements. The reviews of each sprint can be found (Jacobs, 2023, Sprint reviews)
2. **Unit test:** I tested the service layer of the back-end to make sure the logic that I implemented was correctly working. This can be found inside the user acceptance test plan to see how this was done (Jacobs, 2023, Acceptance testplan, §5.2).
3. **Code review:** The company supervisor is doing peer reviews on my code, to give me feedback on my implementation. Also, I propose to my company supervisor, that when I have a question about my code or a certain way of implementing a part, we will have a review of my code.
4. **A/B testing**: This method has been applied to the design. When I wanted feedback from the UI/UX developer of Author-e, I sometimes prepared my designs by making two things so that she had a clearer view of the design. An example was about the assessment points of putting the behaviors horizontally or vertically in the table, by showing both solutions, it went more clear on what solutions we had to choose, see details (Jacobs, 2023, Module Design Report, §3.4).
5. **System test:** The user acceptance tests are made to test if the functional requirements are correctly implemented. These tests have test scenarios with expected outcomes and can be found in (Jacobs, 2023, Acceptance testplan, §4.1 & §5.1).

Collaboration and Communication

In the project plan, you can see the team members whom I can contact with questions that belong to their roles/tasks, see (Jacobs, 2023, Projectplan, §4.1).

UI/UX development

During the decisions of the UI/UX of the module in LB4, I had a lot of communication with several people. At the beginning of developing a new UI/UX for LB4, I did my own research and tried to come up with the best solution. After this, I asked Vine (UI/UX developer of Author-e, who is an expert in this field) to discuss the design and try to come up with a solution. After this, during the implementation, I will regularly ask Vine for her input and we will have meetings on certain changes of when a design will turn out to be a bit different than we envisioned. Moreover, when I started implementing the system, I had bi-weekly meetings to give a demo to my company supervisor and the stakeholder, who then also gave input on the UI/UX. This approach ensured that I got the design which is improved and has a better user experience compared to the LB3 module. Since there is enough discussion and continuous improvement on UI/UX, I decided that a User eXperience report is not needed, since there is already enough input about the UI. This document was mentioned in the project plan, (Jacobs, 2023, Projectplan, §2.6)

Daily stand up

Every Monday through Friday we have daily stand-up meetings to say what you have done the day before and what you are going to do that day. This kept me sharp on the things I was working on. This also was a quick way when my company supervisor or boss had a question about something. It basically kept my project in a constant flow due to having continuous improvement and measurements to show what you have done and going to do.

Sprint reviews

Every Monday I have a meeting with my company supervisor to discuss the previous sprint this always includes:

- What went well? Where could I have improved on?
- If I managed to complete the tasks I imposed.
- Questions regarding the way of working.

Before this meeting, I always prepare myself by looking back on how the sprint went and making a suggestion plan on what I am going to do in the upcoming sprint. I always need to be proactive because I need to take the lead during these meetings. All the sprint reviews that contain the provisioned tasks and a retrospective are listed in the progress report.

These sprint reviews are also used to keep my company supervisor on track with what is going on. Also, I was communicative about the assignment and if it was going to reach the end goal. This ended up being a good measure, this is why we set up the way we should prioritize the implementation of this module. These detailed sprint reviews can be found in (Jacobs, 2023, Sprint reviews).

The implementation is therefore done in the following order:

1. Qualification file mangement.
2. Assessment scheme overview.
3. Assessment moments.
4. Assessment points.
5. Elective part mangement.
6. Import.

Client meetings

To contact the client, I could do this by planning a meeting or sending an email when there is something small. When meeting with this client, I had questions prepared that were only about the system itself and how it should work. So I had a meeting with the client where the system would be explained of LB3 based on all the questions I had, this kept communication really straight to the point and easy.

Meet-up

There are also some times that I asked my company supervisor for feedback on when I want to implement something. Or I want to ask something to other developers in Author-e, To give a few examples:

- When we refer to the code design analysis: I applied the composite design pattern to the copy function of a qualification file, and then because of code maintainability we also wanted to apply this to the delete function, so I proposed a way of implementing this, but I wanted to make sure this was the correct way of doing it in the system. So I asked my company supervisor, and we discussed the potential way of working, which was a good thing because we came to the conclusion that we had to revise the functions.
- Explanation of the assessment scheme overview: To keep my supervisor on track, when I started on the new section, I first had to explain this to him. This gave me new ideas for example and the supervisor now will be updated on the progress.

These meetings about those struggle points can be found in detail (Jacobs, 2023, Progress document).

6 Conclusion and recommendation

For my internship at Author-e B.V, it concluded that a big part of the module 'qualification files' module has been implemented from LearningBox 3 (LB3) to LearningBox4 (LB4), which matches the goals of Simac Learning Solutions. The project used a structured approach, with the help of the Development Oriented Triangulation Framework (DOT-Framework), which addressed multiple key aspects such as user requirements, user-friendliness, challenges in implementing, and the validation of the readiness for Author-e's client.

In the end, all the requirements are finished that were agreed to, and the client can now manage qualification files and make a whole assessment scheme from scratch.

The project has been executed in 3 phases.

