

VIA University
College

Semester Project: Client/Server System

Project Description – Language Learning Tool

Second Semester Software Engineering



Sprogcentermidt
En verden til forskel

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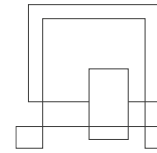
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Background Description

With more than 500,000 immigrants in Denmark (Larsen, 2019), Denmark is investing in ensuring proper integration into Danish society. An important aspect when it comes to integration is the Danish language.

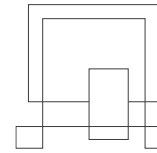
Sprogcenter Midt has delivered Danish lessons to 10 different municipalities in Denmark in three language centres for the past 25 years. With around 100 staff in 2017, Sprogcenter Midt had almost 3,500 enrolled students (Sprogcenter Midt, 2019).

A request for tenders is put every 4 years by the municipalities of Denmark, and to ensure their competitive advantage, **Sprogcenter Midt** is focusing on offering high-quality services by utilizing up to date methods and technologies in their teaching process. At the same time, the majority of the teaching is carried out within a traditional classroom environment. Because of that, the language school has recently introduced, in their teaching process, *Blended Learning* strategy, “*Blended learning is an approach to learning that combines face-to-face and online learning experiences*” (TeachThought Staff, 2018).

As a part the initiative described above, **Sprogcenter Midt** has made the study material available online to students, along with external web resources that include language learning activities to complement their studies. Furthermore, the language school is also investigating how they can use technology within the classroom environment to encompass an *Active Learning* approach to their teaching, “*Active learning engages students in the process of learning through activities and/or discussion in class, as opposed to passively listening to an expert. It emphasizes higher order thinking and often involves group work*” (Freeman, et al., 2014).

Introduced by Vygotsky’s sociocultural theory of development, the approach of embracing the use of cooperative learning groups suggests that learning at a higher level takes places when the students are solving problems beyond their current developmental level with the support of their instructor or peers (Vygotsky, 1978).

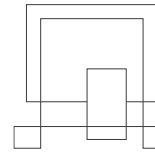
Even though **Sprogcenter Midt** often adopts cooperative group learning within the classroom environment and appreciates the gains from peer to peer learning process, there are still some disadvantages associated with this method. The cultural differences between the students that



inhibit productive communication or the differences in the level of knowledge can impede the efficiency of the learning process. Moreover, it affects the students' engagement into the learning process, as the obstacles described above can lead students to becoming passive within the class, should the work prove to be either too easy or too difficult for their level of knowledge.

Sprogcenter Midt has stated that they are in need of a flexible tool for their teaching process. The tool must provide individually based activities within a socially focused environment aiming to build lexical competences. In the field of second language learning studies there are formalized three dimensions of lexical competences: **Fluency**, **Depth** of knowledge and **Breadth** of the vocabulary (Holmen & Lund, 1999).

Currently, on the market, there are different types of mobile, browser and desktop applications that provide among other features audio/video support, flashcards as memory aids, grammatical and pronunciation exercises and other features. The language school uses two quiz browser – applications within the classroom to aid building lexical competences: **KAHOOT** and **Quizlet**. However, both are insufficient for their needs as neither have the social collaborative aspect of learning. Moreover, both applications, are partially missing the three dimensions necessary for achieving lexical competence because **KAHOOT** can only asses what has already been learnt and **Quizlet** only covers the breadth of vocabulary.



Definition of Purpose

The purpose of this project is to help **Sprogcenter Midt** provide an improved social collaborative teaching tool with the aim of aiding language acquisition and comprehension and thus building the lexical competences of the students.

Problem Statement

How can a product (software, a suite of software, application, etc.) be developed for Sprogcenter Midt that will act as a language learning tool by allowing participants to actively participate and receive feedback, as a didactic design for aiding a high level of lexical competence?

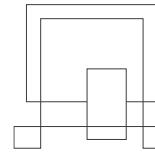
Subproblems:

- How will the involved parties (students & teachers) be enabled to communicate and collaborate concurrently during the creation and usage of a session/quiz?
- How should access to different types of information be granted to the involved parties?
- What relevant information in regards to the students, teachers and learning process needs to be included and stored?
- How should the above specified information be stored and accessed by the different parties?
- What are the features of the minimum viable product that will satisfy the customer's needs?
- What characteristics should be implemented that will make the product easy to use and maintain? (Norman, 1988) (Nielsen, 1994)

Delimitation

To define the scope of the project, there is a need for setting up delimitations. Next will be described issues that cannot be addressed:

- The solution will not be a browser-based application;
- The solution will not be a mobile application;
- The solution will not provide audio/video functionalities;
- The solution will not use flashcards as memory aids;



