

Review of Early Software Lifecycle

Requirements Engineering (RE), Agile Methods, User Interface (UI) Design and Project Management (PM)

Discussion Sub-group as part of the SE degree revision 2021

Members:

- Fethi Rabhi (Leader)
- Wayne Wobcke
- Mortada Al Banna
- Boualem Benatallah
- Sasha Vassar
- Bruno Gaeta
- Nick Patrikeos

This document represents a summary of discussions over email and two meetings (17 September 2021 and 1 October 2021).

Some background

Scope of the sub-group

One of the SE degree review goals is to look at the impact of the Faculty's introduction of 2 design courses DESN2000 and DESN3000. Each course has a shared component from the Faculty's Design Next unit (about 8 hours of lectures and an assignment) and everything else is degree-specific. This sub-group will first look at the SE specific content of DESN2000, make recommendations then look at implications on other courses.

In T2,2020, SENG was taught as a project but this had some issues:

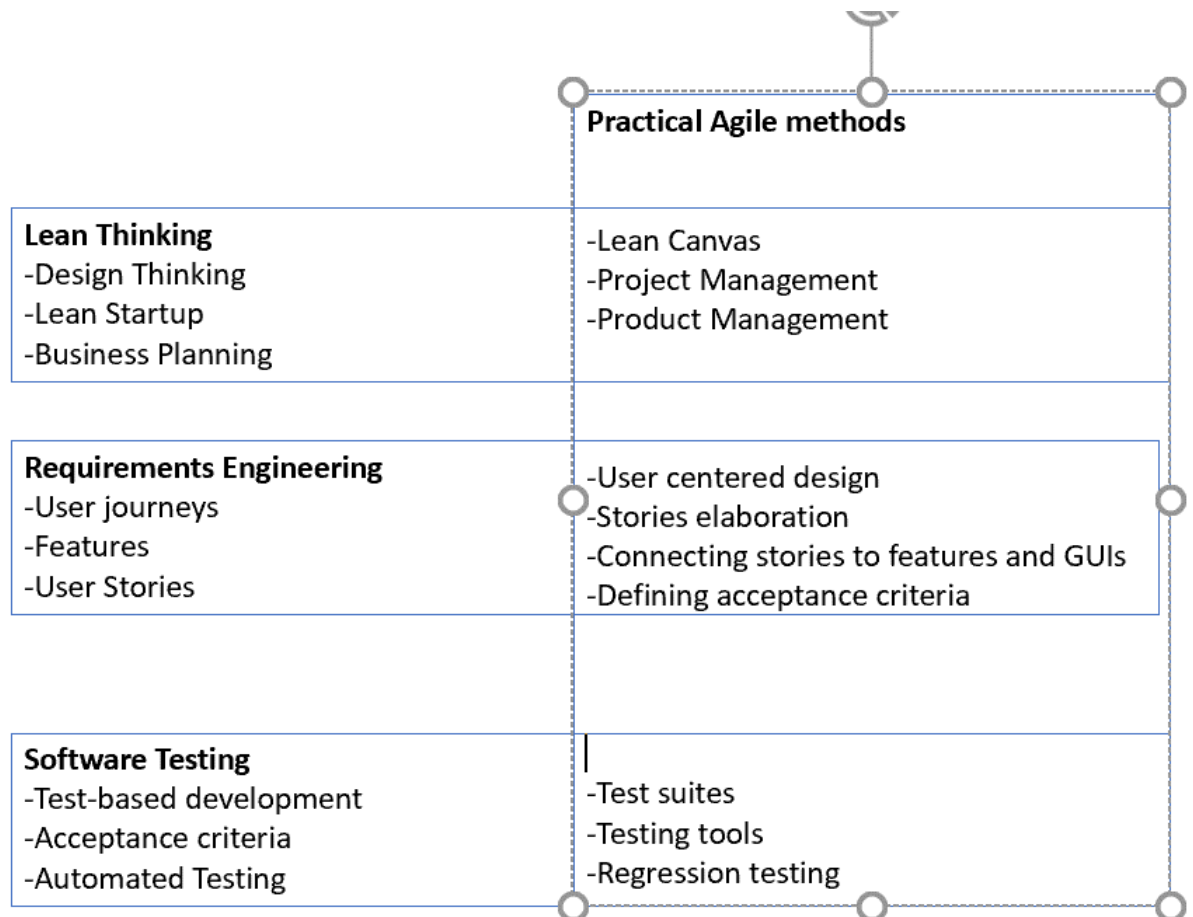
- SE students already do a project and learn about RE in SENG2020 in T1
- The material has to somehow better fit with what Design Next is doing
- Time is too short to go over many topics like Interface Design and doing a full prototype implementation

An effort was made to make changes to DESN2000 in T2,2021 to address these issues. The ideas behind these changes are explained next.

Changes to DESN2000 T2, 2021

The idea was that DESN2000 could focus on the intersection of **Agile Practices** with three types skills:

- 1- Lean Thinking
- 2- Requirements Engineering
- 3- Software Testing



These are to be interconnected by a small project. Attached to this document:

- DESN2000 2021 syllabus
- DESN2000 Project description

Regarding the delivery:

- Lean Thinking: one part (Lean Canvas) was the responsibility of Design Next and the other part (PM) was delivered by a team from SISTM (Business Faculty)
- RE: was a combination of Stories/features and UI design + some concepts of User centred design from Design Next
- Software Testing: was a minor component due to other components' size

Feedback on DESN2000 T2, 2021 from lecturers involved

I tried to summarize feedback from different people according to multiple categories

Positive comments

Here are quotes from lecturing staff:

- 1- The course overall was a great initiative to offer an e2e view (Ecosystem) of the design and management process for engineers from different disciplines.
- 2- I thought it was a brave and celebrated move to take students out of their comfort zone and challenge them to think outside "the box".
- 3- The project management side was also well integrated into the overall ecosystem of (Design Thinking, Business modelling and Project Management).
- 4- The course offered students a wider frame of critical thinking and dealing with a certain level of ambiguity/uncertainty [which is a prominent feature of every job in the industry]. This was intentional when it comes to design and plan (up to deliver) a solution that is customer-

centric using an agile approach to project management.