Initialization Phase - Intern prepared a project plan and gathered information about the assignment of the project.

Sprint phase - This is the main phase of the internship, this includes the implementation of the module and researching, testing the system, and continuous deployment to test the system.

Closing phase - This is still part of the sprint phase, but this includes making the last pieces of the project, where the intern prepares for the upcoming presentations and finalizes the product.

During the project, the intern found multiple ways to improve the system. These recommendations for the future are:

1. **Testing front-end:** The front-end for the 'qualification files' module is not tested during this assignment, see (Jacobs, 2023, Acceptance testplan, §4.3) for an explanation. Therefore there should be integration tests to make sure the front-end components are correctly working.
2. **Assessment Grading for Teachers:** Since the assessment schemes can be made, now the features relating to the assessment grading system for teachers can be started on implementation.
3. **Elective Part Section:** Further implementation on the module 'qualification files', to implement the elective part section.
4. **Import Section:** I recommend when the decision has been made on how the import function needs to be implemented, to implement this section.

7 Personal Reflection

7.1 Evaluation

In today's world, where technology is evolving rapidly fast, this internship at Author-e has given me more confidence and knowledge to continue my journey as a Software Developer.

At the beginning of this internship, I got overwhelmed with all the things that I had to get used to. I had no experience with the framework they are using for LB3, also they used components in LB4 I had to get used to. Author-e uses for LB3 PHP, whereas for LB4 Blazor front-end, with a C# API. I managed to quickly get used to the LB4 environment. On the other side, understanding the LB3 system was quite a struggle, but eventually, by asking for help and questions about the system to various people, I managed to get a better understanding. The challenges that I faced when understanding the LB3 system with the outdated architecture, allowed me to improve my problem-solving skills, and further expand my understanding of software development complexities.

During the internship, I came across some real challenges such as complicated tasks and errors that were difficult to solve. This resulted sometimes in some stress. However, by applying the DOT framework and collaborating with the UI/UX developer, the company supervisor, and the client, I managed to correctly plan my project that would result in a successful project. This experience of really applying correct planning improved me both mentally and gave me more confidence.

With the results of this project, I am proud of the products I managed to deliver. All in all, I expanded my technical skills, more confidence regarding meetings, significant planning improvements, and developed a better collaboration inside of a team. I would like to give gratitude to all the people who supported and mentored me during this internship at Author-e.

7.2 Reflecting on Learning Outcomes

To reflect on the learning outcomes (LOs), the intern can show that the internship achieved all the LOs. There are in total six learning outcomes, which will be listed below with the appropriate arguments and proof.

1. **Professional duties:** This LO is achieved by the following documents and settlements.
   - **Technical design:** Describing how the code works with appropriate explanation, the structure of the LB4 system, and how certain processes work, see the details (Jacobs, 2023, Technical Design).
   - **Research integrating LB3 to LB4:** Showing what the differences are when comparing LB3 and LB4. (Jacobs, 2023, Research integrating LB3 to LB4)
   - **Acceptance testplan:** What kind of tests are done, why it is done, the tests self with results, and showing how a test is done. (Jacobs, 2023, Acceptance testplan)
   - **Functional design:** Setting up the requirements that the module need to have. (Jacobs, 2023, Functional Design)
   - **Database analysis:** To show how the database looks, visualize it with an entity relationship diagram. (Jacobs, 2023, IT Database Analyzes LB Qualification Files)
   - **Module Design Report:** Document to explain the way of working to conclude the UI (Jacobs, 2023, Module Design Report).
   - **Project Plan:** Giving a base on how the internship is going to be (Jacobs, 2023, Project plan)
2. **Situation-orientation:** During this internship, I worked in a structured way according to the way of the company, see (Jacobs, 2023, Sprint review) and the section 'Approach and Methodology of Activities' in this document. Also in (Jacobs, 2023, Progress document), you can see that throughout the weeks I make progress and start to make a product that can be used for the client.
3. **Future-Oriented Organisation:** This can be found in the following document (Jacobs, 2023, Project plan)
4. **Investigative Problem Solving:** To begin, this can be found back in the 'Description of the process' of this document to see each method that has been used from the DOT framework. Additionally, with meetings with the appropriate person in that field, I had a lot of other intakes to the solution, or together we concluded. Furthermore, I did a lot of problem-solving and argumentation in the following sections:
   - **Improve architecture:** Since LB3 has a deprecated architecture, I wanted to try and optimize the architecture implementation for LB4, which uses modern architecture, see details (Jacobs, 2023, Technical Design, §4)
   - **Design (UI/UX):** The design of LB3 needed a lot of improvements and changes, these problems/solutions are documented in the following (Jacobs, 2023, Module Design Report) to see how design problems have been solved.
   - **Meetings:** The standard quick meetings are not documented since they are too short. The other meetings can be found back in (Jacobs, 2023, Progress document) and (Jacobs, 2023, Sprint reviews).
5. **Personal Leadership:** Every sprint I reflect, I take the lead in the sprint review meeting, done by preparing with questions or preparing for a demo. (Jacobs, 2023, Sprint reviews). I plan everything using a task board. Also, I ask for feedback from the team members I work with, which you can find in (Jacobs, 2023, Project plan, §4.1) who they are. For example asking continuous feedback about the UI which is documented in (Jacobs, 2023, Module Design Report). Also, I made a mid-term reflection so I can reflect on it at the end, to measure where I am at this internship, and compare it at the end of the internship. (Jacobs, 2023, Mid-Term Reflection)
6. **Targeted Interaction:** Due to scrum methodology, there are a lot of moments where I make sure everyone is up-to-date with the progress I am making. With the team members (Jacobs, 2023, Project plan, §4.1), I have conversations and chats. I adjust my way of talking and asking questions based on the person. When I for example had a meeting with the client, I made sure the questions and vocabulary were not technical and were limited to what the client could understand. By adjusting to the person, I got the right knowledge that I needed from the conversations. The important meetings are also documented in (Jacobs, 2023, Progress document).