- The solution will not focus on grammatical or/and pronunciation exercises for the learning process;
- The user interface's language will not include Danish (or other language except English) ;

Choice of Frameworks, Tools and Technologies

Frameworks

To ensure a proper management of the project, software development frameworks will be used:

- The Unified Software Development Process – to ensure an iterative and incremental development of the project;
- SCRUM – as a framework for an Agile team management;
- Work - Breakdown Structure – as a product-orientated breakdown structure of the project into smaller components;

Tools

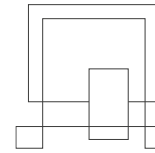
Different tools will be used for improving efficiency of the project development:

- #Slack – communication platform;
- Axosoft – SCRUM framework software;
- Microsoft Project – project management and time schedule;
- BitBucket – version control server;
- GitKraken – version control interface;
- IntelliJ IDEA – Java integrated development environment;
- pgAdmin – PostgreSQL development and administration platform;

Technologies

For providing the desired outcome different technologies will be used in the project:

- Java – as the main programming language, including relevant Design Patterns and JDBC application programming interface;
- PostgreSQL – will be used as an object - relational database management system for ensuring data persistence, extensibility and standards compliance;

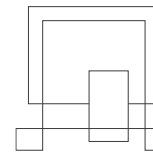


Time Schedule

The main milestones that provide a time frame for the project are:

Milestone (Description)	State (Initial / In-progress / Final)	Deadline (Date)
Pre-inception phase		
Group Formation / Contract	Final	11 th of February
Project Proposal	Initial	13 th of February
Project Proposal	Final	21 st of February
Project Description	Initial	28 th of February
Project Description	Final	7 th of March
Inception Phase		
User Stories & Requirements	In-progress	14 th of March
Domain Model & Initial Analysis	In-progress	21 st of March
Requirements & Test Specification	Final	28 th of March
Elaboration Phase		
Design & Implementation	Initial	4 th of April
Architecture in place (Client – Server)	Final	11 th of April
Low Activity Period	Easter Break	15 th – 21 st April
In-Depth Analysis & Design	In-progress	25 th of April
Minimum Viable Product (Inc. basic GUI)	Final	2 nd of May
Construction Phase		
In-Depth Analysis & Design	Final	9 th of May
Implementation	In-progress	14 th of May
Working Product	In-progress	16 th of May
In-Depth Implementation	Final	23 rd of May
Product	Final	31 st of May
Transition Phase		
Deployment	Final	1 st of June
Project Report	Final	1 st of June
Process Report	Final	5 th of June
Buffer Time for Exceptions, Force Majors and other Issues	Final	7 th of June

Table 1 – Time Schedule Table



It is important to point out that each phase, with the exception of the first two phases, consist of multiple iterations of the software development process (Analysis – Design – Implementation – Testing). Another crucial element to be considered is the fact that the documentation part (Process and Project Reports) will not be a separate and independent part from the project but rather an ongoing process along with the project development.

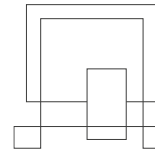
The amount of work needed to be put in the realization of the project, given the data from the methodology of the course is around 1400 hours (considering the number of members in the team, and weight of the project in regards to ECTS) (VIA University College, 2019).

The theoretical time schedule for the working on the project, is on Thursdays of each week (~8h/day), plus three full weeks starting from the end of May month (~37h/week). Considering the number of members in the group, it will account for around 1100 hours. This will mean that it will be needed at least 300 extra hours, which will be split between the members of the group.

The main deadline is on the 7th of June with the hand-in of the entire project, even so, there are intermittent milestones that need to be met for the project to be successful.

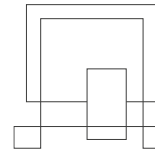
Risk Assessment

ID	Description	Product of likelihood and severity	Prevention Plan	Identifiers	Contingency Plan
1	Not meeting final deadline	$3 * 5 = 15$	Assessment of the milestones	Missing group's internal deadlines	Increased work time to get back on track with the schedule
2	Poor quality of the work	$4 * 4 = 16$	Internal + External feedback	Poor feedbacks	Revision and correction of the finished work so that the quality is at a desired level
3	Deviation from purpose of the project	$2 * 5 = 10$	Internal + External feedback	Ongoing check with the problem formulation and sub-problems	Correct the work that was done so it fits the purpose of the project, do not continue until corrected
4	Not meeting all software requirements	$5 * 2 = 10$	Constant control with the imposed requirements	Incapacity of meeting some requirements	Document the unmet requirements and the reasons that led to it