Recommendations for improvement - scope

I separated between scope and delivery issues. Here are quotes from lecturing staff around scope of course:

- 1- I myself discovered at the end of the week 1 lecture that students had big confusion about what "Business" means. They also faced the challenge to identify and understand what is the business context for their design work.
- 2- There was a small disconnect between the Design Next piece and the rest of the course content as some students seemed to be confused between the two scopes. So maybe we can have more unified coordination next time before the start between Design next and the rest, as for the students this is one course regardless of who's delivering it.
- 3- Integration with Design Next was an issue. We need more integration. SE can do more discipline specific material that is relying on what Design Next provides. Needs to be done in advance.
- 4- Although the tools are secondary and not the primary target/resources for teaching this course (as I understand it), the approach to creating the solution needs more emphasized than what tools to use [some guidance only can be provided on available tools]. It would be good to decide ahead of time and communicate to students what are the roles of the tools (Design tool, Project management tools, Prototyping tools,...etc) so they don't feel framed and pressured to use a specific tool [if that's what we intend to prepare them for from an industry perspective].
- 5- In order to improve the outcomes of the group work assignment, we can ask students to use formal project management and requirement engineering applications such as Microsoft project and Jira.
- 6- We can add a lecture about virtual and augmented reality and how to design application for these 2 new environments.
- 7- In my opinion, Business Canvas needs to be moved to DESN3000, students just need to get a taste but I believe we should keep PM
- 8- I agree with what everyone said, especially using a project tracking software. I am not sure if it is overlapping with other project management courses, but it can be a good way to reinforce it for students.

Recommendations for improvement – delivery

Here are quotes from lecturing staff regarding the delivery:

- 1- To reflect the above understanding in the course overview to manage students expectations [if that's not there already as I thought some students were not expecting or at least were not psychologically prepared for this].
- 2- Students felt disorganisation in course in general
- 3- Activities: workshops for design next and SE ones were all on same day. Many missed them. Timing critical.
- 4- Mentors need to be recruited early and briefed beforehand. They need to understand assessment details and clarify which tool is compulsory/optional. Students were receiving conflicting information from mentors.
- 5- In terms of finding mentors, it would have been easier if each of our workshops were at a different time. I was almost running out of possible candidates. However, I was lucky to find mentors that students were really satisfied with them this term.

Final Recommendations

Changes to DESN2000 for 2022

The following recommendations are made:

- Keep main focus of the course on User-Centred design, design thinking and Requirements Engineering (RE) and early stages of software lifecycle. DESN2000 to become a course which teaches students to see software as a product.
- Reduce amount on Lean Canvas and Business Plan but keep an element of how to evaluate business value of features and in particular how useful is a particular feature (links with user centric design)
- Exclude program testing and instead focus on usability & acceptance testing which was found to be informative & useful
- Keep Project Management to a minimum as students weren't writing software, so speculations about the project were made in a vacuum and without understanding of what goes into the development of software.
- Focus on "product management" – which user stories are most important and which features should be developed first – planning sprints at a high level rather than specifics of a project implementation
- Strengthen the UI part in particular interconnection with RE, trying to suggest a process in which both are used together. UI part could look at aspects like accessibility not considered in a typical UI course. Teach students use of a UI design tool (Figma, Acture)
- Make COMP1531 prerequisite

Changes to SENG2021 Requirements and Design Workshop

- Play down RE, User stories and UI design
- Include introduction of a PM tool (Jira ?) and architecture design

Changes to SENG3011 Implementation Workshop

- Include more PM and tools to support complete software development and deployment pipelines

Recommendations for other courses outside of this sub-group's scope

- DESN3000 could do more on lean canvas and creating business plan
- COMP1531 and COMP2511 should cover API testing, blackbox testing, automated testing and testing tools sufficiently
- If more UI design is to be introduced in DESN2000, COMP3511 could be revised accordingly or kept for CS students and a more advanced UI course for SE ?

Summary of Relationships of existing courses to SWEBOK

SWEBOK Knowledge Areas are available for download at [Software Engineering Body of Knowledge Version 3 | IEEE Computer Society](#)

Course Name	SWEBOK Areas	SWEBOK Sub-Areas
DESN2000	1 Software requirements	-Requirements process - Requirements elicitation - Requirements analysis - Requirements validation
	2 Software Design	-UI Design
	7. Software Engineering Management	-Review and Evaluation
SENG2021	2 Software Design	-Software structure and architecture

		-Software design notation
	13 Computing Foundations	-Abstraction -Basic Concept of a System -Database Basics
SENG3011	3. Software Construction	-Managing Construction -Construction Technologies -Software Construction Tools
	7. Software engineering management	-Software Project Planning
COMP1531	1 Software requirements	-Fundamentals
	2 Software Design	-Fundamentals
	3. Software Construction	-Fundamentals
	4. Software Testing	-Fundamentals
	8. Software Engineering Process	-Software Process Definition -Software Lifecycles
COMP2511	2 Software Design	-Key issues -Structure and Architecture -Strategies and Methods
	3. Software Testing	-Design evaluation techniques (not listed)
DESN3000	11. Software Engineering Professional Practice	
	12. SE Economics	