7.3 Reflecting on the project

To look at what I improved on, at the beginning of the internship I had to make a project proposal that also included points where I wanted to improve, Let's go over these points and see how I improved on it.

Improve communication skills: Based on previous projects, I improved on writing documents by trying to give clearer arguments, writing more in-depth questions, and writing fairly quickly. Also, communication with other people is my belief. From being a bit stressed and anxious during the stand-up meeting to now feeling a lot more comfortable. Also, the meetings with different kinds of team members went a lot better. With the right preparation going into the meeting and having set-upped well-formulated questions, helped bring the message I wanted to say more directly and smoothly.

Time management: I structured down the big sections of the module into smaller ones, this way I could manage implementing the module more easily. With the task board, I could manage my tasks throughout the sprints (weeks), and it gave me a good structure of what was finished and what was left to be done. Also constantly reflecting on what I can improve on gives me a constant feeling to check myself if I am on track. Furthermore, with the mid-term reflection, added an extra check on where I am at in the process helping me to be aware of the time.

Develop a better problem-solving mindset: With this assignment, I could apply and improve my problem-solving skills. Since I needed to improve an older system I had to look and improve on each aspect. I think I improved this mindset for several reasons:

- The problem of the deprecated and hard-to-maintained code of LB3 to improve. I think I did a good job in this since I did a lot of research on potential improvements for the new system. This can be found in (Jacobs, 2023, Technical Design, §4) where I actively try to find solutions to existing problems/opportunities. Also during meetings with my company supervisor, it felt that I was more active to try and find a solution for problems.
- UI/UX improvements were also a part where there were a lot of problems in the old design that could be improved. I think I did this with a good approach, by doing first self-research and then starting by asking to have meetings with the UI/UX developer, which led to more self-thinking to improve the design.

Of course, throughout the internship, the right planning is also something where I improved this mindset. These points mentioned above are the most noticeable to see the problem-solving mindset improve on.

Improve collaborative skills: I think I got more proactive in for asking feedback from my team members. When there was a chance of asking a question I took the opportunity. I feel that before the internship I lacked bit of courage to ask people and teachers, but during the internship, I improved quite a lot in this. I think that I also contributed a lot in trying to improve the system and for example, communicated for approval for certain changes.

Improve Adaptability: With the initialization phase, I wanted to try to get used to the system fairly quickly. This went quite well, I managed to structure and plan my way of working correctly. I did this by trying to start to understand to big picture first, and later dive more into the details. With my approach I got used to the system in a short period, saving me time which also gave had more time for the actual implementation.

7.4 Comparison to mid-term reflection

The following sections are what I have done or expanded on compared to the mid-term reflection. (Jacobs, 2023, Mid-Term Reflection). Also, the section 'Professional Growth' is added to the section of 'Skills and Knowledge'.

Goals/Achievements

To begin with, the goals that I have set during the mid-term review, have been completed.

- The implementation of the assessment management part is done and fully functional.
- I docuemented about the differences between LB3 and LB4 (Jacobs, 2023, Research integrating LB3 to LB4)
- I added necessary documentation throughout the last weeks and finalized each product.

Overall, I implemented all the sections that are fully tested and operational, to the agreements I made with my company supervisor and stakeholder.

Skills and Knowledge

I further expanded my knowledge in C# and Blazor, and also I got a lot of information on how a big web application is maintained. Also, the other skills I improved on such as communication, can be found in this document under 'Reflecting on the project'. Additionally, I further gained experience with the DOT framework by doing more research. Over time, I gained more knowledge of how they work at Author-e, what is done to maintain good security, and the importance of understanding clients. I for example got some presentations from my boss to explain why things are important and the way they are doing it.

Challenges

The second half of the internship went a lot better, everything was clear about what I had to do. The only thing was that the assessment point overview section took a lot of time and needed constant attention regarding the UI. This was done with meetings with the client and UI/UX developer to ask questions and brainstorm about it. Furthermore, I also ran into some bugs in the code that took some time, but this was fixed fairly easily.

Feedback

The positive feedback I received gave me extra motivation to continue the way I am working. Also, the feedback I gave myself to improve on, I think I applied this quite well. An example is that I paid extra attention on my task board to set my prioritization more strictly, to make sure everything is done before a demo meeting for example.

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