5	Unreliable sources of information	$2 * 4 = 8$	Assessment of the source of information with a critique eye	Outdate and contradictory data	Remove the identified unreliable sources and information that they were providing, find new sources and rework what was removed
6	Absence of references	$1 * 4 = 4$	Ongoing check of the references	Information without a source	Review the not referenced work, find the source and reference it
7	Not identifying all the risks	$5 * 3 = 15$	Ongoing update of the risk	Existence of the not assessed risks	Include the newly identified risk and develop a plan for it
8	Unsatisfied client requiring ongoing consulting	$3 * 3 = 9$	Regular meeting about the scope and direction of the project	Negative feedback from the client	Make a review meeting were the concept of the solution is discussed and reviewed / Use information previously provided by the user (e.g. User Stories, specification, etc.)
9	Different coding styles between team members	$2 * 1 = 2$	Using a pre-agreed coding style and conforming to it	Hard to read and implement code from different member	Identify the owner of the not confirming code style and make him/her review so it conforms with the specified style
10	Basic architecture of the client-server system not working	$2 * 2 = 4$	Starting work early to ensure proper functionality and access to help	No connection between client and server	Consult with supervisors and focus all the manpower towards achieving an working architecture of the system

Table 2 – Risk Assessment Table



Source of information

Freeman, S. et al., 2014. Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences of the United States of America*, pp. 8410 - 8415.

Holmen, A. & Lund, K., 1999. *Studier i dansk som andetsprog*. Copenhagen: Akademisk Forlag.

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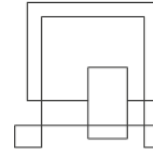
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Available at: <https://www.teachthought.com/learning/the-definition-of-blended-learning>

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Vygotsky, L., 1978. *Mind in Society*. Cambridge: Harvard University Press.



Appendices

Appendix A – Group Contract

Group Contract

Members:

Gais El-AAsi; Deivydas Žibkus; Marcel Valentijn Daniel Notenboom; Lukas Vaisnoras; Lyons Leviticus;

Foreword

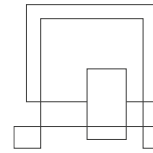
This contract is a binding document and governs the team until the assigned project deadline. If the team separates, or a member is fired, the basic contract laws remain intact for both parties. However, being fired may cause work responsibilities to shift.

Article I: Absence

- a. If a team member will be absent on a day in which work is due, he or she must inform the team members a day in advance and have all work that he or she is responsible for turned in. All team members must stick to the provided agenda to have the assignments completed on time. If there will be an unexpected absence, the team member is to complete the work from home and contact the team members to let them know he or she is not present for the day.
- b. Team members will contact one another if they are absent for any amount of period during the time allotted for working on the projects.

Article II: Work Policy

- a. Any member that can prove that they cannot complete the work assigned to him or her alone, due to team accepted reasons, may acquire assistance from other team members to help complete it. This will only apply for work that is team work and not individual work, and work will only be finished by that team member; the assisting team member will not write it.
- b. Each team member will work to the best of his or her ability, making sure to complete the work is up to standard, and that her or she completes it with punctuality.
- c. If a team member commits plagiarism, he or she is solely responsible and will incur the punishment on his or her own.
- d. The main communication platform for the team members is #Slack and all members must be reached on it within reasonable time.



Article III: Leadership

- a. At the beginning of the project, a leader will be voted upon democratically. If a team member is absent at the time of voting, he or she waives his or her right to participate in voting. The member who wins the most votes becomes the leader. If there is an unclear outcome (same number of votes for different members), the team will have no leader until one can be chosen by a revote.
- b. By being elected leader, the member must perform the following duties:
 - Organize team meetings;
 - Create and enforce a team agenda to govern team progress;
 - Organize any out-of-school project efforts;
 - Provide communication between team members in order to help them work toward the project goal;
 - Act as a communication person between the team and the supervision;
- c. If the team leader fails to perform these duties, or another member is also carrying them out, a revote may be taken to determine whether to obtain a new leader.

Article V: Member Dismissal

- a. The following conducts will result in a team member being able to be dismissed:
 - Incomplete or missing team work (This is non-negotiable and will be enforced by the supervisors);
 - Plagiarism or any form of cheating;
 - If a team member decides to leave under his or her own will;

Article VI: Conflict Resolution

- a. Conflicts that may arise with regards to the project should ideally be resolved through amicable discussion/common sense/VIA guidelines. If agreement cannot be reached this way, a group vote should take place, with the majority vote determining the outcome.

Article VII: Signature

- a. By signing this contract, the following team members abide to the articles listed here. If any member fails to abide by the articles of this contract, he or she may be fired from the team given at least a 50% vote in favor of firing the member.

Signature

Notenboom

L.Lyons



Gais El-A'asi

Dzuyyy-